AMD

TPC Express Benchmark™ IoT
Full Disclosure Report

IGinX 0.7.2

running on

XFUSION 2258 V7
(with 7x XFUSION 2258 V7 Nodes)

with

Red Hat Enterprise Linux 8.6

TPCx-IoT Version	2.1.1
Report Edition	First
Report Submitted	October 12, 2024

Abstract

AMD conducted the TPC Express Benchmark™ IoT (TPCx-IoT) on the 7x XFUSION 2258 V7. The software used included IGinX 0.7.2. 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 2.1.1.

The benchmark results are summarized below.

Configuration Summary

Sponsor	Cluster Nodes	Storage Software	Operating System
AMD	XFUSION 2258 V7	IGinX 0.7.2	Red Hat Enterprise Linux 8.6

TPC Express Benchmark™ IoT Metrics

Total System Cost (CNY)	IoTps	CNY/kIoTps	Availability Date
2,410,085.23	14,268,836.29	168.91	October 12, 2024

Executive Summary

The Executive Summary follows on the next several pages.

AMD ◣	**IGinX 0.7.2**	TPCx-IoT	2.1.1
		TPC Pricing	2.9.0
		Report Date	October 12, 2024

Total System Cost	TPCx-IoT Performance Metric	Price/Performance
2,410,085.23 CNY	**14,268,836.29 IoTps**	168.91 CNY/kIoTps

Servers	Operating System	Other Software	Availability Date
XFUSION 2258 V7	Red Hat Enterprise Linux 8.6	None	October 12, 2024

System Under Test Configuration Overview

7x XFUSION 2258 V7

2x AMD EPYC 9654 96-Core Processor
24x 64GB (1536GB) Memory
1x 100GbE 2-Port Adaptor
1x 1GbE 2-Port Adaptor
1x 3.84TB SSD
1x 1.92TB SSD

**NVIDIA MSN3700-CS2F 100GbE Switch
(32x QSFP28 Ports)**
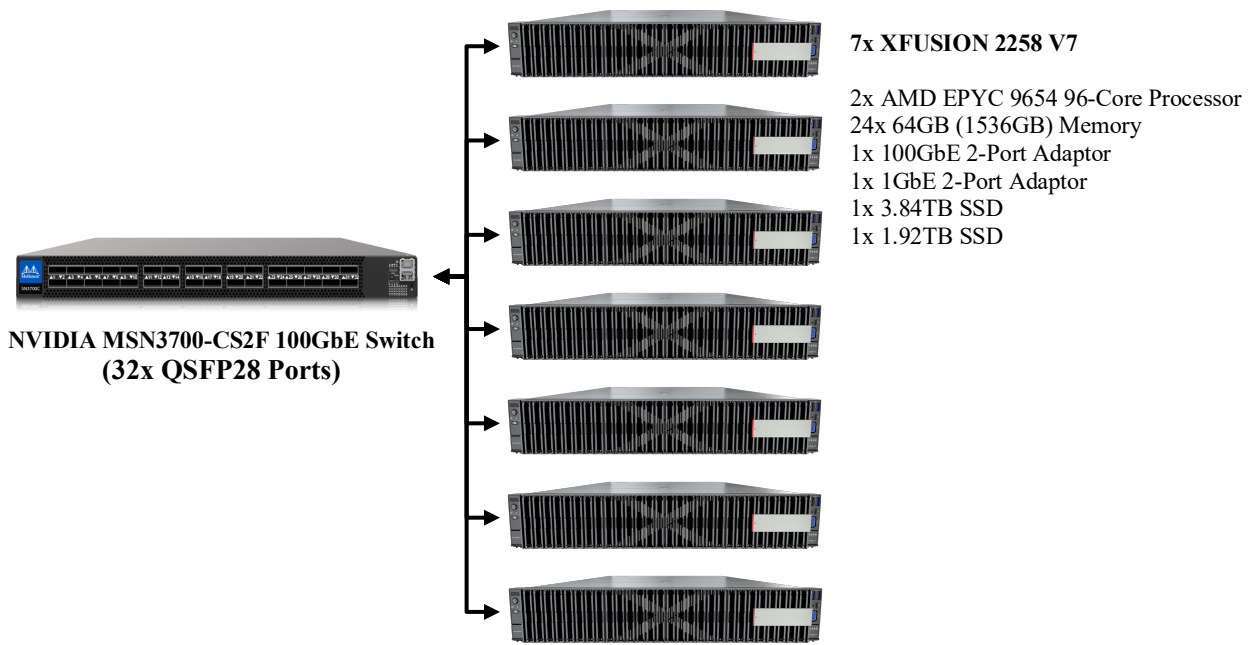
Total Servers:	7x		
Total Processors/Cores/Threads:	14/1344/2688		
Each Server Configuration	Processor	2x AMD EPYC 9654 96-Core Processor	
	Memory：	1,536GB	
	Storage Device:	1x Samsung PM1733 3.84TB 1x Samsung PM9A3 1.92TB	
	Network:	1x Broadcom BCM957508-P2100G Dual-Port 100Gbps 1x Mellanox ConnectX-4 Lx 1Gbps	
Connectivity	NVIDIA MSN3700-CS2F 100GbE Switch		
Total Rack Units:	(7x XFUSION 2258 V7) + (1x MSN3700) = (7x2) + (1x1) = 15 RU		

AMD	**IGinX 0.7.2**			TPCx-IoT	2.1.1
				TPC Pricing	2.9.0
				Report Date	October 12, 2024
Description	**Part Number**	**Source**	**List Price (CNY)**	**Qty**	**Extended Price (CNY)**
Server Hardware					
XFUSION 2258 V7 2x AMD EPYC 9654 96-Core Processor 24x 64GB (1536GB) Memory 1x 1GbE 2-Port Adaptor 1x 3.84TB SSD 1x 1.92TB SSD	2258V7	3	-	7	1,542,349.75
			Sub-Total		1,542,349.75
Network					
NVIDIA MSN3700-CS2F 100GbE Switch	SN3700	1	134,330.00	1	134,330.00
Dual-port 100G network adapter	P2100G	1	4,508.55	7	31,559.85
5M QSFP 100G DAC cable	Q28-PC05	1	544.39	7	3,810.73
			Sub-Total		169,700.58
Software					
IGinX v0.7.2 Cluster Edition 7x24h Technical Support	-	2	486,000.00	1	486,000.00
Red Hat Enterprise Linux Server, Premium (1 year)	-	4	10,096.90	21	212,034.90
			Sub-Total		698,034.90
			Total		2,410,085.23

Price Sources:
1) Advanced Micro Devices, Inc. (AMD)
2) 北京市赛翼科技有限公司 (Beijing Saiyi Technology Co., Ltd.)
3) xFusion Digital Technologies Co., Ltd.
4) Red Hat Inc.

Three-Year Cost of Ownership	2,410,085.23 CNY
IoTps	14,268,836.29
CNY/kIoTps:	168.91

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.

AMD	**IGinX 0.7.2**	TPCx-IoT	2.1.1
		TPC Pricing	2.9.0
		Report Date	October 12, 2024

Numerical Quantities

Scale Factor   35,000,000,000

Performance Run (Run1)

Warmup Run Start Time	2024-10-12 00:14:42
Warmup Run End Time	2024-10-12 00:52:27
Warmup Run Elapsed Time	2,264.643
Measured Run Start Time	2024-10-12 00:52:29
Measured Run End Time	2024-10-12 01:32:01
Measured Run Elapsed Time	2,371.514
Performance Metric (IoTps)	14,758,504.48

Performance Run (Run2)

Warmup Run Start Time	2024-10-12 02:09:32
Warmup Run End Time	2024-10-12 02:46:31
Warmup Run Elapsed Time	2,218.482
Measured Run Start Time	2024-10-12 02:46:34
Measured Run End Time	2024-10-12 03:27:27
Measured Run Elapsed Time	2,452.898
Performance Metric (IoTps)	**14,268,836.29**

TPCx-IoT 2.1.1
Full Disclosure Report

Tsinghua University
IGinX 0.7.2

Report Date
October 12, 2024

AMD	**IGinX 0.7.2**	TPCx-IoT	2.1.1
		TPC Pricing	2.9.0
		Report Date	October 12, 2024

Performance Run Report (Run1)

```
===============================================
TPCx-IoT Performance Metric (IoTps) Report

Test Run 1 details : Total Time For Warmup Run In Seconds = 2,264.643
Test Run 1 details : Total Time In Seconds = 2,371.514
                 Total Number of Records = 35,000,000,000

TPCx-IoT Performance Metric (IoTps): 14,758,504.48

===============================================
```

Repeatability Run Report (Run2)

```
===============================================
TPCx-IoT Performance Metric (IoTps) Report

Test Run 2 details : Total Time For Warmup Run In Seconds = 2,218.482
Test Run 2 details : Total Time In Seconds = 2,452.898
                 Total Number of Records = 35,000,000,000

TPCx-IoT Performance Metric (IoTps): 14,268,836.29

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```

Summary details of the run reports are shown above. For the complete run reports, see the Supporting Files Archive.

AMD	**IGinX 0.7.2**	TPCx-IoT	2.1.1
		TPC Pricing	2.9.0
		Report Date	October 12, 2024

Revision History

Date	Edition	Description
October 12, 2024	First	Initial Publication

Table of Contents

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 sp*onsored by AMD.*

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.

7x XFUSION 2258 V7

2x AMD EPYC 9654 96-Core Processor
24x 64GB (1536GB) Memory
1x 100GbE 2-Port Adaptor
1x 1GbE 2-Port Adaptor
1x 3.84TB SSD
1x 1.92TB SSD

NVIDIA MSN3700-CS2F 100GbE Switch
(32x QSFP28 Ports)
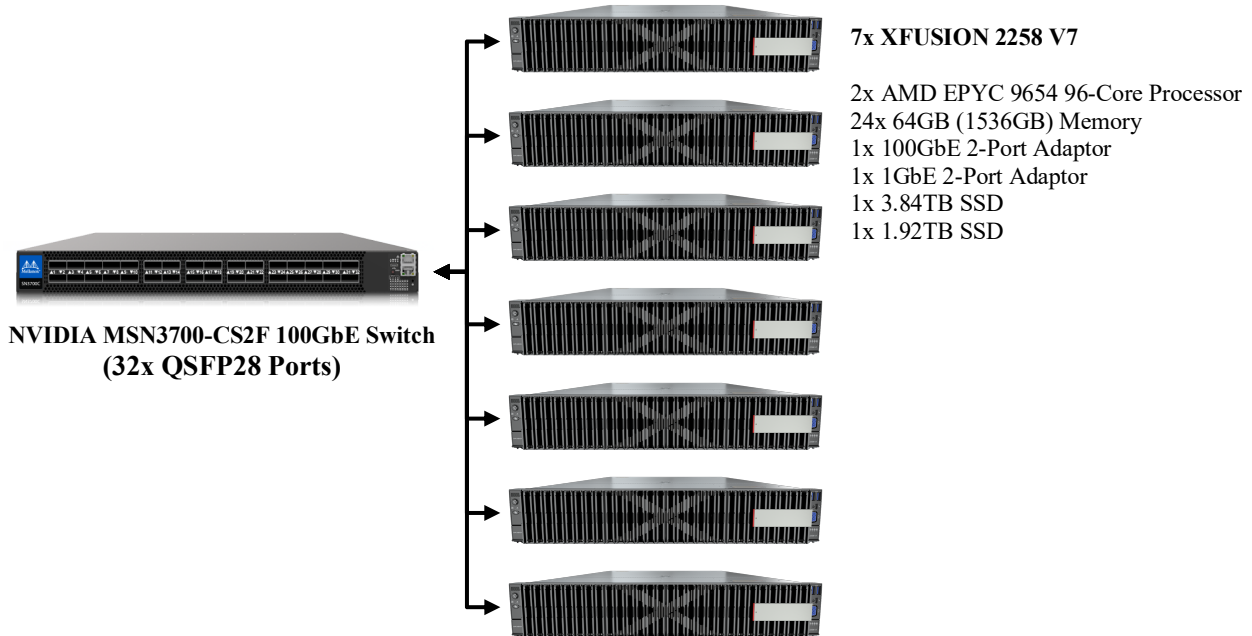
The measured configuration consisted of:

Total Nodes:	7
Total Processors/Cores/Threads:	14/1,344/2,688
Total Memory:	10,752GB
Total Number of Used Storage Devices:	7
Total Used Storage Capacity:	26.88TB
Connectivity:	NVIDIA MSN3700-CS2F 100GbE Switch
Servers	7x XFUSION 2258 V7
Processors/Cores/Threads:	14/1344/2688
Processor Model:	14x AMD EPYC 9654 96-Core Processor
Memory:	7x 1536GB
Storage Devices:	7x Samsung PM1733 3.84TB
	7x Samsung PM9A3 1.92TB (unused)
Network Controller:	7x Broadcom BCM957508-P2100G Dual-Port 100Gbps
	7x Mellanox ConnectX-4 Lx 1Gbps

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
1-7	All Storage	1x Samsung PM1733 3.84TB	Operating System, Swap, Root, IGinX All Data, Benchmark
	Unused Storage	1x Samsung PM9A3 1.92TB	Unused

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	Zookeeper	IGinX
1	X	X
2		X
3		X
4		X
5		X
6		X
7		X

The storage system software used was IGinX 0.7.2. IGinX is a polystore system open sourced by Tsinghua University under the LGPL-3.0 license. For more information, please refer to https://github.com/IGinX-THU/IGinX. 北京市赛翼科技有限公司 (Beijing Saiyi Technology Co., Ltd.) offers premium maintenance and support services on a contractual basis.

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.

Performance Run Report (Run1)

```
===============================================
TPCx-IoT Performance Metric (IoTps) Report

Test Run 1 details : Total Time For Warmup Run In Seconds = 2,264.643
Test Run 1 details : Total Time In Seconds = 2,371.514
                    Total Number of Records = 35,000,000,000

TPCx-IoT Performance Metric (IoTps): 14,758,504.48

===============================================
```

Repeatability Run Report (Run2)

```
===============================================
TPCx-IoT Performance Metric (IoTps) Report

Test Run 2 details : Total Time For Warmup Run In Seconds = 2,218.482
Test Run 2 details : Total Time In Seconds = 2452.898
                    Total Number of Records = 35,000,000,000

TPCx-IoT Performance Metric (IoTps): 14,268,836.29

===============================================
```

2.3   Benchmark Kit Identification

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

TPCx-IoT Kit Version	2.1.1

File	MD5
TPC-IoT-master.sh	cc24620cfdee0829od771c5471a8d1ee
./tpcx-iot/lindormtsdb-binding/lib/core-0.13.0-SNAPSHOT.jar	a211f7290bc163ed88473e2cae2e6bc8
IoT_cluster_validate_suite.sh	b2342754095f973ce27f43c28d3ca0ae

2.4   Benchmark Kit Changes

Add IGinX JDBC driver JAR package into directory "./tpcx-iot/lindormtsdb-binding/lib".

No modifications were made to the TPC provided kit other than the following scripts:

- Benchmark_Macros_LindormTSDB.sh
- IoTDataCheck_LindormTSDB.sh
- IoTDataRowCount_LindormTSDB.sh

```
$ diff Benchmark_Macros_LindormTSDB.sh org/Benchmark_Macros_LindormTSDB.sh
3,4c3,4
< # List of IGinX Server IP, separated by ":"
<
DB_HOSTS=192.168.100.101#192.168.100.102#192.168.100.103#192.168.100.106#192.16
8.100.107#192.168.100.108#192.168.100.110
---
> IOT_DATABASE="benchmark"
> IOT_DATA_TABLE="sensor"
6,7c6
< # IGinX Server IP to be used by client
< DB_HOST=192.168.100.101
---
> CHECK_IF_TABLE_EXISTS="exists table $IOT_DATA_TABLE;"
9,10c8
< # IGinX Server Port of all the nodes
< DB_PORT="6888"
---
> TRUNCATE_TABLE="drop database $IOT_DATABASE; create database $IOT_DATABASE
with (string_compression = 'true', skip_wal = 'true', shard_num = 200); use
$IOT_DATABASE; create table $IOT_DATA_TABLE (device_id VARCHAR TAG, time
BIGINT, field0 VARCHAR, PRIMARY KEY (device_id));"
12,13c10
< # Client batch size
< BATCH_SIZE="10000"
---
> CREATE_TABLE="create database $IOT_DATABASE with (string_compression =
'true', skip_wal = 'true', shard_num = 200); use $IOT_DATABASE; create table
$IOT_DATA_TABLE (device_id VARCHAR TAG, time BIGINT, field0 VARCHAR, PRIMARY
KEY (device_id));"
15c12
```

```
< CHECK_IF_TABLE_EXISTS="show columns;"
---
> CHECK_STATS_DB="show databases;"
17c14
< TRUNCATE_TABLE="clear data;"
---
> COUNT_ROWS_IN_TABLE="use $IOT_DATABASE; stats table $IOT_DATA_TABLE;"
19c16
< CREATE_TABLE="quit;"
---
> SUT_TABLE_PATH="/tsdb/data/*/default/$IOT_DATABASE*/*/chunks/0/*"
21c18
< CHECK_STATS_DB="show cluster info;"
---
> ROW_COUNT="ROWS="
23c20
< COUNT_ROWS_IN_TABLE="count points;"
---
> DB_HOST="tsdb-1"
25c22
< SUT_SHELL="xargs sh $IGINX_CLI_PATH/start_cli.sh -h $DB_HOST -p $DB_PORT -e"
---
> DB_PORT="8242"
27c24
<
SUT_PARAMETERS="lindorm.tsdb.url=jdbc:iginx:tsdb:,iginx.authorities=$DB_HOSTS,l
indorm.tsdb.batchsize=$BATCH_SIZE,lindorm.tsdb.debug=true,lindorm.tsdb.hosts=No
SuchHost"
---
> SUT_SHELL="lindorm-cli -url jdbc:lindorm:tsdb:url=http://$DB_HOST:$DB_PORT"
29c26,27
< SUDO="sudo"
---
> # limdorm.tsdb.hosts : Lindorm TSDB connection string or lists of cluster
nodes, separated by ":"
> SUT_PARAMETERS="lindorm.tsdb.hosts=tsdb-1:tsdb-2:tsdb-3:tsdb-4:tsdb-5:tsdb-
6:tsdb-7:tsdb-8:tsdb-9:tsdb-
10,lindom.tsdb.port=$DB_PORT,lindorm.tsdb.batchsize=18000,lindorm.tsdb.database
=$IOT_DATABASE,lindorm.tsdb.table=$IOT_DATA_TABLE,lindorm.tsdb.driver.http.comp
ression=true,lindorm.tsdb.debug=false"
30a29
> SUDO="sudo"
```

$ diff IoTDataCheck_LindormTSDB.sh org/IoTDataCheck_LindormTSDB.sh
```
2d1
< CLUSTER_SHELL=0
4d2
< CLUSTER_SHELL=1
6c4,25
< echo '"show replica number;"' | $SUT_SHELL | tail -n 3 | head -n 1
---
> #
> # Licensed to the Apache Software Foundation (ASF) under one
> # or more contributor license agreements.  See the NOTICE file
```

```
> # distributed with this work for additional information
> # regarding copyright ownership.  The ASF licenses this file
> # to you under the Apache License, Version 2.0 (the
> # "License"); you may not use this file except in compliance
> # with the License.  You may obtain a copy of the License at
> #
> #      http://www.apache.org/licenses/LICENSE-2.0
> #
> # Unless required by applicable law or agreed to in writing, software
> # distributed under the License is distributed on an "AS IS" BASIS,
> # WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
> # See the License for the specific language governing permissions and
> # limitations under the License.
> #
> #  @author Chinmayi Narasimhadevara
> #
> # Modify HDFS shell log level
> export HADOOP_ROOT_LOGGER=ERROR
> hadoop fs -stat %r $SUT_TABLE_PATH | head -n 1
```

$ diff IoTDataRowCount_LindormTSDB.sh org/IoTDataRowCount_LindormTSDB.sh
```
2d1
< CLUSTER_SHELL=0
4d2
< CLUSTER_SHELL=1
6,7c4,25
< echo $COUNT_ROWS_IN_TABLE | $SUT_SHELL >$PWD/logs/IoTValidate-time-run$1.txt
< num_rows=$(cat $PWD/logs/IoTValidate-time-run$1.txt | tail -n 3 | head -n 1)
---
> #
> # Licensed to the Apache Software Foundation (ASF) under one
> # or more contributor license agreements.  See the NOTICE file
> # distributed with this work for additional information
> # regarding copyright ownership.  The ASF licenses this file
> # to you under the Apache License, Version 2.0 (the
> # "License"); you may not use this file except in compliance
> # with the License.  You may obtain a copy of the License at
> #
> #      http://www.apache.org/licenses/LICENSE-2.0
> #
> # Unless required by applicable law or agreed to in writing, software
> # distributed under the License is distributed on an "AS IS" BASIS,
> # WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
> # See the License for the specific language governing permissions and
> # limitations under the License.
> #
> #  @author Chinmayi Narasimhadevara
> #
> #
>
> num_rows=$(echo $COUNT_ROWS_IN_TABLE | $SUT_SHELL | grep $IOT_DATA_TABLE |
cut -d'|' -f 3 | awk '{print $2}')
```

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	35,000,000,000	35,000,000,000
Measured Run Time (seconds)	2371.514	2452.898
IoTps	14,758,504.48	14,268,836.29

Run2 Price-Performance: 168.91 CNY/kIoTps

Third-Party Price Quotes

Advanced Micro Devices, Inc. (AMD)

Shipment #: _____

Advanced Micro Devices
AMD International Shipping Request Form

AMD⧨

Date:	2024/10/12			Ship To:	AMD China
From:					1F, Tower 1, Candor Plaza
Cost Center:	1007751				No.669 Huanke Rd., Pudong District,
Ph. Ext:					Shanghai 201210, China
Product Group:	DEAE			Attn:	Chaojun Liang
RMA / PO / Assett Transfer #:				Tel:	13818125335

IMPORTANT - WILL SHIPMENT BE RETURNING TO THE UNITED STATES?   **YES** ☐   **NO** [X]

Item	Commodity Description (List Complete OPN for IC's)	Processor Speed	Restricted	Qty	Unit Price	Total Price	Country Of Mfg.	Model Number	Serial Number	FCC ID Number
1	Mellanox SN3700 100G switch			1	¥134,330.00	¥134,330.00	India	SN3700	MT2248J23265	
2	Dual-port 100G network adapter			7	¥4,508.55	¥31,559.85	Vietnam	P2100G		
4	5M QSFP 100G DAC cable			7	¥544.39	¥3,810.73	China	Q28-PC05		
6						¥169,700.58				
7										
8										
9										
10										

SPECIAL INSTRUCTIONS: Cutoff for same day shipment is noon. Some shipment may require special approval and will not be shipped same day.
Please select service level from below:

☐   **Priority – FedEx 2-3 days (for urgent shipments only)**
X   **Standard/Economy – FedEx/DHL 3-5 days (Default Service Level)**
☐   **CEVA Freight 5-7 days (for shipments over 150 LBS)**

*Transit times are estimates and may vary by destination. Special service requests will require shipping management's approval- please contact Iyla Elkins <iyla.elkins@amd.com>.

TPCx-IoT 2.1.1
Full Disclosure Report

Tsinghua University
IGinX 0.7.2

Report Date
October 12, 2024

北京市赛翼科技有限公司（Beijing Saiyi Technology Co.，Ltd.）

北京赛翼科技有限公司(Beijing Saiyi Technology Co., Ltd.)

QUOTATION   Date: 2024-10-12

From:

Contact Persion: Bo Xu
Company Address: Room 101, Building 22, Area 16, No. 188, South 4th Ring Road West, Fengtai District, Beijing
Phone: +86 18910368011
Fax: +86 (0)10-62783622
E-Mail: saiyitech@126.com

To:

[Company Name]:
[Company Address]:
[E-Mail]:
[Phone]:

No.	Product	Quantity	List Price (CNY)	Total Price (CNY)
1	**IGinX Cluster Maintenance** 3-year support for time-series data management using the IGinX cluster (supporting a maximum of 10 IGinX process instances), including 7x24 remote troubleshooting, debugging, updates, etc.	1	486,000	486,000
			Total	486,000 CNY

Notes:
1. The company reserves the right of final interpretation for this pricing system.
2. This quotation is tax-inclusive.
3. This quotation is valid for 300 days from the date of quote.

IGinX is a polystore system open sourced by Tsinghua University under the LGPL-3.0 license. For more information, please refer to https://github.com/IGinX-THU/IGinX. 北京市赛翼科技有限公司 (Beijing Saiyi Technology Co., Ltd.) offers premium maintenance and support services on a contractual basis.

xFusion Digital Technologies Co., Ltd.

PRICE SCHEDULE

2258 V7 Server

αFUSION

xFusion Digital Technologies Co., Ltd.

2024-10-12

αFUSION

QUOTATION DISCLAIMER

1-This offer is valid until 2024-12-29.

2-The price in this offer only covers the specific items (such as hardware, software and service, etc.) in the BOQ list, excluding the optional parts.

3-The prices of storage battery shall only be applied to this contract.

Please refer to the L3 table for the detail version information.

xFusion shall be entitled to select another supplier if the nominated supplier is no longer qualified or in default of its performance.

Extra charge shall be paid for exceeded length of cables based on actual site information.

Important:The total price of Trunk Cable,Optical Fiber,Ethernet Cable,Jumper Cable,Power Cable,Installation Materials,Auxiliary,Feeders are firmed and shall remain unchanged regardless quantities and required items used on actual.

Statement on Embedded Software License : xFusion application package might include Embedded Software License (abbreviated as "ESL", means a third-party software that must be bundled or integrated with application software or equipment of xFusion, of which limited license is granted by owner to users for designated purpose other than anyone else. Maintenance and Upgrade can not be executed independently or separately). ESL can only be used through xFusion's application package and (1) shall not be installed, configured, upgraded, or modified directly; (2) nor be accessed directly, but solely through xFusion's application package. xFusion may only access the ESL directly for purposes of providing technical assistance.

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No.	Part Number	Model	Description	Qty.	Total Price (CNY)
1	2258 V7_Site1				
1.1	2258 V7				
1.1.1	2258 V7				
1.1.1.1	Base Configuration				
	0231Y732	2258 V7-S8AAC	AMD Genoa (8*2.5inch HDD Chassis)A22H-07	7	
	0231Y019	PAC2000S12-B1	Server Platinum 2000W Version 2.0 AC power supply	7	
1.1.1.2	AMD Genoa CPU(With 2U Body 2U Special Heatsink)				
	0253Y512	BC1AM001CPU	AMD Genoa 9654(2.4GHz/96-Core/384MB/360W)CPU (with 2U body 2U special heat sink)	14	
1.1.1.3	Memory				
	0620Y006	M548R64	DDR5 RDIMM DRAM-64GB-4800MT/s-1.1V-ECC-2Rank(4G*4bit)	168	
1.1.1.4	Hard Disk(with 2.5" Front Panel)-NVMe				
	0255Y301	PM9A31T9V7S2	SSD,1920GB,NVMe PCIe,Read Intensive,PM9A3 Series,2.5inch(2.5inch Drive Bay)	7	
	02312TBN	MZWLJ3T8HBLS-00007C	SSD,3840GB,NVMe PCIe,Read Intensive,PM1733 series,2.5inch(2.5inch Drive Bay)	7	
1.1.1.5	Riser Card				
	0258Y016	BC1M01PRUB	1*16X SLOT(PCIE5.0)+2*8X SLOT(PCIE4.0)-IO1&2 module	7	
1.1.1.6	HDD IO Module				
	0258Y186	BC1M03NHBC	Rear 4*2.5" Hard Disk Backplane Module for NVME for AMD	7	
1.1.1.7	PCIe Card-NIC				
	0231Y815	XP380	XP380 Ethernet Adapter,25GE(Mellanox CX-4 Lx),Dual-Port,SFP28(without Optical Transceiver),Half-height Half-length,Full Handle bars,PCIE 3.0 x8	7	
1.1.1.8	Fan and Air duct				
	0231Y191	BC1M22FAN	8038+ Fan module	28	
	2120Y164	2120Y164_DRAEN.ASM	Air duct (2U)	7	
1.1.1.9	Cable				
	1427Y071-003	XC-1427Y071-003	BTB Connector module,74pin-36pin*2,UBC 8X curved,750mm&650mm,0.16mm,10mm,1536MB/s,Wire mounting,Y	7	
1.1.1.10	Cable and Optical Module				
	3406Y008	OMXD300112	Optical transceiver,25GBase-SR,0.1km	14	
1.1.1.11	Guide Rail and Slide Rail				
	21240434	EGUIDER01	2U Static Rail Kit(Direct delivery materials)	7	
1.1.1.12	C13 wall plug power cords all over the world				
	04050955	IDSV2DKBM55	Power Cords Cable,China AC Power,250V10A,1.5m,PISM,227IEC53(RVV)1.0mm^2(3C),C13SF,250V,10A,Black	7	
1.1.1.13	C13 PDU power cords all over the world				
	04050188	IDS2PWRCBL00	Power Cords Cable,China AC Power 250V10A,1.5m,C14SM,227IEC53(RVV)1.0mm^2(3C),C13SF,PDU Cable	7	

TPCx-IoT 2.1.1
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Tsinghua University
IGinX 0.7.2

Report Date
October 12, 2024

αFUSION

No.	Part Number	Model	Description	Qty.	Total Price (CNY)
1.1.2	**Technical Support Service**				
	88136SCJ-265	0231Y732_88136SCJ-265_36	AMD Genoa (8*2.5inch HDD Chassis)A22H-07_Super-Care Premium Service Gold+7x24x4H 2258 V7_36Month(s)	7	
		Product Total Price			1,502,182.00
		Service Total Price			40,167.75
		Project Total Price			1,542,349.75

Red Hat Inc.

RED HAT STORE

Shopping Cart

Order summary

Item	Quantity	Price	Line total
New Subscription Contract			
Red Hat Enterprise Linux Server, Premium (Physical or Virtual Nodes) (RH00003) Oct 12, 2024 – Oct 11, 2025	21 ⇕ Remove	US$1,428.90	US$30,006.90

Subtotal: US$30,006.90

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USD to CNY Currency Conversion Rate

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QUOTES & COMPANIES

4:57 PM EDT 10/11/24
7.0662
-0.0136 -0.19% ▼

1 Day Range
7.0635 - 7.0873

52 Week Range
7.0033 - 7.3235
(09/27/24 - 10/20/23)

1D   **5D**   1M   3M   YTD   1Y   3Y $ %

Oct 6 Oct 7   Oct 8   Oct 9   Oct 10   Oct 11

7.075
7.050
7.025
7.000

ADVANCED CHARTING   COMPARE ▾

Open 7.0778   Prior Close 7.0662 (10/11/24)
1 Day   USDCNY -0.19% ▼   EURUSD 0.00%   USDJPY 0.39% ▲   BUXX 0.03% ▲

OVERVIEW   **HISTORICAL PRICES**   ADVANCED CHARTING   NY CLOSING EXCHANGE RATES   KEY CROSS RATES

07/14/2024 to 10/12/2024   GO

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DATE	OPEN	HIGH	LOW	CLOSE
10/11/24	7.0778	7.0873	7.0635	7.0662
10/10/24	7.0821	7.0823	7.0619	7.0798
10/09/24	7.0592	7.0837	7.0544	7.0820
10/08/24	7.0203	7.0881	7.0196	7.0594
10/07/24	7.0496	7.0496	7.0179	7.0202

Currency conversion rate is quoted from https://www.wsj.com/market-data/quotes/fx/USDCNY/historical-prices

Base on above currency exchange rate, following table shows the prices with respect to CNY :

Description	List Price (USD)	List Price (CNY)
Red Hat Enterprise Linux Server, Premium	1,428.90	10,096.90

*Note : USD to CNY currency conversion rate is 1:7.0662, which is based on the NY Closing Exchange Rate on October 11, 2024.

Base on above currency exchange rate, following table shows the IoT Metrics with respect to USD :

TPC Express Benchmark™ IoT Metrics

Total System Cost (USD)	IoTps	USD/kIoTps
341,072.33	14,268,836.29	23.91

*Note : USD to CNY currency conversion rate is 1:7.0662, which is based on the NY Closing Exchange Rate on October 11, 2024.

Supporting File Index

Clause	Description	Archive Pathname
Clause 1	Parameters and options used to configure and tune the SUT	/Clause1
Clause 2	Configuration scripts and Run Report	/Clause2
Clause 3	System configuration details	/Clause3

TPCx-IoT 2.1.1
Full Disclosure Report

Tsinghua University
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Report Date
October 12, 2024