



Telecommunications Technology Association

TPC Express Benchmark™ IoT Full Disclosure Report

Machbase 5.7.13

running on

Supermicro A+ Server 2014TP-HTR
(TwinPro™ with 4x H12SST-PS Nodes)

with

Red Hat Enterprise Linux Server Release 7.7

TPCx-IoT Version
Report Edition
Report Submitted

2.0.0
Second
April 2, 2021

Second Edition(First Edition released on <March 2020>)

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Abstract

TTA conducted the TPC Express Benchmark™ IoT (TPCx-IoT) on the Supermicro A+ Server 2014TP-HTR with 4x H12SST-PS Nodes. The software used included Machbase 5.7.13. This report provides full disclosure of the methodology and results. All testing was conducted in conformance with the requirements of the TPCx-IoT Standard Specification, Revision 2.0.0.

The benchmark results are summarized below.

Configuration Summary


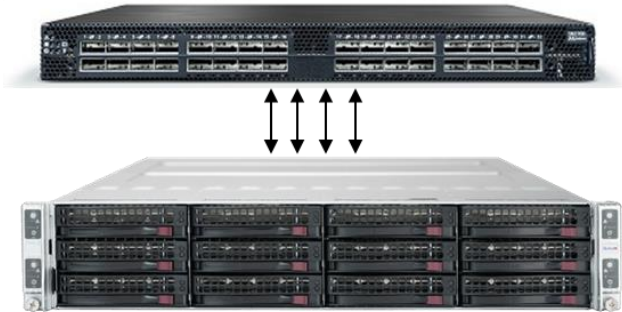
Sponsor	Cluster Nodes	Storage Software	Operating System
TTA	Supermicro A+ Server 2014TP-HTR	Machbase 5.7.13	Red Hat Enterprise Linux Release 7.7


TPC Express Benchmark™ IoT Metrics


Total System Cost (USD)	IoTps	USD/kIoTps	Availability Date
\$419,793	2,199,052.90	\$190.90	Currently Available

Executive Summary

The [Executive Summary](#) follows on the next several pages.

		<h1>Machbase 5.7.13</h1>		TPCx-IoT 2.0.0	
				TPC Pricing 2.5.0	
				Report Date April. 02, 2021	
Total System Cost		TPCx-IoT Performance Metric		Price/Performance	
\$419,793 USD		2,199,052.90 IoTps		\$190.90 USD/kIoTps	
Servers	Operating System	Other Software	Availability Date		
Supermicro A+ Server 2014TP-HTR	Red Hat Enterprise Linux Server Release 7.7	None	Currently Available		
System Under Test Configuration Overview					
<div><div>Mellanox SN2700 100Gb Ethernet Switch (32 x QSFP28 Ports)</div><div></div><div>1 x Supermicro A+ Server 2014TP-HTR TwinPro™ with 4x H12SST-PS Nodes, each with:</div><div><div>1 x Master Node<div>1 x AMD EPYC 7502P 32-Core Processor 8 x 64GB (512GB) Memory 1 x 100GbE 2-Port Adaptor 1 x 25GbE 2-Port and 10GbE 2-Port Adaptor 1 x 1TB M.2 PCIe SSD</div></div><div>3 x Data Nodes<div>1 x AMD EPYC 7502P 32-Core Processor 8 x 32GB (256GB) Memory 1 x 100GbE 2-Port Adapter 1 x 25GbE 2-Port and 10GbE 2-Port Adaptor 1 x 1TB M.2 PCIe SSD 2 x 3.84TB M.2 PCIe SSD</div></div></div></div>					
Total Servers:		1x Supermicro A+ Server 2014TP-HTR (TwinPro™ with 4x H12SST-PS Nodes)			
Total Processors/Cores/Threads:		4/128/256			
Server Configuration:		1x Master Node		3x Data Nodes	
Processor		1x AMD EPYC 7502P (2.50GHz, 32-core, 128 MB L3)		1x AMD EPYC 7502P (2.50GHz, 32-core, 128 MB L3)	
Memory		512 GiB		256 GiB	
Storage Device		1x 1TB M.2 PCIe SSD Gen3		1x 1TB M.2 PCIe SSD Gen3 2x 3.84TB M.2 PCIe SSD Gen3	
Network Controller		1x Mellanox MCX516A-CCAT 100GbE 1x Supermicro AOC-MH25G-m2S2TM 10GbE and 25GbE		1x Mellanox MCX516A-CCAT 100GbE 1x Supermicro AOC-MH25G-m2S2TM 10GbE and 25GbE	
Connectivity		Mellanox SN2700 100GbE Switch			
Total Rack Units:		(2x 2014TP-HTR) + (1x SN2700) = (2x1) + (1x1) = 3 RU			

	<h1>Machbase 5.7.13</h1>				TPCx-IoT	2.0.0
					TPC Pricing	2.5.0
					Report Date	April. 02, 2021
Description	Part Number	Source	List Price (USD)	Qty	Extended Price (USD)	3 yr. Maint. Price (USD)
Server Hardware						
Supermicro A+ Server 2014TP-HTR	AS -2014TP-HTR	1	4,500.00	1	4,500.00	
AMD EPYC 7502P 32-Core Processor	PSE-ROM7502-0054	1	2,857.75	4	11,431.00	
SK hynix 64GB PC4-3200	MEM-DR464L-HL02-ER32	1	320.74	8	2,565.92	
SK hynix 32GB PC4-3200	MEM-DR432L-HL01-ER32	1	159.51	24	3,828.24	
Mellanox 100GbE Dual-Port NIC	AOC-MCX516A-CCAT	1	976.35	4	3,905.40	
2-port 25GbE SFP28 Mellanox CX-4 Lx EN and 2-port 10GbE RJ45 Intel X550	AOC-MH25G-m2S2TM	1	287.39	4	1,149.56	
1 TB NVMe SSD Toshiba KXG50ZNV1T02	HDS-TMN0-KXG50ZNV1T02	1	175.00	4	700.00	
3.84TB NVMe SSD Samsung PM983	HDS-SMN1-MZ1LB3T8HMLA07	1	677.35	6	4,064.10	
ASSEMBLY FEE	MC0037	1	250.00	1	250.00	
Maintenance - 7x24x4 Care Pack (3-yr)	OS4HR3	1	3,000.00	1		3,000.00
Sub-Total					32,394.22	3,000.00
Network						
Mellanox MSN2700-CS2F Spectrum 100GbE 1U Open Ethernet Switch	MSN2700-CS2F	2	33,003.00	1	33,003.00	
Mellanox SUP-SN2000-CL-S-3S-4H Technical Support and Warranty - Silver 3 Year with 4 Hours On-Site Support for SN2700 Cumulus Series Switch	SUP-SN2000-CL-S-3S-4H	2	3,345.00	1		3,345.00
Mellanox MCP1600-E002E30 Passive Copper Cable 1B EDR up to 100Gb/s QSFP28 2m Black 30AWG	MCP1600-E002E30	2	145.00	4	580.00	
Sub-Total					33,583.00	3,345.00
Software						
Red Hat Enterprise Linux Server7.7 with Premium Support 1 Year	RH00003	3	1,299.00	12		15,588.00
Machbase v5.7.13 Cluster Edition (includes 1y 7x24x4 Technical Support)	-	4	98,000.00	4	392,000.00	
Machbase v5.7.13 Cluster Edition 7x24x4 Technical Support	-	4	58,800.00	2		117,600.00
Sub-Total					392,000.00	133,188.00
Infrastructure						
HP EliteDisplay E243 23.8-inch Monitor (w/ spares)	1FH47A8#ABA	5	179.00	3	537.00	
HP Slim USB Keyboard and Mouse (w/ spares)	T6T83UT#ABA	5	35.00	3	105.00	
Sub-Total					642.00	-
Discounts*						
Machbase v5.7.13 Cluster Edition (includes 1y 7x24x4 Technical Support)					(137,200.00)	
Machbase v5.7.13 Cluster Edition 7x24x4 Technical Support						(41,160.00)
Sub-Total					(137,200.00)	(41,160.00)
Total					\$321,419.22 USD	\$98,373.00 USD
Price Source 1) Super Micro Computer Inc. 2) Mellanox Technologies, Ltd. 3) Red Hat Inc. 4) Machbase Inc. 5) Hewlett Packard Inc. Audited by Pre-Publication Board *All discounts are based on US list prices and for similar quantities and configurations. Discounts for similarly sized configurations will be similar to those quoted here, but may vary based on the components in the configuration.				Three-Year Cost of Ownership: \$419,793 USD IoTps: 2,199,052.90 USD/kIoTps: \$190.90 USD		
Prices used in TPC benchmarks must reflect the actual prices a customer would pay for purchase of the components in all regions specified in the result. Individually negotiated discounts are not permitted. Special prices based on assumptions about past or future purchases are not permitted. All discounts reflect standard pricing conventions for the listed components. For complete details, see the pricing section of the TPC benchmark specification. If you find that stated prices are not available according to these terms, please inform the TPC at pricing@tpc.org. Thank you.						

	<h1>Machbase 5.7.13</h1>	TPCx-IoT	2.0.0
		TPC Pricing	2.5.0
		Report Date	April. 02, 2021

Numerical Quantities

Scale Factor


4100000000

Performance Run (Run2)

Warmup Run Start Time	2020-02-19 22:05:25.000
Warmup Run End Time	2020-02-19 22:36:25.000
Warmup Run Elapsed Time	1,860.143
Measured Run Start Time	2020-02-19 22:36:26.000
Measured Run End Time	2020-02-19 23:07:31.000
Measured Run Elapsed Time	1,864.439
Performance Metric (IoTps)	2,199,052.90

Repeatability Run (Run1)

Warmup Run Start Time	2020-02-19 21:00:02.000
Warmup Run End Time	2020-02-19 21:31:12.000
Warmup Run Elapsed Time	1,868.691
Measured Run Start Time	2020-02-19 21:31:12.000
Measured Run End Time	2020-02-19 22:02:09.000
Measured Run Elapsed Time	1,855.897
Performance Metric (IoTps)	2,209,174.32

	<h1>Machbase 5.7.13</h1>	TPCx-IoT 2.0.0 TPC Pricing 2.5.0 Report Date April. 02, 2021
<div data-bbox="581 472 1081 516"> <h2>Performance Run Report (Run2)</h2> </div> <div data-bbox="332 625 888 661"> <p>=====</p> <p>TPCx-IoT Performance Metric (IoTps) Report</p> </div> <div data-bbox="332 659 1247 697"> <p>Test Run2 details : Total Time For Warmup Run In Seconds = 1,860.143</p> </div> <div data-bbox="332 697 1096 772"> <p>Test Run2 details : Total Time In Seconds = 1,864.439</p> <p>Total Number of Records = 4100000000</p> </div> <div data-bbox="332 814 985 850"> <p>TPCx-IoT Performance Metric (IoTps): 2199052.9054</p> <p>=====</p> </div> <div data-bbox="576 1062 1086 1106"> <h2>Repeatability Run Report (Run1)</h2> </div> <div data-bbox="332 1215 888 1251"> <p>=====</p> <p>TPCx-IoT Performance Metric (IoTps) Report</p> </div> <div data-bbox="332 1251 1245 1287"> <p>Test Run1 details : Total Time For Warmup Run In Seconds = 1,868.691</p> </div> <div data-bbox="332 1287 1096 1362"> <p>Test Run1 details : Total Time In Seconds = 1,855.897</p> <p>Total Number of Records = 4100000000</p> </div> <div data-bbox="332 1404 985 1442"> <p>TPCx-IoT Performance Metric (IoTps): 2209174.3237</p> <p>=====</p> </div> <div data-bbox="332 1671 1294 1743"> <p>Summary details of the run reports are show above. For the complete run reports, see the Supporting Files Archive.</p> </div>		


	Machbase 5.7.13	TPCx-IoT 2.0.0 TPC Pricing 2.5.0 Report Date April. 02, 2021									
<div>Revision History</div> <table><thead><tr><th>Date</th><th>Edition</th><th>Description</th></tr></thead><tbody><tr><td>March 30, 2020</td><td>First</td><td>Initial Publication</td></tr><tr><td>April 2, 2021</td><td>Second</td><td>Update Price Performance Metric</td></tr></tbody></table>			Date	Edition	Description	March 30, 2020	First	Initial Publication	April 2, 2021	Second	Update Price Performance Metric
Date	Edition	Description									
March 30, 2020	First	Initial Publication									
April 2, 2021	Second	Update Price Performance Metric									

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Clause 0 Preamble

0.1 TPC Express Benchmark™ IoT Overview

TPC Express Benchmark™ IoT (TPCx-IoT) was developed to provide an objective measure of hardware, operating system and commercial NoSQL database software distributions, and to provide the industry with verifiable performance, price-performance and availability metrics. The benchmark models a continuous system availability of 24 hours a day, 7 days a week.

Even though the modeled application is simple, the results are highly relevant to hardware and software dealing with IoT gateway systems in general. TPCx-IoT stresses both hardware and software including database APIs and network connections to the database. This workload can be used to assess a broad range of NoSQL databases. TPCx-IoT can be used to assess a range of NoSQL implementations in a technically rigorous and directly comparable and vendor-neutral manner. The metric effectively represents the total number of records that can be inserted into a NoSQL database per second while running queries against the database.

The TPCx-IoT kit is available from the TPC (See www.tpc.org/tpcx-iot for more information). Users must sign up and agree to the TPCx-IoT User Licensing Agreement (ULA) to download the kit. Re-distribution of the kit is prohibited. All related work (such as collaterals, papers, derivatives) must acknowledge the TPC and include TPCx-IoT copyright. The TPCx-IoT Kit includes: the TPCx-IoT Specification document, the TPCx-IoT Users Guide document, shell scripts to set up the benchmark environment and Java code to execute the benchmark load.

The purpose of TPC benchmarks is to provide relevant, objective performance data to industry users. To achieve that purpose, TPC benchmark specifications require that benchmark tests be implemented with systems, products, technologies and pricing that:

- Are generally available to users;
- Are relevant to the market segment that the individual TPC benchmark models or represents (e.g., TPCx- IoT models and represents a NoSQL database mimicking an IoT gateway system)
- Would plausibly be implemented by a significant number of users in the market segment the benchmark models or represents.

The use of new systems, products, technologies (hardware or software) and pricing is encouraged so long as they meet the requirements above. Specifically prohibited are benchmark systems, products, technologies or pricing (hereafter referred to as "implementations") whose primary purpose is performance optimization of TPC benchmark results without any corresponding applicability to real-world applications and environments. In other words, all "benchmark special" implementations that improve benchmark results but not real-world performance or pricing, are prohibited.

The rules for pricing are included in the TPC Pricing Specification. Further information is available at www.tpc.org.

Clause 1 General Items

1.1 Test Sponsor

A statement identifying the benchmark sponsor(s) and other participating companies must be provided.

This benchmark was sponsored by Telecommunications Technology Association.

1.2 Parameter Settings

Settings must be provided for all customer-tunable parameters and options which have been changed from the defaults found in actual products, including by not limited to:

- *Configuration parameters and options for server, storage, network and other hardware component incorporated into the pricing structure;*
- *Configuration parameters and options for operating system and file system component incorporated into the pricing structure;*
- *Configuration parameters and options for any other software component incorporated into the pricing structure;*
- *Compiler optimization options.*

Comment 1: In the event that some parameters and options are set multiple times, it must be easily discernible by an interested reader when the parameter or option was modified and what new value it received each time.

Comment 2: This requirement can be satisfied by providing a full list of all parameters and options, as long as all those that have been modified from their default values have been clearly identified and these parameters and options are only set once.

The [Supporting Files Archive](#) contains the parameters and options used to configure the components involved in this benchmark.

1.3 Configuration Diagrams

Diagrams of both measured and priced configurations must be provided, accompanied by a description of the differences.

This includes, but is not limited to:

- *Total number of nodes used*
- *Total number and type of processors used/total number of cores used/total number of threads used (including sizes of L2 and L3 caches)*
- *Size of allocated memory, and any specific mapping/partitioning of memory unique to the test*
- *Number and type of disk units (and controllers, if applicable)*
- *Number of channels or bus connections to disk units, including their protocol type*
- *Number of LAN (for example, Ethernet) connections and speed for switches and other hardware components physically used in the test or are incorporated into the pricing structure*
- *Type and the run-time execution location of software components*

1.3.1 Measured Configuration

Figure 1-1 shows the measured configuration.



Figure 1-1 Measured Configuration

The measured configuration consisted of:

Total Nodes:	4
Total Processors/Cores/Threads:	4/128/256
Total Memory:	1.53TB
Total Number of Storage Devices:	10
Total Storage Capacity	27.04TB

Connectivity:	Mellanox SN2700 100GbE Switch
---------------	-------------------------------

Servers	1x Master Node:	3x Data Nodes:
Processors/Cores/Threads:	1/32/64	1/32/64
Processor Model:	1x AMD EPYC 7502P (2.50GHz, 32-core, 128MB L3)	1x AMD EPYC 7502P (2.50GHz, 32-core, 128MB L3)
Memory:	512 GiB	256 GiB
Storage Devices:	1x 1TB M.2 PCIe SSD Gen3	1x 1TB M.2 PCIe SSD Gen3 2x 3.84TB M.2 PCIe SSD Gen3
Network Controller:	1x Mellanox MCX516A-CCAT 100GbE 1x Supermicro AOC-MH25G-m2s2TM 10GbE and 25GbE	1x Mellanox MCX516A-CCAT 100GbE 1x Supermicro AOC-MH25G-m2s2TM 10GbE and 25GbE

The distribution of software components over server nodes is detailed in section 1.5.

1.3.2 Priced Configuration

There are no differences between the priced configuration and the measured configuration.

1.4 Dataset Distribution

The distribution of dataset across all media must be explicitly described.

Table 1-1 describes the distribution of the dataset across all storage media in the system.

Server	Storage	Disk Drive	Description of Content
1	M.2 PCIe Gen3	1 x 1TB NVMe SSD	Machbase Broker, Operating System, Root, Swap
2-4	M.2 PCIe Gen3	1 x 1TB NVMe SSD 2 x 3.84TB NVMe SSD	Operating System, Root, Swap Machbase Data, coordinator

Table 1-1 Dataset Distribution Across Storage Media

1.5 Software Component Distribution

The distribution of various software components across the system must be explicitly described.

Table describes the distribution of the software components across the system.

Server	Broker	Coordinator	Warehouse
1	X		
2		X	X
3			X
4			X

Table 1-2 Software Component Distribution Across Nodes

The storage system software used was Machbase 5.7.13.

Clause 2 Workload Related Items

2.1 Hardware and Software Tunable Parameters

Script or text used to set all hardware and software tunable parameters must be reported.

The [Supporting Files Archive](#) contains all configuration scripts.

2.2 Run Report

The run report generated by the TPCx-IoT Kit for Performance Run and Repeatability Run must be reported.

The [Supporting Files Archive](#) contains the full run report. The following excerpts from the run report summarize the Performance Run and the Repeatability Run.

Run Report for Run 1 (Repeatability Run)

```
=====
TPCx-IoT Performance Metric (IoTps) Report
Test Run 1 details :    Total Time For Warmup Run In Seconds = 1,868.691
Test Run 1 details :    Total Time In Seconds = 1,855.897
                        Total Number of Records = 4100000000
```

TPCx-IoT Performance Metric (IoTps): 2209174.3237

Run Report for Run 2 (Performance Run)

```
=====
TPCx-IoT Performance Metric (IoTps) Report
Test Run 2 details :    Total Time For Warmup Run In Seconds = 1,860.143
Test Run 2 details :    Total Time In Seconds = 1,864.439
                        Total Number of Records = 4100000000
```

TPCx-IoT Performance Metric (IoTps): 2199052.9054

2.3 Benchmark Kit Identification

The version of the TPCx-IoT kit and checksums for key files are listed below.

TPCx-IoT Kit Version	1.0.5
----------------------	-------

File	MD5
TPC-IoT-master.sh	aabeca02709f778295fcd1891ce3f74e
tpcx-iot/machbase-binding/lib/core-0.13.0-SNAPSHOT.jar	18b59e748a7026036e85e2e70ba45af5
IoT_cluster_validate_suite.sh	1d85705dc67fb3c767d7a1fe8775275f

2.4 Benchmark Kit Changes

No modifications were made to TPC-provided kit.

Clause 3 Scale Factor and Metrics

3.1 Scale Factor, Performance, Price-Performance

The metrics for Run 1 and Run 2 are summarized below.

	Run 1	Run 2
Scale Factor	4100000000	4100000000
Measured Run Time (seconds)	1,855.897	1,864.439
IoTps	2,209,174.32	2,199,052.90

Run2 Price-Performance: 190.90 \$/kIoTps

Third-Party Price Quotes

Super Micro Computer Inc.



980 Rock Ave.

San Jose, CA 95131

US

Phone: (408) 503-8000 Fax: (408) 503-8008

Please email PO to Supermicro Order Desk: epos@supermicro.com and
cc Supermicro Sales Representative.

Quotation

Date	Page
03/04/2020	1
Quotation Number	
8600387579	
Expiration Date	
04/03/2020	

Sold To:

ADVANCED MICRO DEVICES, INC (CA)
DEBBIE CHRISTOPHER
2485 AUGUSTINE DRIVE
SANTA CLARA CA 95054-3002
USA

Ship To:

ADVANCED MICRO DEVICES, INC (CA)
DEBBIE CHRISTOPHER
2485 AUGUSTINE DRIVE
SANTA CLARA CA 95054-3002
USA

Reference	Customer No.	Salesperson	Incoterms	Ship Via	Payment Terms
	AM00360U00	VIVIAN HUYEN	Ex Works	FED STD OVNIGHT CUST	NET 45 DAYS

Qty. Ord.	Item Number	Description	Unit Price	UoM	Extended Price
1	AS -2014TP-HTR	H12SST-PS, CSE-827HQ+ -R2K04BP2, UP,SATA 2U 4 Nodes 3.5"	4,500.00	EA	4,500.00
4	PSE-ROM7502-0054	Rome 7502 DP/UP 32C/64T 2.5G 128M 180W 4094, HF, RoHS	2,857.75	EA	11,431.00
8	MEM-DR464L-HL02-ER32	64GB DDR4-3200 2Rx4 (16Gb) ECC RDIMM	320.74	EA	2,565.92
24	MEM-DR432L-HL01-ER32	32GB DDR4-3200 2Rx4 ECC REG DIMM	159.51	EA	3,828.24
4	AOC-MCX516A-CCAT	MCX516A-CCAT ConnectX-5 EN,100GbE 2-p QSFP28,PCIe3x1	976.35	EA	3,905.40
4	AOC-MH25G-M2S2TM-O	SIOM 2+ 2-port 25G & 10G, SFP28 & RJ45, Mellanox (Retail)	287.39	EA	1,149.56
4	HDS-TMN0-KXG60ZNV1T02	(EOL)Toshiba XG5 1TB NVMe M.2 22x80mm < 1DWPD	175.00	EA	700.00
6	HDS-SMN1-MZ1LB3T8HMLA07	Samsung PM983 3.84TB NVMe PCIe3x4 V4 M.2 22x110mm (1.3 DWPD)	677.35	EA	4,064.10
1	MC0037	ASSEMBLY FEE	250.00	EA	250.00
1	OS4HR3	3 YR ONSITE 24X7X4 SERVICE	3,000.00	EA	3,000.00

Comments:


Less	
Order Discount	
Subtotal	35,394.22
Total sales tax	0.00
Total order	35,394.22

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Mellanox MSN2700-CS2F Spectrum 100GbE 1U Open Ethernet Switch with Mellanox Onyx 32 QSFP28 Ports 2 Power Supplies AC x86 CPU Standard Depth P2C Airflow Rail Kit RoHS6

MPN: MSN2700-CS2F Condition: **New**



Availability: Limited 🚧

MSRP: \$33,003.00

Switch Family: SN2000

Condition: New

Max Ports: 32x100GbE

Connector Type: QSFP28

Max Speed: 100GbE

ECCN: 5A991

Operating System: Mellanox Onyx

Technology: Ethernet

Product Brief: [Download MSN2700-CS2F](#)


Recommended Support: 🛠️

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Technology: Ethernet
Contract Length: 3 Years
Program Level: Silver


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TPCx-IoT 2.0.0
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TTA
Machbase 5.7.13

Report Date
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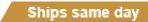
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Mellanox MCP1600-E002E30 Passive Copper Cable IB EDR up to 100Gb/s QSFP28 2m Black 30AWG
MPN: MCP1600-E002E30 Condition: **New**



Availability: [Ships same day](#) 📦

Price: **\$145.00**

Condition: [New](#)

Technology: [InfiniBand](#)

Max Speed: [EDR](#)


Material: [Copper](#)

Connector Type: [QSFP28](#)

Passive/Active: [Passive](#)

Length: [2.0m and under](#)


ECCN: [EAR99](#)


Product Brief:  [Download MCP1600-E002E30](#)


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Item	Quantity	Price	Line total
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<i>Red Hat Enterprise Linux Server, Premium (Physical or Virtual Nodes) (RH00003)</i> Feb 25, 2020 - Feb 24, 2021	12 Remove	US\$1,299.00	US\$15,588.00
Subtotal:			US\$15,588.00




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Machbase Inc.


Quotation						
Doc. No.	: MACH-SALES-20200310-01		Business License	120-87-96403		
Date	: 2020-03-10		Company	Machbase Inc.	CEO	Andrew Kim
To	: TTA		BusinessTerritory	Service, Business Service	ProductType	Software
CC	: Mr. Ki Han Choi		Address	Rn. 904, 273 Digital-ro, Guro-gu		
Charge	: Peter Lee (+82-10-7128-6127)			Seoul, Korea		
Here we quote as follows			Tel.	T : 02-2109-5607	F : 02-2038-4607	
Quote	364,364		USD (VAT Incl.)			
No.	Content		List Price (USD/Node)	Proposed Price (USD/Node)	Quantity (Node)	Tax. Incl. (USD)
1	Machbase Cluster Edition V5.7.13		98,000	63,700	4	254,800
	Machbase Run-Time License					
	Machbase Time Series DBMS					
	Machbase Client Developmet Kit					
	Machbase Coordinator					
	Machbase Broker					
	Machbase Warehouse					
	Machbase Web Admin					
	Machbase Tag Analyzer					
No.	Content		Ref. Price (USD)	Maintenance Rate (%)	Total Period (Year)	Tax. Incl. (USD)
2	Maintenance		254,800	15%	2.00	76,440
	Support & On-site Guide					
	Fault Handling					
	API Connection					
	Guide for Server & Node Configuration					
Total					331,240	364,364
<< REMARK >>						
.- Here is a quote for applying a Machbase time series database for TTA.						
.- Quotation : Machbase Cluster Edition Run-Time License 4 nodes and 3 years Maintenance (1 Year for free)						
.- Maintenance: Free maintenance for one year after the contract, 15% of maintenance rate applied afterwards.						
.- Payment terms: Cash payment terms. (Within 30 days of issue of tax invoice)						
.- Server installation condition: It is recommended to separate DB server and Storage server.						
.- Installation : Cluster Edition - 7 Days, DB Table Guide is seperately guided with DB Professional Service.						
.- Quotation validity period: 120 days from the date of quotation						
MACHBASE						

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Supporting File Index

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