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QUOTATION

Quote # MWYQ23434

Date: 3/20/2018

Microway Confidential

Quote To:	**Ship To:**	**Sales Rep.**
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The following configuration has been tested for use with a single GPU but not publicly validated.

Qty	Description	Your Price	Extended Price
	Microway is a small business, woman owned and operated. We are building many clusters at any one time and have built thousands of custom clusters for universities, government research labs and agencies, and corporations. Microway has been in the scientific computing business since 1982.		
1	**Microway 2U EPYC Compute Server**	$26,808	$26,808

Navion Dual AMD EPYC 2U Server
  1600W High-Efficiency "Titanium" Redundant 1+1 Power Supply
  Up to two AMD EPYC 7000-Series processors (Socket SP3 LGA)
  AMD Infinity Fabric link between CPU sockets
  Thirty-two slots for up to 4TB ECC DDR4-2666 memory
  Quad Integrated Intel i350AM4 Gigabit Ethernet Ports (RJ45)
  Integrated ASPEED AST2500 BMC with Graphics Controller
  IPMI 2.0 w/ Virtual Media, KVM and Dedicated LAN Support
  PCI-Express expansion slots:
    One full-height PCI-Express 3.0 x16 slot (10.5" length)
    Five full-height PCI-Express 3.0 x8 slots (9.5" length)
    One low-profile PCI-Express 3.0 x8 slot
    One low-profile PCI-Express 3.0 x8 (internal)
  Twelve front hot-swap 3.5" drive bays supporting either:
    Default: (12) SATA 6Gbps drives (via onboard controller)
    (8) SATA 6Gbps drives and (4) NVMe drives (with optional add-in controller)
    (SATA 6Gbps bays can be upgraded to SATA/SAS 12Gbps bays via optional add-in controllers)
  Two rear hot-swap 2.5" drive bays (optional)
  Internal ports: two SATA SuperDOM, one TPM header, and one USB 3.0 port (Type A)
  Rear ports: four 1G LAN, one IPMI LAN, one VGA, two USB 3.0, and one serial COM port
  Front I/O: power button and reset button
  Rackmount Rail Kit included (29" chassis depth)

  (2) AMD "EPYC" 7551 Thirty Two Core CPU 2.0 GHz Base Clock Frequency
  2.55 GHz All Core Boost Speed, 3.0 GHz Max Core Boost Speed
  64MB Shared L3 Cache, 180W TDP

  (16) 32GB DDR4 2666 MHz ECC/Registered Memory (Dual Rank)

  (512GB Total Memory @ 2666MHz)

240GB Intel DC S4500 2.5" SATA 6Gbps 3D NAND SSD
 SATA 6Gb/s Interface (Supports 3Gb/s)
 3D NAND TLC Internal Solid State Drive
 Targeted Lifetime Endurance: ~1 Drive Write Per Day; 0.62 PBW
 Full data path and Power loss protection; 256 bit AES encryption
 Sustained sequential read: up to 500 MB/s
 Sustained sequential write: up to 190 MB/s
 Random 4KB IOPS: up to 69,000 read; up to 16,000 write
 Average Latency: 36µs read, 36 µs write
 2,000,000 Hours MTBF
 Uncorrectable Bit Error Rate (UBER): 1 sector per 10^17 bits read

(Operating System)

2.5" HDD Adapter for 3.5" HDD Carrier Tray (Tool-less)

Mellanox ConnectX-3 Pro EN Single-Port QSFP 40G Ethernet Adapter
 PCI-E 3.0 x8 8GT/s; RoHS (R6) Compliant

40GigE Mellanox Ethernet Cable, QSFP+ Passive Copper, 3 meters, 30 AWG

NVIDIA Tesla V100 PCI-E 16GB "Volta" GPU Accelerator
   Full-Speed PCI-E 3.0 x16 Link
   GV100 GPU chip with NVIDIA Passive Heatsink
   5,120 CUDA Cores with Enhanced Unified Memory and Cooperative Groups
   640 NVIDIA Tensor Cores optimized for Deep Learning training
   GPU-boost capability allows for increased clock speeds
   16GB High-Bandwidth HBM2 Memory (900 GB/sec peak bandwidth)
   Supports INT8, INT32 integer; IEEE Half-, Single-, and Double-Precision Floating Point operations
   Performance (with GPU Boost): 112 TFLOPS (half), 14 TFLOPS (single), 7 TFLOPS (double)
   Double PCI slot form factor
   Power Consumption: 250W TDP (One 8- and one 6-pin connector on rear)
   Software Development Tools:
     OpenACC, OpenCL, C/C++ language compiler, debugger, profiler and memory analyzer
     Standard numerical libraries: cuDNN, nvGRAPH, FFT, BLAS, SPARSE, RAND & more:
       https://developer.nvidia.com/gpu-accelerated-libraries

LG Slim External USB 2.0 8X DVD/ 24X CD Writer (Black)
   DVD+RW/-RW: 8X/6X
   Also reads and writes DVD-RW/+RW/-RAM, CD-R/-RW
   Buffer Memory: 1.5MB
   Sustained Rate: DVD-ROM (max.) 11.08MB/s, CD-ROM 3.6MB/s

CentOS 7.x Linux (or your distribution of choice) and NVIDIA CUDA installed, configured and tested.

IPMI management capability is integrated on the motherboard. IPMI allows administrators to remotely monitor and control each computer individually. Capabilities include:
* System Power On, Power Off and Reset
* Monitor Fan Speeds, Component Temperatures and Voltages
* Remote Serial Console and KVM Access
* Virtual Media: local devices (CD, USB, etc) appear as directly connected to remote system

1	**NVIDIA Academic Instant Rebate**	-$1,500	-$1,500
	$1,500 EDU discount per NVIDIA Tesla V100 16GB GPU (restrictions apply)		

Microway Testing Procedure:

Each computer system is network booted to execute low-level memory tests for 12+ hours.

Once passed, operating systems are loaded and Linux stress tests are executed for 48+ hours. These tests include processor and memory intensive applications that have been shown to cause faults in the field. A separate set of tests accesses all sectors on each hard drive and runs filesystem-intensive applications to ensure drive and filesystem reliability.

Qty	Description	Your Price	Extended Price

Microway's hardware warranty may be extended on an annual basis for up to 5 years total warranty.

Microway provides lifetime technical support. Out-of-warranty repairs will be billed at Time and Materials rates.

Shipping and Insurance: prepay and add

	Total (Academic Pricing)	**$25,308**

The following items are optional, and are not included in the total:

	Qty	Description	Your Price	Extended Price
☐	1	**Upgrade to Dual Port Ethernet Adapter (Optional)**	$76	$76

Mellanox ConnectX-3 Pro EN Dual-Port QSFP 40G Ethernet Adapter
 PCI-E 3.0 x8 8GT/s; RoHS (R6) Compliant

☐	1	**Upgrade Memory to 1TB @ 2133MHz (Optional)**	$6,144	$6,144

(32) 32GB DDR4 2666 MHz ECC/Registered Memory (Dual Rank)

☐	1	**Upgrade Memory to 2TB (Optional)**	$23,136	$23,136

(32) 64GB DDR4 ECC LRDIMM 2666MHz Memory

☐	1	**Change Processors to: (Optional)**	$256	$256

(2) AMD "EPYC" 7501 Thirty Two Core CPU 2.0 GHz Base Clock Frequency
 2.6 GHz All Core Boost Speed, 3.0 GHz Max Core Boost Speed
 64MB Shared L3 Cache, 170W TDP

☐	1	**Change Processors to: (Optional)**	$2,268	$2,268

(2) AMD "EPYC" 7601 Thirty Two Core CPU 2.2 GHz Base Clock Frequency
 2.7 GHz All Core Boost Speed, 3.2 GHz Max Core Boost Speed
 64MB Shared L3 Cache, 180W TDP

☐	1	**Upgrade SSD to: (Optional)**	$149	$149

480GB Intel DC S4500 2.5" SATA 6Gbps 3D NAND SSD
 SATA 6Gb/s Interface (Supports 3Gb/s)
 3D NAND TLC Internal Solid State Drive
 Targeted Lifetime Endurance: ~1 Drive Write Per Day; 0.90 PBW
 Full data path and Power loss protection; 256 bit AES encryption
 Sustained sequential read: up to 500 MB/s
 Sustained sequential write: up to 330 MB/s
 Random 4KB IOPS: up to 72,000 read; up to 20,000 write
 Average Latency: 36μs read, 36 μs write
 2,000,000 Hours MTBF
 Uncorrectable Bit Error Rate (UBER): 1 sector per 10^17 bits read

☐	1	**Upgrade SSD to: (Optional)**	$381	$381

960GB Intel DC S4500 2.5" SATA 6Gbps 3D NAND SSD
SATA 6Gb/s Interface (Supports 3Gb/s)
3D NAND TLC Internal Solid State Drive
Targeted Lifetime Endurance: ~1 Drive Write Per Day; 1.86 PBW
Full data path and Power loss protection; 256 bit AES encryption
Sustained sequential read: up to 500 MB/s
Sustained sequential write: up to 490 MB/s
Random 4KB IOPS: up to 72,000 read; up to 30,000 write
Average Latency: 36µs read, 36 µs write
2,000,000 Hours MTBF
Uncorrectable Bit Error Rate (UBER): 1 sector per 10^17 bits read

☐ 1 **Upgrade SSD to: (Optional)** $931 $931

1.9TB Intel DC S4500 2.5" SATA 6Gbps 3D NAND SSD
SATA 6Gb/s Interface (Supports 3Gb/s)
3D NAND TLC Internal Solid State Drive
Targeted Lifetime Endurance: ~1 Drive Write Per Day; 3.27 PBW
Full data path and Power loss protection; 256 bit AES encryption
Sustained sequential read: up to 500 MB/s
Sustained sequential write: up to 490 MB/s
Random 4KB IOPS: up to 72,000 read; up to 33,000 write
Average Latency: 36µs read, 36 µs write
2,000,000 Hours MTBF
Uncorrectable Bit Error Rate (UBER): 1 sector per 10^17 bits read

The following drives have higher endurance:

☐ 1 **Upgrade SSD to: (Optional)** $51 $51

240GB Intel DC S4600 2.5" SATA 6Gbps 3D NAND SSD
SATA 6Gb/s Interface (Supports 3Gb/s)
3D NAND TLC Internal Solid State Drive
Endurance Rating (Lifetime Writes): ~3 Drive Writes Per Day; 1.4 PBW
Full data path and Power loss protection; 256 bit AES encryption
2,000,000 Hours MTBF
Uncorrectable Bit Error Rate (UBER): 1 sector per 10^17 bits read
Sustained sequential read: up to 500 MB/s
Sustained sequential write: up to 260 MB/s
Random 4KB IOPS: up to 72,000 read; up to 38,000 write
Average Latency: 36µs read, 36 µs write

☐ 1 **Upgrade SSD to: (Optional)** $185 $185

480GB Intel DC S4600 2.5" SATA 6Gbps 3D NAND SSD
SATA 6Gb/s Interface (Supports 3Gb/s)
3D NAND TLC Internal Solid State Drive
Targeted Lifetime Endurance: ~3 Drive Writes Per Day; 2.95 PBW
Full data path and Power loss protection; 256 bit AES encryption
Sustained sequential read: up to 500 MB/s
Sustained sequential write: up to 480 MB/s
Random 4KB IOPS: up to 72,000 read; up to 60,000 write
Average Latency: 36µs read, 36 µs write
2,000,000 Hours MTBF
Uncorrectable Bit Error Rate (UBER): 1 sector per 10^17 bits read

☐ 1 **Upgrade SSD to: (Optional)** $674 $674

960GB Intel DC S4600 2.5" SATA 6Gbps 3D NAND SSD
SATA 6Gb/s Interface (Supports 3Gb/s)
3D NAND TLC Internal Solid State Drive
Targeted Lifetime Endurance: ~3 Drive Writes Per Day; 5.25 PBW
Full data path and Power loss protection; 256 bit AES encryption
Sustained sequential read: up to 500 MB/s
Sustained sequential write: up to 490 MB/s
Random 4KB IOPS: up to 72,000 read; up to 65,000 write
Average Latency: 36µs read, 36 µs write
2,000,000 Hours MTBF
Uncorrectable Bit Error Rate (UBER): 1 sector per 10^17 bits read

Qty	Description	Your Price	Extended Price
☐ 1	**Upgrade SSD to: (Optional)**	$1,504	$1,504

1.9TB Intel DC S4600 2.5" SATA 6Gbps 3D NAND SSD
SATA 6Gb/s Interface (Supports 3Gb/s)
3D NAND TLC Internal Solid State Drive
Targeted Lifetime Endurance: ~3 Drive Writes Per Day; 10.84 PBW
Full data path and Power loss protection; 256 bit AES encryption
Sustained sequential read: up to 500 MB/s
Sustained sequential write: up to 480 MB/s
Random 4KB IOPS: up to 72,000 read; up to 65,000 write
Average Latency: 36μs read, 36 μs write
2,000,000 Hours MTBF
Uncorrectable Bit Error Rate (UBER): 1 sector per 10^17 bits read

Qty	Description	Your Price	Extended Price
☐ 1	**Add PCI-E NVMe SSD: (Optional)**	$1,901	$1,901

Intel DC P4600 Series 2TB PCI-E NVMe SSD (Half-Height Half-Length)
PCI-E x4 3.1 NVMExpress Interface to System
3D NAND TLC Internal Solid State Drive
Targeted Lifetime Endurance: ~3 Drive Writes Per Day, 11.08 PBW
Built in power protection
Sequential Read: up to 3,200 MB/s
Sequential Write: up to 1,575 MB/s
Random Read IOPS: Up to 610,000
Random Write IOPS: Up to 196,650
Read Latency: 85μs
Write Latency: 15μs
2,000,000 Hours MTBF
Uncorrectable Bit Error Rate: 1 sector per 10^17 bits read

FOB: Destination (freight PPA)

Ship Date: 5 - 6 Weeks after receipt of order and documentation

Warranty: Two years offsite with replacement components typically cross-shipped within 24 hours of problem determination by Microway Tech Support.

Technical Support Lifetime technical support via telephone, fax, or email.

Terms: NET 30

Shipping Method: FedEx Freight

The Buyer is responsible for any sales taxes or duties related to the purchase.

Since 1982 Microway has been a leader in providing high performance computing solutions. Microway specializes in building complex clusters, servers, and workstations. We are unique in having Linux expertise throughout our organization to provide testing of all systems at our assembly and integration center at our headquarters in Plymouth, Massachusetts. Our validation suite includes a number of MPI applications and Microway proprietary software, including MPI Link-Checker and InfiniScope.

Microway is classified as a small business - woman owned and operated.

Microway welcomes our customers (and potential customers) to personally visit our manufacturing facility. We value the opportunity to share our understanding of the systems we build, and to demonstrate our dedication to quality in our design, fabrication, final testing and technical support. Please contact me if you plan to be in or near Massachusetts and would like to make an appointment.

Prices subject to review at time of order due to world-wide component price volatility.

This quote is valid for 30 days.