

C5. Qualification Vender List											
Attention! You must enable BIOS runtime error to monitor correctable and uncorrectable issue during test											
Intel CPU											
Product Name	Code Name	Q-Spec	Stepping	Cache	System Bus	# of Cores	Processor Base Frequency	Max Turbo Frequency	TDP	Memory Types	Processor Graphics
Skylake-Intel® Xeon® Processor-Intel Xeon D Family											
Intel® Xeon® D-2160T	SKYLAKE-D	D NNR	M-1	16 5MB	N/A	12	2.2 GHz	3 GHz	90W	DDR4-2400	
Intel® Xeon® D-2148HT	SKYLAKE-D	D NNR	M-1	11MB	N/A	8	2.3 GHz	3 GHz	80W	DDR4-2400	
Intel® Xeon® D-2133T	SKYLAKE-D	D NNP	M-1	11MB	N/A	10	2.2 GHz	3 GHz	120W	DDR4-2400	
Intel® Xeon® D-2145HT	SKYLAKE-D	D NNT	M-1	11MB	N/A	8	1.9 GHz	3 GHz	85W	DDR4-2400	
Intel® Xeon® D-2123T	SKYLAKE-D	D NNV	M-1	8.25MB	N/A	4	2.2 GHz	3 GHz	80W	DDR4-2400	
Intel® Xeon® D-2163T	SKYLAKE-D	D NNP	M-1	16 5MB	N/A	12	2.1 GHz	3 GHz	75W	DDR4-2400	
Memory											
Product Name	Memory Type	Module Supplier	Size	Chip Brand	Rank	Voltage	Data Transfer Rate	Error Correction	CAS Latency	Pins	Note
RDIMM											
HMA5GRTAFR8N-LHTD	DDR4	SK Hynix	16GB	SK Hynix	2R X8	1.2V	2400MHz	ECC Registered	17	288-pin	
HMA5GRTAFR8N-LHTD	DDR4	SK Hynix	32GB	SK Hynix	2R X4	1.2V	2400MHz	ECC Registered	17	288-pin	
HMA5GRTAFR8N-LHTD	DDR4	SK Hynix	32GB	SK Hynix	2R X4	1.2V	2400MHz	ECC Registered	17	288-pin	
T32G4RFD23A-38F81	DDR4	Crucial	32GB	Micron	2R X4	1.2V	2400MHz	ECC Registered	17	288-pin	
T32G4RFD42A-2G3B1-001	DDR4	Crucial	32GB	Micron	2R X4	1.2V	2400MHz	ECC Registered	17	288-pin	
T116G4RFD42A-18F81	DDR4	Crucial	16GB	Micron	1R X4	1.2V	2400MHz	ECC Registered	17	288-pin	
M393BG53CSJ	DDR4	INNOVISK	32GB	Samsung	2R X4	1.2V	2400MHz	ECC Registered	17	288-pin	
M393AK408B2-CTD	DDR4	Samsung	32GB	Samsung	2R X4	1.2V	2666MHz	ECC Registered	19	288-pin	
T32G4RFD426-38F1D	DDR4	CRUCIAL	32GB	Micron	2R X4	1.2V	2666MHz	ECC Registered	19	288-pin	
HMA5GRTAFR8N-VKT3	DDR4	SKhynix	32GB	SKhynix-Montage	2R X4	1.2V	2666MHz	ECC Registered	19	288-pin	
HMA5GRTAFR8N-VKT3	DDR4	SKhynix	32GB	SKhynix-IDT	2R X4	1.2V	2666MHz	ECC Registered	19	288-pin	
HMA5GRTAFR8N-VKT3	DDR4	SKhynix	32GB	SKhynix-IDT	2R X4	1.2V	2666MHz	ECC Registered	19	288-pin	
KSM28RD432HA	DDR4	Kingston	32GB	SKhynix-IDT	2R X4	1.2V	2666MHz	ECC Registered	19	288-pin	
KSM28RD418HA	DDR4	Kingston	16GB	SKhynix-IDT	1R X4	1.2V	2666MHz	ECC Registered	19	288-pin	
KSM28RD58HA	DDR4	Kingston	64GB	SKhynix-IDT	1R X4	1.2V	2666MHz	ECC Registered	19	288-pin	
M393AK408B2-CWELQ	DDR4	Samsung	64GB	Samsung	2R X4	1.2V	2666MHz	ECC Registered	19	288-pin	
M393AG408B2-CTDQ1	DDR4	Samsung	64GB	Samsung-IDT	2R X4	1.2V	2666MHz	ECC Registered	19	288-pin	
T32G4RFD426-2G5H1-001	DDR4	CRUCIAL	32GB	Micron	2R X4	1.2V	2666MHz	ECC Registered	19	288-pin	
M393AK408B2-CVFBY	DDR4	Samsung	64GB	Samsung-IDT	2R X4	1.2V	2666MHz	ECC Registered	21	288-pin	
M393AK408B2-CVFBY	DDR4	Samsung	64GB	SKhynix-Montage	2R X4	1.2V	2666MHz	ECC Registered	21	288-pin	
KSM28RD432MEI	DDR4	Kingston	32GB	SKhynix-IDT	2R X4	1.2V	2666MHz	ECC Registered	21	288-pin	
HMA5GRTAFR8N-VKT3	DDR4	SKhynix	32GB	SKhynix-Montage	2R X4	1.2V	3200MHz	ECC Registered	22	288-pin	
HMA5GRTAFR8N-VKT3	DDR4	SKhynix	64GB	SKhynix-IDT	2R X4	1.2V	3200MHz	ECC Registered	21	288-pin	
MTA18ASF2072PZ-2G2J3UJ	DDR4	Micron	16GB	Micron-Rambus	2R X4	1.2V	3200MHz	ECC Registered	22	288-pin	
MTA36ASF4072PZ-2G2J3UJ	DDR4	Micron	32GB	Micron-Rambus	2R X4	1.2V	3200MHz	ECC Registered	22	288-pin	
M393AK408B2-CWELQ	DDR4	Samsung	64GB	Samsung-Montage	2R X4	1.2V	3200MHz	ECC Registered	22	288-pin	
M393AG408B2-CWELQ	DDR4	Samsung	64GB	Samsung-IDT	2R X4	1.2V	3200MHz	ECC Registered	22	288-pin	
KSM28RD432MEI	DDR4	Kingston	32GB	Micron-IDT	1R X4	1.2V	3200MHz	ECC Registered	22	288-pin	
LRDIMM											
HMA8GL7AMR8N-LHTE	DDR4	SKhynix	64GB	SKhynix	4DR X4	1.2V	2400MHz	ECC Registered	17	288-pin	
HMA8GL7AMR8N-VKTF	DDR4	SKhynix	64GB	SKhynix	4DR X4	1.2V	2400MHz	ECC Registered	17	288-pin	
T32G4RFD42A-2G3B1-001	DDR4	CRUCIAL	32GB	Micron	2R X4	1.2V	2400MHz	ECC Registered	17	288-pin	
M393AK408B2-CVFBY	DDR4	Samsung	64GB	Samsung-IDT	4DR X4	1.2V	3200MHz	ECC Registered	21	288-pin	
M393AK408B2-CVFBY	DDR4	Samsung	64GB	Samsung-IDT	4DR X4	1.2V	3200MHz	ECC Registered	22	288-pin	
ECC UDIMM											
M4CJ-8G5SMCRG	DDR4	INNOVISK	8GB	Samsung		1.2V	2133MHz	ECC Unbuffer	15	288-pin	
T51GLH72V1H	DDR4	Transcend	8GB	Samsung	2R X8	1.2V	2133MHz	ECC Unbuffer	15	288-pin	
D2C10M4-K108	DDR4	Acronix	8GB	SKhynix	2R	1.2V	2133MHz	ECC Unbuffer	15	288-pin	
8921A2K43B91-CPB	DDR4	SAMSUNG	16GB	Samsung	2R X8	1.2V	2133MHz	ECC Unbuffer	15	288-pin	
T39C4WF082A-18F81	DDR4	Crucial	8GB	Micron	2R X8	1.2V	2400MHz	ECC Unbuffer	17	288-pin	
KVR24E17D8-18MA	DDR4	Kingston	16GB	Micron	2R X8	1.2V	2400MHz	ECC Unbuffer	17	288-pin	
AD4U240316G17-B	DDR4	ADATA	16GB		2R X8	1.2V	2400MHz	ECC Unbuffer	17	288-pin	
HMA8G7AFR8N-LH	DDR4	SKhynix	16GB	SKhynix	2R X8	1.2V	2400MHz	ECC Unbuffer	17	288-pin	
M44A021	DDR4	Panram	16GB		2R X8	1.2V	2666MHz	ECC Unbuffer	19	288-pin	
Seagate HDD (SAS HDD may need RAID Card support)											
Product Name	Type	Vendor	Form Factor	Format	Capacity	Interface Speed	Series	Cache	RPM	Encryption	Note
Seagate Enterprise Capacity 2.5 HDD											
ST2000NM003	SATA	Seagate	2.5"	4Kn	2TB	6Gbps	Enterprise Capacity V.3	128MB	7200	N/A	Just test this HDD to cover
ST2000NM003	SATA	Seagate	2.5"	512n	2TB	6Gbps	Enterprise Capacity V.3	128MB	7200	N/A	Just test this HDD to cover
Seagate Enterprise Capacity 3.5 HDD											
ST18000NM005	SATA	Seagate	3.5"	512e	8TB	6Gbps	Enterprise Capacity V.5	256MB	7200	N/A	
ST18000NM005	SATA	Seagate	3.5"	4Kn	8TB	6Gbps	Enterprise Capacity V.5	256MB	7200	N/A	
ST10000NM0148	SATA	Seagate	3.5"	4Kn	10TB	6Gbps	Enterprise Capacity V.6	256MB	7200	N/A	Just test this HDD to cover
ST10000NM016	SATA	Seagate	3.5"	512e	10TB	6Gbps	Exos X10 (Enterprise Capacity V.6)	256MB	7200	N/A	Just test this HDD to cover
ST14000NM018	SATA	Seagate	3.5"	512e	14TB	6Gbps	Exos X14 (Enterprise Capacity)	256MB	7200	N/A	SM02
ST18000NM016	SATA	Seagate	3.5"	512e/4Kn	18TB	6Gbps	EXOS X16	256MB	7200	N/A	FW SM03
WD HDD											
Product Name	Type	Vendor	Form Factor	Format	Capacity	Interface Speed	Series	Cache	RPM	Encryption	Note
Datacenter											
WD4002FYYZ-01UL1B2	SATA	WD	3.5"	512n	4TB	6Gbps	WD Re	64MB	7200	N/A	Just test this HDD to cover
WD8001F5YZ-01SS7B0	SATA	WD	3.5"	512e	8TB	6Gbps	WD Re	128MB	7200	N/A	Just test this HDD to cover
WU5210DLE4	SATA	WD	3.5"	512e	10TB	6Gbps	Ultrastar DC HC330	256MB	7200	N/A	SD
HGST HDD (SAS HDD may need RAID Card support)											
Product Name	Type	Vendor	Form Factor	Format	Capacity	Interface Speed	Series	Cache	RPM	Encryption	Note
Enterprise Hard Drives											
HUS726060LE610	SATA	HGST	3.5"	512e	6TB	6Gbps	Ultrastar 7K6000	128MB	7200	N/A	Just test this HDD to cover
Toshiba HDD (SAS HDD may need RAID Card support)											
Product Name	Type	Vendor	Form Factor	Format	Capacity	Interface Speed	Series	Cache	RPM	Encryption	Note
Enterprise Hard Drives											
HGS5ACA800A	SATA	Toshiba	3.5"	4Kn	8TB	6Gbps	Capacity	128MB	7200	N/A	
HGS5ACA100N	SATA	Toshiba	3.5"	512e	1TB	6Gbps	Capacity	128MB	7200	N/A	
HGS5ACA141E	SATA	Toshiba	3.5"	512e	14TB	6Gbps	Capacity	256MB	7200	N/A	FW D104
SATA/SAS SSD											
Product Name	Type	Vendor	Form Factor	Interface	Capacity	Interface Speed	FW	Note			
SATA/SAS SSD											
MTFD0A1181DN-1A11ZABY1 (5200 MAX)	SSD	Micron	2.5"	SATA	1.92TB	6Gbps					
MZL1H1T96-8010C1 Series	SSD	Samsung	2.5"	SATA	1.92TB	6Gbps					
SSDPCX0919TB-D3-S4510 Series	SSD	Intel	2.5"	SATA	1.92TB	6Gbps					
SSDCCW8019TB-D3-S4510 Series	SSD	Intel	2.5"	SATA	1.92TB	6Gbps					
MAR0LE10063	SSD	Seagate	2.5"	SATA	960GB	6Gbps					
MAR0LE10063	SSD	Seagate	2.5"	SATA	480GB	6Gbps					
MKHX1R58B0G	SSD	Toshiba	2.5"	SATA	960GB	6Gbps					
PCIe SSD											
Product Name	Type	Vendor	Form Factor	Interface	Capacity	Interface Speed	Note				
SDPEKX02071P4550 Series PCIe Gen3 x4 4TB	PCIe	Intel	PCIe 3.0	PCIe(NVMe)	4TB	Gen3 x4					
Samsung PM1725B-MZPL3129HAQ PCIe Gen3 x8 3.2TB	PCIe	Samsung	PCIe 3.0	PCIe(NVMe)	3.2TB	Gen3 x8					
U.2											
Product Name	Type	Vendor	Form Factor	Interface	Capacity	Interface Speed	Note				
SSDPEKX02071P4610 Series	U.2	Intel	2.5"	SFF8633(NVMe)	3.2TB	Gen3 x4					
SSDPEKX02071P4510 Series	U.2	Intel	2.5"	SFF8633(NVMe)	2TB	Gen3 x4					
MZWL1327AQZ PM1733 Series	U.2	Samsung	2.5"	SFF8633(NVMe)	3.2TB	Gen3 x4					
MZWL179HMLP PM983 Series	U.2	Samsung	2.5"	SFF8633(NVMe)	1.92TB	Gen3 x4					
MZWL1378HLS PM1733 Series	U.2	Samsung	2.5"	SFF8633(NVMe)	3.84TB	Gen4 x4					
MTFDHAL312TCU 9200 Series	U.2	Micron	2.5"	SFF8633(NVMe)	3.2TB	Gen3 x4					
MCDK1LR98G CDS Series	U.2	Toshiba	2.5"	SFF8633(NVMe)	960GB	Gen3 x4					
M.2											
Product Name	Type	Vendor	Form Factor	Interface	Capacity	Interface Speed	Series	Cache	RPM	Encryption	Note
MZVPV128H9GM	M.2	Samsung	2280	PCIe(NVMe)	128GB						
MZVPV128H9GL	M.2	Samsung	2280	PCIe(NVMe)	512GB						
MD20C-512GM-MT	M.2	TECHCOMP	2280	PCIe	512GB						
MXP398-512GD	M.2	ADATA	2280	PCIe(NVMe)	512GB						
Graphics Card											
Product Name	Processor Cores	Memory Bandwidth (GB/sec)	OpenGL	Microsoft DirectX	Graphics Card Power (W)	NVIDIA SLI / AMD CrossFire Ready	Note				
Nvidia GeForce (http://www.geforce.com/hardware)											
GeForce 117AN X ( Pascal)	3584	490.5 GB/s	4.5	12	250 W	Yes (4-way)					
RTX M1080PC-8GD ( GTX1080 G1 Gaming (passive heatsink) ( Pascal)	2560	320 GB/s	4.5	12	180 W	Yes (2-way)					
GTX 1070 G1 Gaming (passive heatsink) ( Pascal)	1920	256 GB/s	4.5	12	150 W	Yes (2-way)					
GTX 1060 G1 Gaming (passive heatsink) ( Pascal)	1280	192 GB/s	4.5	12	120 W						
GeForce GTX 1050 Ti Gaming edition ( Pascal)	2560	320 GB/s	4.5	12	180 W	Yes (2-way)					
GeForce GTX 1070 Ti Gaming edition ( Pascal)	1920	256 GB/s	4.5	12	150 W	Yes (2-way)					
GeForce GTX 1050 Ti Gaming edition ( Pascal)	1280	192 GB/s	4.5	12	120 W						
RAID Cards											
Model	RAID-on-Chip Controller	Host Bus Type	Internal Ports	Internal Connectors	External Ports	External Connectors	Data Transfer Rates	Note			
GIGABYTE Storage Cards											
GC-M52E4	Marvell 9230	PCIe-x8 Gen2 x4 bus	4	SATA III			6Gbps ports				
GC-M5U21	LSI SAS 2208	PCIe-x8 Gen2 x8 bus	8	Mini-SAS for 8x SAS			6Gbps ports				
GC-M5U22	LSI SAS 2208	PCIe-x8 Gen2 x8 bus	8	2 x Mini-SAS for 8x SAS			6Gbps ports				
GC-M5U23	LSI SAS 2208	PCIe-x8 Gen2 x8 bus	8	2 x Mini-SAS for 8x SAS			6Gbps ports				

RA201-A	LSI SAS 2208	PCIe x8 Gen3 x8 bus	8	2 x Mini-SAS for 8x SAS		60Gb/s ports	
SRAS338	LSI SAS 3208	PCIe x8 Gen3 x8 bus	8	2 x Mini-SAS HD for 8x SAS		12Gb/s ports	
SAS3548	LSI SAS 3008	PCIe x8 Gen3 x8 bus	8	2 x external Mini-SAS HD SFF8644		12Gb/s ports	
SRM448	LSI SAS 3108	PCIe x8 Gen3 x8 bus	8	2 x internal Mini-SAS HD SFF8643		12Gb/s ports	
LSI RAID Controller Cards							
SuperRAID SAS 9341-B	LSISAS3008 PowerPC 476 controller @ 1.2 Gbps	x8 lane PCI Express@ 3.0	8	2 x HD Mini-SAS SFF8643 (Horizontal mount)		Up to 12Gb/s per port	
MegaRAID SAS 9405-16i	SAS3516 dual-core RAID-on-Chip (ROC)	x8 lane PCI Express@ 3.1	8	4 x Mini-SAS HD SFF-8643		12Gb/s SAS 3.0	
LSI Host Bus Adapters (HBAs)							
LSI SAS 9400-16i	SAS3416	x8 lane PCI Express@ 3.1	16	4 x Mini-SAS HD SFF-8643		12Gb/s SAS 3.0	
Microsemi RAID Cards							
SmartRAID 3154-16i	PM8236	8-Lane PCIe Gen3	16	4 x Internal SFF-8643		12 Gb/s per port	
Microsemi Host Bus Adapters							
SmartHBA 2100-B	PM8222	8 Lane PCIe Gen3	8	2 x Internal SFF-8643		12 Gb/s per port	
PMC RAID Cards (Adaptics)							
Adaptec ASR 8850Q	-	8-lane PCIe Gen3	8	2 x internal mini SAS HD (SFF-8643), 2 x external mini SAS HD (SFF-8644)		12Gb/s per port	
LAN Cards							
Product Name	Connector	System Interface Type	# of Ports	System Interface Type	Data rate	Note	
GIGABYTE LAN Cards							
GLN4832	SFP+	PCIe x8 Gen2 x8	Dual	10Gb/s per port	INTEL E2599ES		
GLN4828	RJ45	PCIe x8 Gen2 x8	Dual	10Gb/s per port	INTEL X540		
GLN4761	QSFP+	PCIe x8 Gen3 x8	Single	40Gb/s per port	INTEL XL710		
GLN4752	QSFP+	PCIe x8 Gen3 x8	Dual	40Gb/s per port	INTEL XL710		
GLN4622	RJ45	PCIe x8 Gen3 x4	Dual	10Gb/s per port	INTEL X550-AT2		
GLN4244	SFP28	PCIe Gen3 x16	Quad	25Gb/s per port	Mellanox ConnectX-4		
GC-MNVX21	SFP+	PCIe x8 Gen3 x8	Dual	10Gb/s per port	Mellanox ConnectX-3		
GC-MNVX21	SFP+	PCIe x8 Gen2 x8	Dual	10Gb/s per port	Broadcom BCM57710S		
GLN4224	RJ45	PCIe x8 Gen3 x4	Quad	10Gb/s per port	INTEL X550-AT2		
GLN4M34	SFP28	PCIe Gen3 x16	Quad	10Gb/s per port	Mellanox ConnectX-4		
Intel 10GbE							
Intel® Ethernet Converged Network Adapter X710-QDA2	SFP+	PCIe x3.0 (8.0 GT/s)	Dual	10Gb/s per port			
Intel® Ethernet Network Adapter X722-QDA4	SFP+	PCIe x3.0 (8.0 GT/s)	Quad	10Gb/s per port			
Intel 25GbE							
Intel® Ethernet Network Adapter XXV710-DA2	SFP28	PCIe x3.0 (8.0 GT/s)	Dual	25Gb/s per port			
Intel 40GbE							
Intel® Ethernet Converged Network Adapter XL710-QDA2	QSFP+	PCIe x3.0 (8.0 GT/s)	Dual	40Gb/s per port			
Mellanox ConnectX							
MCX156A-CCAT	QSFP28	PCIe Gen3 x16	Single	100Gb/s per port	Mellanox ConnectX-5 EN		
MCX555A-ECAT	SFP28	PCIe Gen3 x16	Single	100Gb/s per port	Mellanox ConnectX-4 VPI (InfiniBand)		
MCX4121A-ACAT	SFP28	PCIe Gen3 x8	Dual	25Gb/s per port	Mellanox ConnectX-4 Lx EN		
MCX156A-CCAT	QSFP28	PCIe Gen3 x16	Dual	100Gb/s per port	Mellanox ConnectX-5 EN		
MCX156A-CCAT	QSFP28	PCIe Gen3 x16	Single	100Gb/s per port	Mellanox ConnectX-5 EN		
Mellanox ConnectX-3 VPI Adapter Cards							
MCX196A-FCAT	QSFP	PCIe 3.0	Dual	FDR IB (56Gb/s)			
MCX555A-ECAT	QSFP28	PCIe 3.0 x16	Single	100Gb/s per port	Mellanox ConnectX-5 VPI (InfiniBand)		
Solarflare Onload Server Adapters							
SFN7322	SFP+	8 GT/s (Gen3)	Dual	10Gb/s per port			
Ologic LAN Adapters							
OLE3611HE-CU	QSFP28	PCIe x16 Gen3 x16	Single	100Gb/s per port			
OLE3442-CU-CK	SFP+	PCIe x8 Gen3 x8	Dual	10Gb/s per port			
OLE3442-BU-CK	RJ45	PCIe x8 Gen3 x8	Dual	10Gb/s per port			
Broadcom (Emulex) Ethernet Networking Adapters							
BCM4102-NX	SFP+	PCIe 3.0 x8	Dual	10Gb/s per port			
BCM957414M142CC	SFP28	PCIe 3.0 x8	Dual	25Gb/s per port	BCM57414		
PSU							
Product Name	Vendor	Input Voltage	Wattage	Application	Efficiency	Note	
SP1200-20AAG	FSP	100-240Vac	1200W	Desktop	N/A		
FSP900-50AAG	FSP	100-240Vac	900W	Desktop	N/A		
USB Device							
Product Name	Type	Vendor	Capacity	Note			
USB 3.0							
PURE CLASSIC X178B1FWB075	HDD	Gigabyte	500G				
90FBA-S7AAS0002	HDD	Seagate	500G				
TOSHIBA CANVIO BASIC	HDD	Toshiba	500G				
ADBACV500AWT-01	HDD	WD	500G				
ST-DSS-1UB00	Device	CyberStorm					
ST-11515US-001	Device	ICY BOX					
NA317U	Device	max					
SST-1531	Device	Silver Stone					
ST-1003 Plus	Device	CyberStorm					
MB99-1U3-1S	Device	ICYDOCK					
ST10-SB35G	Device	STARDOM					