

Alibaba Cloud Computing Ltd.

TPC Benchmark™ DS

Full Disclosure Report

for

Alibaba Cloud AnalyticDB (ADB)

(with 18 Alibaba AnalyticDB Elastic Compute Unit)

using

Alibaba Cloud AnalyticDB 3.0.12

and

Alibaba Group Enterprise Linux Server release 7.2 (Paladin)

First Edition

June 14, 2020

First Edition – June, 2020

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Abstract

This document contains the methodology and results of the TPC Benchmark™ DS (TPC-DS) test conducted in conformance with the requirements of the TPC-DS Standard Specification, Revision 2.11.0.


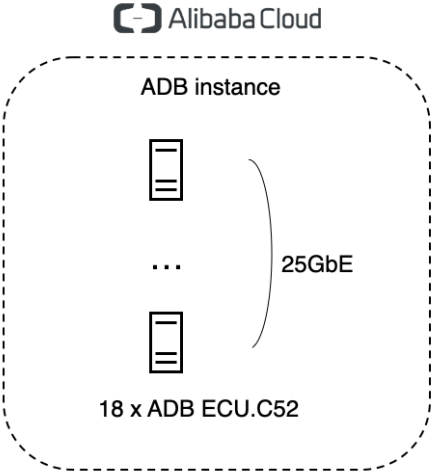
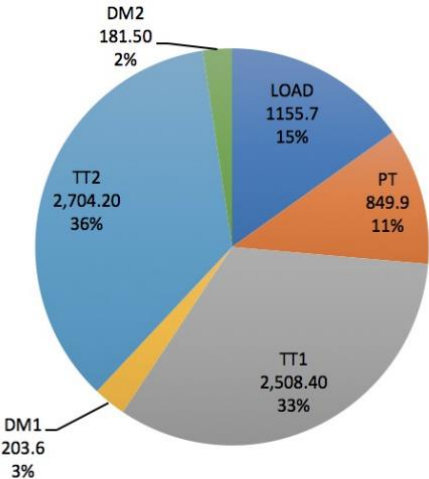
The test was conducted at a Scale Factor of 10000GB with 18 AnalyticDB ECU running Alibaba Cloud AnalyticDB version 3.0.12 on Alibaba Group Enterprise Linux Server release 7.2(Paladin).

Measured Configuration

Company Name	Cluster Node	Database Software	Operation System
Alibaba Cloud Computing Ltd.	Alibaba Cloud AnalyticDB Elastic Compute Unit	Alibaba Cloud AnalyticDB 3.0.12	Alibaba Group Enterprise Linux Server release 7.2 (Paladin)

TPC Benchmark™ DS Metrics

Total System Cost (RMB)	TPC-DS Throughput (QphDS@10000GB)	Price/Performance (RMB/QphDS@10000GB)	Availability Date
¥1,126,006.68	18,998,559	¥0.06	As of Publication

 Alibaba Cloud	Alibaba Cloud AnalyticDB		TPC-DS: 2.11.0 TPC-Pricing: 2.5.0 Report Date: June 14, 2020	
Total System Cost	TPC-DS Throughput	Price/Performance	System Availability Date	
¥1,126,006.68 RMB	18,998,559 QphDS@10000GB	¥0.06 RMB/QphDS@10000GB	As of Publication	
Dataset Size ¹	Database Manager	Operation System	Other Software	Cluster
10,000 GB	Alibaba Cloud AnalyticDB 3.0.12	Alibaba Group Enterprise Linux Server 7.2 (Paladin)	N/A	Yes
 <p style="text-align: center;">Benchmarked Configuration</p>		 <p style="text-align: center;">Elapsed Time</p>		
Load includes backup = No		RAID = No		
System Configuration:		Alibaba Cloud AnalyticDB Cluster		
Servers:		18 x ECU C52		
Total Processors/Cores/Threads:		936 virtual cores (threads)		
Total Memory:		6,912 GB		
Total Storage:		144,000 GB		
Storage Ratio:		14.4		
Server Configuration:		Per node (ECU C52)		
Processors/Cores/Threads:		52 virtual cores (threads)		
Memory:		384 GB		
Network:		25Gbps		
Storage Device:		8,000 GB SSD (4 x 2,000 GB NVMe)		
<p>1. Dataset Size includes only raw data (i.e., no temp, index, redundant storage space, etc.).</p> <p>2. Total Storage = 8,000 * 18 (ECU SSD) = 144,000 GB</p> <p>3. Storage Ratio = Total Storage / SF = 144,000 GB / 10,000 GB</p>				

Alibaba Cloud		Alibaba Cloud AnalyticDB			TPC-DS: 2.11.0 TPC-Pricing: 2.5.0 Report Date: June 14, 2020		
Description	Part Number	Src	Unit Price (RMB)	Qty	Ext. Price (RMB)	3-Year Maint. (RMB)	
Licence Compute and Software Services							
<u>AnalyticDB 3.0 Cluster (3-Year Pre-Pay)</u>	(Est China 2)	1	1,122,709.68	1	1,122,709.68	included	
- C52 Node Group (3 ECU nodes per group)			included	6			
- 8,000GB Storage (per ECU node)			included	18			
- Private Network			included	1			
Licence Computer and Software Services Sub-Total					1,122,709.68	0.00	
Other Components							
Lenovo MIIX 210 Laptop (Includes spares)		2	1,099.00	3	3,297.00		
Other Components Sub-Total					3,297.00	0.00	
1 = Alibaba Cloud, 2 = Tmall.com				3-Year Cost of Ownership		1,126,006.68	
				QphDS@10000GB		18,998,559	
Audited by Francois Raab, InfoSizing				RMB/QphDS@10000GB		0.06	
<p>Prices used in TPC benchmarks reflect the actual prices a customer would pay for a one-time purchase of the stated components. Individually negotiated discounts are not permitted. Special prices based on assumptions about past or future purchases are not permitted. All discounts reflect standard pricing policies for the listed components. For complete details, see the pricing sections of the TPC benchmark specifications. If you find that the stated prices are not available according to these terms, please inform at pricing@tpc.org. Thank you.</p>							

Alibaba Cloud		Alibaba Cloud AnalyticDB		TPC-DS: 2.11.0 TPC-Pricing: 2.5.0 Report Date: June 14, 2020	
Metrics Details:					
Name	Value	Unit			
Scale Factor (SF)	10,000	GB			
Streams	4	Stream			
Queries (Q)	396	Queries			
T_load	1,155.7	Second			
T_ld	0.0129	Hour			
T_power	849.9	Second			
T_pt	0.9444	Hour			
T_tt1	2,508.5	Second			
T_tt2	2,704.3	Second			
T_dm1	203.6	Second			
T_dm2	181.5	Second			
T_tt	1.4480	Hour			
T_dm	0.1070	Hour			
Load Step	Start	End	(sec.)	(hh:mm:ss)	
Build	06/14/20 20:32:43.98	06/14/20 20:51:59.68	1,155.70	0:19:16	
Audit	06/14/20 20:51:59.68	06/14/20 21:18:38.49	1,598.81	0:26:39	
Finish	06/14/20 21:18:38.49	06/14/20 21:18:38.49	0.00	0:00:00	
Reported	06/14/20 20:32:43.98	06/14/20 21:18:38.49	1,155.70	0:19:16	
Test	Start	End	(sec.)	(hh:mm:ss)	
Power	06/14/20 21:30:19.94	06/14/20 21:44:29.83	849.89	0:14:10	
Thruput-1	06/14/20 21:44:29.83	06/14/20 22:26:18.24	2,508.41	0:41:48	
DM-1	06/14/20 22:26:18.25	06/14/20 22:29:41.85	203.60	0:03:24	
Thruput-2	06/14/20 22:29:41.86	06/14/20 23:14:46.07	2,704.21	0:45:04	
DM-2	06/14/20 23:14:46.07	06/14/20 23:17:47.52	181.45	0:03:01	
Stream	Start	End	(sec.)	(hh:mm:ss)	
Pt - 0	06/14/20 21:30:19.94	06/14/20 21:44:29.83	849.89	0:14:10	
Tt1 - 1	06/14/20 21:44:29.83	06/14/20 22:25:33.32	2,463.49	0:41:03	
Tt1 - 2	06/14/20 21:44:29.83	06/14/20 22:24:47.74	2,417.91	0:40:18	
Tt1 - 3	06/14/20 21:44:29.83	06/14/20 22:25:41.91	2,472.08	0:41:12	
Tt1 - 4	06/14/20 21:44:29.83	06/14/20 22:26:18.24	2,508.41	0:41:48	
Tt2 - 5	06/14/20 22:29:41.86	06/14/20 23:14:46.07	2,704.21	0:45:04	
Tt2 - 6	06/14/20 22:29:41.86	06/14/20 23:14:45.68	2,703.82	0:45:04	
Tt2 - 7	06/14/20 22:29:41.86	06/14/20 23:13:53.42	2,651.56	0:44:12	
Tt2 - 8	06/14/20 22:29:41.86	06/14/20 23:14:37.68	2,695.82	0:44:56	
DMt1 - 1	06/14/20 22:26:18.25	06/14/20 22:28:13.10	114.85	0:01:55	
DMt1 - 2	06/14/20 22:28:13.09	06/14/20 22:29:41.85	88.76	0:01:29	
DMt2 - 3	06/14/20 23:14:46.07	06/14/20 23:16:14.10	88.03	0:01:28	
DMt2 - 4	06/14/20 23:16:14.10	06/14/20 23:17:47.52	93.42	0:01:33	

Timing Intervals for Queries (in Seconds)

Query	Stream 0	Stream 1	Stream 2	Stream 3	Stream 4	Min	25%tile	Median	75%tile	Max	Stream 5	Stream 6	Stream 7	Stream 8	Min	25%tile	Median	75%tile	Max
1	1.9	4.5	10.9	3.6	32.5	3.6	4.3	7.7	16.3	32.5	7.6	9.8	3.9	10.0	3.9	6.7	8.7	9.9	10.0
2	6.8	14.7	14.8	20.8	12.8	12.8	14.2	14.8	16.3	20.8	15.7	17.4	21.5	15.9	15.7	15.9	16.7	18.4	21.5
3	4.4	12.8	20.4	26.7	10.9	10.9	12.3	16.6	22.0	26.7	22.0	19.6	16.3	10.1	10.1	14.8	18.0	20.2	22.0
4	27.3	43.3	53.5	79.3	40.6	40.6	42.6	48.4	60.0	79.3	44.9	50.3	46.5	43.3	43.3	44.5	45.7	47.5	50.3
5	10.2	29.7	19.6	41.7	63.6	19.6	27.2	35.7	47.2	63.6	25.6	36.1	44.5	28.3	25.6	27.6	32.2	38.2	44.5
6	1.1	5.0	1.4	4.0	4.0	4.0	4.0	4.0	4.3	5.0	12.7	2.1	2.8	2.5	2.1	2.4	2.7	3.2	5.3
7	2.9	13.1	12.9	15.8	4.4	4.4	10.8	13.0	13.8	15.8	7.3	9.0	15.2	3.4	3.4	6.3	8.2	10.6	15.2
8	8.1	21.7	55.6	18.0	33.2	18.0	20.8	27.5	38.8	55.6	38.9	23.3	16.3	22.1	16.3	20.7	22.7	27.2	38.9
9	19.7	61.5	61.1	25.6	21.1	21.1	24.5	43.4	61.2	61.5	30.3	36.5	43.9	49.1	30.3	35.0	40.2	45.2	49.1
10	2.0	16.5	9.6	13.6	7.7	7.7	9.1	11.6	14.3	16.5	11.2	6.0	12.3	3.7	3.7	5.4	8.6	11.5	12.3
11	23.3	56.9	51.4	51.4	30.7	30.7	46.2	51.4	52.8	56.9	74.5	35.8	57.5	37.8	35.8	37.3	47.7	61.8	74.5
12	0.7	2.7	1.0	2.7	2.0	1.0	1.8	2.4	2.7	2.7	2.6	2.2	2.1	2.3	2.1	2.2	2.3	2.4	2.6
13	5.5	8.5	16.6	10.5	8.4	8.4	8.5	9.5	12.0	16.6	13.1	12.9	11.8	15.8	11.8	12.6	13.0	13.8	15.8
14	24.3	60.8	43.7	43.1	55.4	43.1	43.6	49.6	56.8	60.8	71.1	49.1	65.4	58.3	49.1	56.0	61.9	66.8	71.1
15	2.9	2.9	8.6	14.7	13.2	2.9	7.2	10.9	13.6	14.7	16.7	6.7	7.2	4.6	4.6	6.2	7.0	9.6	16.7
16	9.1	31.2	36.1	22.4	39.3	22.4	29.0	33.7	36.9	39.3	37.2	18.3	50.5	28.0	18.3	25.6	32.6	40.5	50.5
17	5.0	26.0	10.5	25.7	11.9	10.5	11.6	18.8	25.8	26.0	19.7	11.9	9.6	7.9	7.9	9.2	10.8	13.9	19.7
18	4.7	14.7	18.2	11.0	8.8	8.8	10.5	12.9	15.6	18.2	10.9	11.4	13.5	8.4	8.4	10.3	11.2	11.9	13.5
19	2.4	4.7	3.5	7.1	3.0	3.0	3.4	4.1	5.3	7.1	3.5	2.5	3.9	4.3	2.5	3.3	3.7	4.0	4.3
20	1.0	2.0	1.9	2.6	2.1	1.9	2.0	2.1	2.2	2.6	2.8	3.0	5.8	2.7	2.7	2.8	2.9	3.7	5.8
21	0.7	0.5	1.1	1.6	1.0	0.5	1.0	1.4	3.7	10.0	0.6	0.7	13.5	0.6	0.6	0.6	0.7	3.9	13.5
22	1.2	6.9	2.6	5.6	20.4	2.6	4.9	6.3	10.3	20.4	4.4	3.6	10.7	4.5	3.6	4.2	4.5	6.1	10.7
23	65.0	302.1	224.2	347.4	303.5	224.2	282.6	302.8	314.5	347.4	280.3	373.8	253.9	338.4	253.9	273.7	309.4	347.3	373.8
24	33.5	126.0	81.6	86.5	97.2	81.6	85.3	91.9	104.4	126.0	110.7	146.1	106.9	89.3	89.3	102.5	108.8	119.6	146.1
25	3.6	4.6	9.5	6.6	9.1	4.6	6.1	7.9	9.2	9.5	3.2	18.4	16.3	8.9	3.2	7.3	12.6	16.8	18.4
26	1.7	6.6	4.4	10.0	8.5	4.4	6.1	7.6	8.9	10.0	3.2	4.9	4.2	9.6	3.2	4.0	4.6	6.1	9.6
27	2.9	8.3	9.4	8.1	17.1	8.1	8.3	8.9	11.3	17.1	10.3	12.2	16.9	20.4	10.3	11.7	14.6	17.8	20.4
28	13.8	40.8	38.0	35.7	29.7	29.7	34.2	36.9	38.7	40.8	54.8	51.8	32.2	33.2	33.2	33.0	42.5	52.6	54.8
29	4.2	17.1	4.3	22.9	22.6	4.3	13.9	19.9	22.7	22.9	9.1	20.0	24.9	38.8	9.1	17.3	22.5	28.4	38.8
30	2.2	5.6	16.6	6.5	5.0	5.0	5.5	6.1	9.0	16.6	6.1	7.2	2.3	7.2	2.3	5.2	6.7	7.2	7.2
31	21.4	26.7	50.5	30.6	41.7	26.7	29.6	36.2	43.9	50.5	46.3	43.8	34.0	22.8	22.8	31.2	38.9	44.4	46.3
32	1.2	3.6	1.3	5.9	4.0	1.3	3.0	3.8	4.5	5.9	1.8	3.4	3.7	1.5	1.5	1.7	2.6	3.5	3.7
33	1.8	3.4	19.0	7.9	11.2	3.4	6.8	9.6	13.2	19.0	3.9	4.0	7.2	4.6	3.9	4.0	4.3	5.3	7.2
34	8.0	22.6	24.2	17.4	18.7	17.4	18.4	20.7	23.0	24.2	15.3	31.3	31.3	24.8	15.3	22.4	28.1	31.3	31.3
35	6.4	17.1	26.5	26.8	18.9	17.1	18.5	22.7	26.6	26.8	15.7	18.5	19.0	17.5	15.7	17.1	18.0	18.6	19.0
36	5.5	15.6	18.6	19.1	16.5	15.6	16.3	17.6	18.7	19.1	15.3	13.6	13.7	14.9	13.6	13.7	14.3	15.0	15.3
37	4.2	8.6	6.8	10.5	9.6	6.8	8.2	9.1	9.8	10.5	23.8	9.4	11.4	21.3	9.4	10.9	16.4	21.9	23.8
38	15.9	49.3	43.0	58.4	50.1	43.0	47.7	49.7	52.2	58.4	84.3	51.6	34.1	56.7	34.1	47.2	54.2	63.6	84.3
39	2.2	1.1	2.3	2.3	2.6	1.1	2.0	2.3	2.4	2.6	6.2	2.3	2.5	2.1	2.1	2.3	2.4	2.4	2.6
40	2.3	7.9	5.2	5.5	4.7	4.7	5.1	5.4	6.1	7.9	3.5	2.8	11.7	5.2	2.8	3.3	4.4	6.8	11.7
41	0.5	2.2	4.0	1.9	2.1	1.9	2.1	2.2	2.7	4.0	1.4	1.6	0.7	1.0	0.7	0.9	1.2	1.5	1.6
42	0.6	0.9	5.2	2.7	0.6	0.6	0.8	1.8	3.3	5.2	3.5	2.1	3.0	14.5	2.1	2.8	3.3	6.3	14.5
43	6.1	16.9	13.1	12.6	13.3	12.6	13.0	13.2	14.2	16.9	22.3	9.6	18.6	21.8	9.6	16.4	20.2	21.9	22.3
44	10.5	36.5	27.6	32.7	28.8	27.6	28.5	30.8	33.7	36.5	22.5	46.7	45.2	42.0	22.5	37.1	43.6	45.6	46.7
45	2.1	42.0	3.2	4.8	5.0	3.2	4.4	4.9	14.3	42.0	6.7	37.0	4.5	6.4	4.5	5.9	6.6	14.3	37.0
46	8.2	12.9	29.7	21.5	28.5	12.9	19.4	25.0	28.8	29.7	25.4	21.7	19.3	14.9	14.9	18.2	20.5	22.6	25.4
47	17.0	49.8	51.0	70.0	51.5	49.8	50.7	51.3	56.1	70.0	65.4	82.4	48.5	51.1	48.5	50.5	58.3	69.7	82.4
48	5.7	19.2	7.7	10.3	25.1	7.7	9.7	14.8	20.7	25.1	26.8	20.8	12.2	11.7	11.7	12.1	16.5	22.3	26.8
49	8.2	19.0	5.2	2.4	7.4	2.4	4.5	6.3	10.3	19.0	11.7	7.8	11.7	7.1	7.1	7.6	9.8	11.7	11.7
50	13.3	44.2	45.7	59.6	87.1	44.2	45.3	52.7	66.5	87.1	72.7	68.9	52.2	65.6	52.2	62.3	67.3	69.9	72.7
51	13.7	45.0	19.5	32.6	32.4	19.5	29.2	32.6	35.9	45.0	28.7	35.5	38.0	21.9	21.9	17.8	20.8	26.1	38.0
52	0.6	19.0	2.2	1.0	2.9	1.0	1.9	2.6	6.9	19.0	1.7	3.0	1.4	2.4	1.4	1.6	2.1	2.6	3.0
53	1.9	2.9	6.0	5.3	2.0	2.0	2.7	4.1	5.5	6.0	11.2	4.2	23.7	8.9	4.2	7.7	10.1	14.3	23.7
54	2.1	11.3	16.7	6.6	3.0	3.0	5.7	9.0	12.7	16.7	4.6	7.1	7.9	5.5	4.6	5.3	6.3	7.3	7.9
55	0.6	0.9	3.5	2.1	7.8	0.9	1.8	2.8	4.6	7.8	2.3	3.6	5.9	2.9	2.3	2.8	3.3	4.2	5.9
56	1.4	2.1	4.9	1.6	3.7	1.6	2.0	2.9	4.0	4.9	15.7	3.4	15.4	2.3	2.3	3.1	9.4	15.5	15.7
57	14.8	23.4	38.7	52.7	34.8	23.4	32.0	36.8	42.2	52.7	45.2	35.1	41.5	33.8	33.8	34.8	38.3	42.4	45.2
58	1.3	6.2	2.7	2.5	8.5	2.5	2.7	4.5	6.8	8.5	21.6	4.1	3.8	2.5	2.5	3.5	4.0	8.5	21.6
59	6.4	27.1	12.4	19.9	19.8	12.4	18.0	19.9	21.7	27.1	17.8	21.7	15.4	11.3	11.3	14.4	16.6	18.8	21.7
60	1.6	3.7	5.2	5.3	2.6	2.6	3.4	4.5	5.2	5.3	8.4	3.7	2.3	4.9	2.3	3.4	4.3	5.8	8.4
61	2.6	5.4	7.7	4.0	3.4	3.4	3.9	4.7	6.0	7.7	4.2	5.2	3.5	2.7	2.7	3.3	3.9	4.5	5.2
62	3.2	14.6	18.9	4.2	11.7	4.2	9.8	13.2	15.7	18.9	13.1	11.4	8.4	13.3	8.4	10.7	12.3	13.2	13.3
63	1.9	4.5	5.2	4.1	8.4	4.1	4.4	4.9	6.0	8.4	5.7	9.0	6.7	4.7	4.7	5.5	6.2	7.3	9.0
64	47.1	85.9	107.6	152.7	118.1	85.9	102.2	112.9	126.8	152.7	100.5	96.3	102.0	167.9	96.3	99.5	101.3	118.5	167.9
65	8.2	19.8	33.9	20.8	20.8	19.8	20.4	22.7	24.1	35.9	45.0	29.7	10.1	20.3	25.6	10.1	17.8	20.8	29.7
66	4.6	6.3	9.5	7.9	5.9	5.9	6.2	7.1	8.3	9.5	6.4	36.7	7.1	10.8	6.4	6.9	9.0	17.3	36.7
67	33.2	103.3	183.9	109.4	64.6	64.6	93.6	106.4	128.0	183.9	102.9	106.6	115.3	126.0	102.9	105.7	111.0	118.0	126.0
68	7.0	22.2	20.5	19.0	46.9	19.0	20.1	21.4	28.4	46.9	25.3	25.1	20.6	19.3	19.3	20.3	22.9	25.2	25.3
69	2.0	10.3	9.3	7.4	11.1	7.4	8.8	9.8	10.5	11.1	2.6	1.7	8.7	7.2	1.7	2.4	4		

Timing Intervals for Refresh Functions (in Seconds)									
DM Fx	R-Run 1	R-Run 2	R-Run 3	R-Run 4	Min	25%tile	Median	75%tile	Max
DF_CS	42.2	26.3	27.5	28.0	26.3	27.2	27.7	31.5	42.2
DF_I	6.2	3.1	2.6	3.4	2.6	3.0	3.2	4.1	6.2
DF_SS	57.7	42.3	41.2	44.9	41.2	42.0	43.6	48.1	57.7
DF_WS	33.7	16.5	16.1	18.3	16.1	16.4	17.4	22.1	33.7
LF_CR	9.8	7.3	7.7	8.0	7.3	7.6	7.9	8.5	9.8
LF_CS	46.8	39.1	38.5	39.9	38.5	39.0	39.5	41.6	46.8
LF_I	11.6	7.5	7.7	8.1	7.5	7.7	7.9	8.9	11.6
LF_SR	9.4	7.5	7.4	8.0	7.4	7.5	7.8	8.4	9.4
LF_SS	47.7	38.9	39.4	40.5	38.9	39.2	39.9	42.3	47.7
LF_WR	9.8	5.5	4.3	5.0	4.3	4.8	5.3	6.6	9.8
LF_WS	34.2	12.4	12.5	12.4	12.4	12.4	12.4	17.9	34.2

Preface

TPC Benchmark™ DS Overview

The TPC Benchmark™ DS (TPC-DS) is a decision support benchmark that models several generally applicable aspects of a decision support system, including queries and data maintenance. The benchmark provides a representative evaluation of performance as a general-purpose decision support system.

This benchmark illustrates decision support systems that:

- Examine large volumes of data;
- Give answers to real-world business questions;
- Execute queries of various operational requirements and complexities (e.g., ad-hoc, reporting, iterative OLAP, data mining);
- Are characterized by high CPU and IO load;
- Are periodically synchronized with source OLTP databases through database maintenance functions.
- Run on “Big Data” solutions, such as RDBMS as well as Hadoop/Spark based systems.

A benchmark result measures query response time in single user mode, query throughput in multi user mode and data maintenance performance for a given hardware, operating system, and data processing system configuration under a controlled, complex, multi-user decision support workload.

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

- a) Are generally available to users;
- b) Are relevant to the market segment that the individual TPC benchmark models or represents (e.g., TPC-DS models and represents complex, high data volume, decision support environments);
- c) Would plausibly be implemented by a significant number of users in the market segment modeled or represented by the benchmark.

In keeping with these requirements, the TPC-DS database must be implemented using commercially available data processing software, and its queries must be executed via SQL interface. 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, which improve benchmark results but not real-world performance or pricing, are prohibited.

TPC benchmark results are expected to be accurate representations of system performance. Therefore, there are specific guidelines that are expected to be followed when measuring those results. The approach or methodology to be used in the measurements are either explicitly described in the specification or left to the discretion of the test sponsor.

When not described in the specification, the methodologies and approaches used must meet the following requirements:

- The approach is an accepted engineering practice or standard;
- The approach does not enhance the result;
- Equipment used in measuring the results is calibrated according to established quality standards;
- Fidelity and candor is maintained in reporting any anomalies in the results, even if not specified in the benchmark requirements.

Further information is available at <http://www.tpc.org/>

General Items

0.1 Test Sponsor

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

This benchmark was sponsored by Alibaba Cloud Computing Ltd.

0.2 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:

- *Database Tuning Options*
- *Optimizer/Query execution options*
- *Query processing tool/language configuration parameters*
- *Recovery/commit options*
- *Consistency/locking options*
- *Operating system and configuration parameters*
- *Configuration parameters and options for any other software component incorporated into the pricing structure*
- *Compiler optimization options*

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

Default ADB configuration parameters and options are used.

0.3 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:

- *Number and type of processors*
- *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 (e.g. Ethernet) Connections, including routers, workstations, terminals, etc., that were physically used in the test or are incorporated into the pricing structure.*
- *Type and the run-time execution location of software components (e.g., DBMS, query processing tools/languages, middle-ware components, software drivers, etc.).*

Measured Configuration

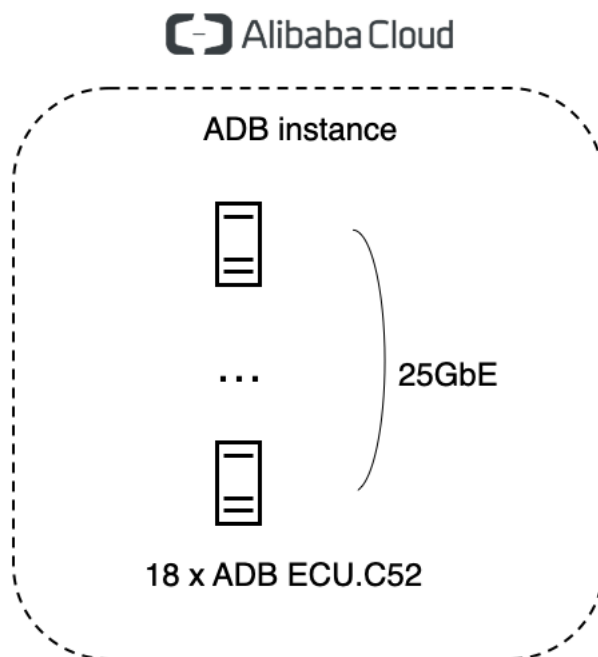


Figure 0.3: Measured Configuration

The measured configuration consisted of 18 ECUs:

ECU details (18 ECUs):

- ECU Instance Type: C52
- Processors: 52 virtual cores (threads)
- Memory: 384 GB
- Storage:
 - 8,000 GB SSD Local Disk (data disk)
- Network:
 - Bandwidth (Gbit/s): 25.0

AnalyticDB System Components Configuration

ECU 1-2	Coordinator
ECU 1-18	Worker

Priced Configuration

There are no differences between the priced and measured configurations.

Clause 2: Logical Database Design Related Items

2.1 Database Definition Statements

Listings must be provided for the DDL scripts and must include all table definition statements and all other statements used to set up the test and qualification databases.

The Supporting File Archive contains the table definitions and all other statements used to set up the test and qualification databases.

2.2 Physical Organization

The physical organization of tables and indices within the test and qualification databases must be disclosed. If the column ordering of any table is different from that specified in Clause 2.3 or 2.4, it must be noted.

Horizontal partitioning is used as described in 2.3.

2.3 Horizontal Partitioning

If any directives to DDLs are used to horizontally partition tables and rows in the test and qualification databases, these directives, DDLs, and other details necessary to replicate the partitioning behavior must be disclosed.

All tables are partitioned. The partition columns for the tables are:

call_center: cc_call_center_sk
 catalog_page: cp_catalog_page_sk
 customer: c_customer_sk
 customer_address: ca_address_sk
 customer_demographics: cd_demo_sk
 date_dim: d_date_sk
 household_demographics: hd_demo_sk
 income_band: ib_income_band_sk
 item: i_item_sk
 promotion: p_promo_sk
 reason: r_reason_sk
 ship_mode: sm_ship_mode_sk
 store: s_store_sk
 time_dim: t_time_sk
 warehouse: w_warehouse_sk
 web_page: wp_web_page_sk
 web_site: web_site_sk
 catalog_sales: cs_item_sk, cs_sold_date_sk
 catalog_returns: cr_item_sk, cr_returned_date_sk
 inventory: inv_item_sk, inv_date_sk
 store_returns: sr_item_sk, sr_returned_date_sk
 store_sales: ss_item_sk, ss_sold_date_sk
 web_returns: wr_item_sk, wr_returned_date_sk
 web_sales: ws_item_sk, ws_sold_date_sk

2.4 Replication

Any replication of physical objects must be disclosed and must conform to the requirements of Clause 2.5.3.

No physical object was replicated.

Clause 3: Scaling and Database Population

3.1 Initial Cardinality of Tables

The cardinality (e.g., the number of rows) of each table of the test database, as it existed at the completion of the database load (see Clause 7.1.2) must be disclosed.

Table 3.1 lists the cardinality of each table as they existed upon completion of the build.

Table 3.1 Initial Number of Rows

Table Name	Row Count
call_center	54
catalog_page	40,000
catalog_returns	1,440,033,112
catalog_sales	14,399,964,710
customer	65,000,000
customer_address	32,500,000
customer_demographics	1,920,800
date_dim	73,049
household_demographics	7,200
income_band	20
inventory	1,311,525,000
item	402,000
promotion	2,000
reason	70
ship_mode	20
store	1,500
store_returns	2,879,775,099
store_sales	28,799,985,654
time_dim	86,400
warehouse	25
web_page	4,002
web_returns	720,020,485
web_sales	7,199,963,324
web_site	78

3.2 Distribution of Tables and Logs Across Media

The distribution of tables and logs across all media must be explicitly described using a format similar to that shown in the following example for both the tested and priced systems.

Table 3.2 Distribution of Tables and Logs

Server Node	Disk Type	Disk drive	Description of Content
Coordinator (1-2)	Local SSD Disk	/dev/nvme0n1	event log and transaction log
worker (1-18)	Local SSD Disk	/dev/nvme[0-3]n1	event log, temp files, cache of table data

All the base Tables were stored on local storage.

Table size on local storage:

store_sales	3996GB
catalog_sales	3024GB
web_sales	1512GB
store_returns	342GB
catalog_returns	234GB
web_returns	104.4GB
inventory	28.8GB
customer	8560MB
customer_address	3510MB
customer_demographics	79.2MB
item	110MB
time_dim	4.9MB
catalog_page	5.4MB
date_dim	9.9MB
household_demographics	156KB
call_center	24KB
promotion	252KB
web_site	28KB
web_page	392KB
store	396KB
income_band	8KB
reason	8KB
ship_mode	8KB
warehouse	8KB

3.3 Mapping of Database Partitions/Replications

The mapping of database partitions/replications must be explicitly described.

Neither database partitions nor replications were mapped to specific devices.

3.4 Implementation of RAID

Implementations may use some form of RAID. The RAID level used must be disclosed for each device. If RAID is used in an implementation, the logical intent of its use must be disclosed

For each ECU node, a logical volume is created on four PCIe NVMe drives and all data is stored in this logical volume.

3.5 DBGEN Modifications

The version number (i.e., the major revision number, the minor revision number, and third tier number) of dsdgen must be disclosed. Any modifications to the dsdgen source code (see Appendix B:) must be disclosed. In the event that a program other than dsdgen was used to populate the database, it must be disclosed in its entirety.

Dsdgen version v2.11.0rc2 was used. No changes were made to the dsdgen tool.

3.6 Database Load time

The database load time for the test database (see Clause 7.4.3.7) must be disclosed.

The database load time was 1154.3 seconds.

3.7 Data Storage Ratio

The data storage ratio must be disclosed. It is computed by dividing the total data storage of the priced configuration (expressed in GB) by SF corresponding to the scale factor chosen for the test database as defined in Clause 3.1. The ratio must be reported to the nearest 1/100th, rounded up. For example, a system configured with 96 disks of 2.1 GB capacity for a 100GB test database has a data storage ratio of 2.02.

The data storage ratio is $(144,000) / 10,000 = 14.4$

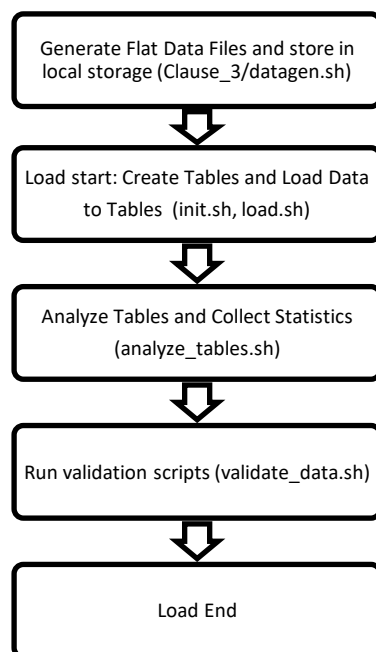
Total Storage Capacity (Local node) = 18 (ECU) * 8,000GB = 144,000 GB

3.8 Database Load Mechanism Details and Illustration

The details of the database load must be disclosed, including a block diagram illustrating the overall process. Disclosure of the load procedure includes all steps, scripts, input and configuration files required to completely reproduce the test and qualification databases.

The database was built as shown in Figure 3.8. All of the related source code and scripts are included in the Supporting Files.

Figure 3.8: Block Diagram of database build process:



The final database load time is calculated as (load end time – load start time – duration of validation scripts).

3.9 Qualification Database Configuration

Any differences between the configuration of the qualification database and the test database must be disclosed.

The qualification database was built using the same scripts as the test database with the following exceptions:

- The Scale factor is adjusted to 1 GB

All of the related source code and scripts are included in the Supporting Files.

Clause 4 and 5: Query and Data Maintenance Related Items

4.1 Query Language

The query language used to implement the queries must be identified.

SQL was the query language used to implement the queries.

4.2 Verifying Method of Random Number Generation

The method of verification for the random number generation must be described unless the supplied dsdgen and dsqgen were used.

TPC-supplied dsdgen version 2.11.0rc2 and dsqgen version 2.11.0rc2 were used.

4.3 Generating Values for Substitution Parameters

The method used to generate values for substitution parameters must be disclosed. The version number (i.e., the major revision number, the minor revision number, and third tier number) of dsqgen must be disclosed.

TPC supplied dsqgen version 2.11.0rc2 was used to generate the substitution parameters, as follows:

```
./dsqgen \  
-directory $modified_tpl_dir \  
-input $modified_tpl_dir/templates.lst \  
-scale ${sf} \  
-streams 9 \  
-output_dir $output_dir \  
-dialect adb \  
-rngseed $SEED
```

4.4 Query Text and Output Data from Qualification Database

The executable query text used for query validation must be disclosed along with the corresponding output data generated during the execution of the query text against the qualification database. If minor modifications have been applied to any functional query definitions or approved variants in order to obtain executable query text, these modifications must be disclosed and justified. The justification for a particular minor query modification can apply collectively to all queries for which it has been used. The output data for the power and Throughput Tests must be made available electronically upon request.

Supporting Files Archive contains the actual query text and query output. Following are the modifications to the query.

The following MQM are used:

- Use vendor-specific syntax of date expressions. (MQM f.1)
 - Q5
 - Q12
 - Q16
 - Q20
 - Q21
 - Q32
 - Q37
 - Q40
 - Q72
 - Q77

- Q80
- Q82
- Q92
- Q94
- Q95
- Q98
- Use column references expression in ORDER BY clause (MQM e.2)
 - Q58
 - Q72
- Use internal result table to hold the result set for Q64
 - Q64

The Supporting Files Archive contains the full set of executable query text template used in the test.

4.5 Query Substitution Parameters and Seeds Used

All the query substitution parameters used during the performance test must be disclosed in tabular format, along with the seeds used to generate these parameters.

The Supporting Files Archive contains the query substitution parameters and seed used in the test.

4.6 Refresh Setting

All query and refresh session initialization parameters, settings and commands must be disclosed.

The Supporting Files Archive contains the query and scripts, along with initialization parameters and settings.

4.7 Source Code of Refresh Functions

The details of how the data maintenance functions were implemented must be disclosed (including source code of any non-commercial program used).

The Supporting Files Archive contains the source code implementing the refresh functions.

4.8 Staging Area

Any object created in the staging area (see Clause 5.1.8 for definition and usage restrictions) used to implement the data maintenance functions must be disclosed. Also, any disk storage used for the staging area must be priced, and any mapping or virtualization of disk storage must be disclosed.

Loading refreshing data from external tables

Clause 6: Data Persistence Properties Related Items

The results of the data accessibility tests must be disclosed along with a description of how the data accessibility requirements were met.

The data accessibility test was performed by failing the local storage of one ADB ECU. This failure was induced during the execution of the first data maintenance test.

The logical volume on each ECU is made of 4 PCIe NVMe. The storage failure was simulated by removing access to 1 of the PCIe NVMe.

The Supporting Files Archive contains the logs of status before and after the storage failures.

Clause 7: Performance Metrics and Execution Rules Related Items

7.1 System Activity

Any system activity on the SUT that takes place between the conclusion of the load test and the beginning of the performance test must be fully disclosed including listings of scripts or command logs.

The only activity between the end of the load test and the beginning of the performance test was the generation of the executable query text.

7.2 Test Steps

The details of the steps followed to implement the performance test must be disclosed.

The Supporting Files Archive contains the scripts and logs.

7.3 Timing Intervals for Each Query and Refresh Function

The timing intervals defined in Clause 7 must be disclosed.

See the Executive Summary at the beginning of this report.

7.4 Throughput Test Result

For each Throughput Test, the minimum, the 25th percentile, the median, the 75th percentile, and the maximum times for each query shall be reported.

See the Executive Summary at the beginning of this report.

7.5 Time for Each Stream

The start time and finish time for each query stream must be reported.

See the Executive Summary at the beginning of this report.

7.6 Time for Each Refresh Function

The start time and finish time for each data maintenance function in the refresh run must be reported for the Throughput Tests

See the Executive Summary at the beginning of this report.

7.7 Performance Metrics

The computed performance metric, related numerical quantities and the price/performance metric must be reported.

QphDS@10000GB = 14,895,566

See the Executive Summary at the beginning of this report for more detail.

Clause 8: SUT and Driver Implementation Related Items

8.1 Driver

A detailed textual description of how the driver performs its functions, how its various components interact and any product functionalities or environmental settings on which it relies must be provided. All related source code, scripts and configuration files must be disclosed. The information provided should be sufficient for an independent reconstruction of the driver.

The Mysql compatible ADB client was used to submit the queries. It connects to the ADB instance via JDBC. The command is: `mysql -h${host} -P${port} -Dtpcds10000 -A -c`

The ADB instance accepts SQL queries from the ADB clients and processes the queries. All queries are compiled on the ADB Coordinator node and then dispatched to the ADB worker nodes as distributed tasks. When the tasks finish, their result is collected by the Coordinator which sends the query output to the ADB client.

The Supporting Files Archive contains all the command, scripts and logs.

8.2 Implementation Specific Layer (ISL)

If an implementation specific layer is used, then a detailed description of how it performs its functions, how its various components interact and any product functionalities or environmental setting on which it relies must be provided. All related source code, scripts and configuration files must be disclosed. The information provided should be sufficient for an independent reconstruction of the implementation specific layer.

No Implementation Specific Layer was used.

8.3 Profile-Directed Optimization

If profile-directed optimization as described in Clause 7.2.10 is used, such use must be disclosed. In particular, the procedure and any scripts used to perform the optimization must be disclosed.

Profile-directed optimization was not used.

Clause 9: Pricing Related Items

9.1 Hardware and Software Used

A detailed list of hardware and software used in the priced system must be reported. The rules for pricing are included in the current revision of the TPC Pricing Specification located on the TPC website (<http://www.tpc.org>)

A detailed list of all licensed services, hardware and software, is provided in the Executive Summary of this report.

9.2 Availability Date

The System Availability Date (see Clause 7.6.5) must be the single availability date reported on the first page of the executive summary. The full disclosure report must report Availability Dates individually for at least each of the categories for which a pricing subtotal must be. All Availability Dates required to be reported must be disclosed to a precision of 1 day, but the precise format is left to the test sponsor.

The total system is available as of the date of this report.

9.3 Country-Specific Pricing

Additional Clause 7 related items may be included in the full disclosure report for each country specific priced configuration.

The configuration is priced in RMB for the China market.

Clause 11: Audit Related Items

Auditor's Information and Attestation Letter

The auditor's agency name, address, phone number, and attestation letter with a brief audit summary report indicating compliance must be included in the full disclosure report. A statement should be included specifying whom to contact in order to obtain further information regarding the audit process.

This benchmark was audited by: Francois Raab, of InfoSizing.



Benchmark sponsor: Liang Lin
Alibaba Cloud Intelligence Business Group
969 West Wen Yi Road
Yu Hang District, Hangzhou
Zhejiang, China

June 17, 2020

I verified the TPC Benchmark™DS (TPC-DS™v2.11.0) performance of the following configuration:

Platform: Alibaba Cloud AnalyticDB (ADB)
on Alibaba Cloud Elastic Compute Unit (ECU)
Operating System: Alibaba Group Enterprise Linux Server 7.2 (Paladin)
Database Manager: Alibaba Cloud AnalyticDB 3.0.12

The results were:

Performance Metric 18,998,559 QphDS@10000GB
Database Load Time 19m 16s

Servers Alibaba Cloud Elastic Compute Unit (ECU)

18 x ECU C52, each with:

CPU	52 x Virtual Cores (threads)		
Memory	384 GB		
Storage	Qty	Size	Type
	4	2,000 GB	PCIe NVMe

In my opinion, these performance results were produced in compliance with the TPC requirements for the benchmark.

The following verification items were given special attention:

- The database records were defined with the proper layout and size
- The database population was generated using Dsdgen
- The database was properly scaled to 10,000GB and populated accordingly
- The database load time was correctly measured and reported

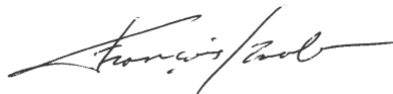
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- The query templates were produced using approved minor query modifications and query variants
- The query input variables were generated by Dsqgen
- The execution of the queries against the qualification database produced compliant output
- The tests were driven and sequenced according to the requirements
- The throughput tests involved 4 query streams
- The execution times for queries and data maintenance functions were correctly measured and reported
- The data accessibility test was performed and verified
- The system pricing was verified for major components and maintenance
- The major pages from the FDR were verified for accuracy

Additional Audit Notes:

In the course of the benchmark execution and the independent audit process, a number of issues were raised with the benchmark maintenance subcommittee. These issues were resolved, sometimes resulting in changes to the benchmark specification. While this result was audited against version 2.11.0 of the benchmark, it also takes advantage of some pending changes that are intended for release in the next version of the benchmark.

Respectfully Yours,



François Raab, TPC Certified Auditor

Supporting Files Index

Clause	Description	Archive File Pathname
Clause 3	Database create and load scripts, SQL scripts for validation and log files	SupportingFiles/Clause_3/init.sh SupportingFiles/Clause_3/load.sh SupportingFiles/Clause_3/sqls/count_tables.sql SupportingFiles/Clause_3/sqls/desc_tables.sql SupportingFiles/Clause_3/sqls/Validate_Data.sql SupportingFiles/Clause_3/sqls/Check_Insert.sql SupportingFiles/Clause_3/sqls/Check_RI.sql SupportingFiles/Clause_3/logs/
	Scripts for collecting statistics	SupportingFiles/Clause_3/analyze_tables.sh
	Tools for data generation	SupportingFiles/Clause_3/datagen.sh
Clause 4	The script to execute qualification test and log file	SupportingFiles/Clause_4/run_qualification_test.sh SupportingFiles/Clause_4/logs/qualification_test.log
	SQL for qualification queries	SupportingFiles/Clause_4/queries/
	Query patches	SupportingFiles/Clause_4/patches
	Output from executing qualification queries	SupportingFiles/Clause_4/output/
Clause 5	Data maintenance execution scripts and logs files for each stream [s]	SupportingFiles/Clause_5/mt.sh SupportingFiles/Clause_5/run_refresh.sh SupportingFiles/Clause_5/logs/run_refresh_[s].log SupportingFiles/Clause_5/logs/mt_[s].log
	SQL scripts for DM functions for stream [s]	SupportingFiles/Clause_5/mtsql_[s]/
	Output from executing DM functions	SupportingFiles/Clause_5/outputs/
	Raw data files for maintenance	SupportingFiles/Clause_5/data
	MT function and data verification scripts, sqls, outputs and logs	SupportingFiles/Clause_5/run_verify_mt.sh SupportingFiles/Clause_5/mt_verify/run_verify_mt.log SupportingFiles/Clause_5/mt_verify/sqls/ SupportingFiles/Clause_5/mt_verify/*.out
Clause 6	Data accessibility test scripts, logs and output files	SupportingFiles/Clause_6/data_access_test.sh SupportingFiles/Clause_6/logs/ data_access_test.log SupportingFiles/Clause_6/output/worker_disk_remove.out SupportingFiles/Clause_6/output/worker_disk_status_fail.out SupportingFiles/Clause_6/output/worker_disk_status_good.out

Clause 7	Performance test scripts and logs	SupportingFiles/Clause_7/pt.sh SupportingFiles/Clause_7/tt.sh SupportingFiles/Clause_7/run_stream.sh SupportingFiles/Clause_7/logs/pt.log SupportingFiles/Clause_7/logs/tt_[r].log SupportingFiles/Clause_7/logs/stream_[s]_timing.log
	Query text for query [q] in stream [s]	SupportingFiles/Clause_7/stream_[s]/queries/query_[q].sql
	Output of query [q] in stream [s]	SupportingFiles/Clause_7/stream_[s]/output/query_[q].out

Appendix A: Provisioning Compute Services

Purchase Page for provisioning the 6 node groups (18 ECU) Alibaba Cloud AnalyticDB with 3-Year Subscription

Original page in Chinese

阿里云 购物车 工单 备案 bjbean****

分析型数据库 (包年包月)

包年包月 按量付费

不清楚如何购买, 计费太复杂? [点击查看详情](#) 了解收费标准。
3.0集群版活动中, 8节点内首月1元促销(限首购客户, 续费费包月8折, 包年7折)。
MySQL查询不动赶快试用AnalyticDB基础版! 基础版大幅度降低用户使用门槛, 3个月只要10元 (MySQL分析实例购买时长选择3个月才能享受活动), 基础版和集群版的区别。

版本

3.0	2.0
-----	-----

地域

华南1 (深圳)	华东1 (杭州)	华北2 (北京)	华东2 (上海)	西南1 (成都)
马来西亚 (吉隆坡)	新加坡	中国 (香港)	华北3 (张家口)	美国 (硅谷)
华北1 (青岛)	英国 (伦敦)	美国 (弗吉尼亚)	日本 (东京)	德国 (法兰克福)
澳大利亚 (悉尼)	印度 (孟买)	印度尼西亚 (雅加达)		

不同地域之间的产品内网不互通; 订购后不支持更换地域, 请谨慎选择, 教我选择

可用区

华东2 可用区 F

系列

基础版 集群版

集群版包含两种规格类型:
【计算密集型】以字母C开头, 数据全部存储在SSD磁盘中, 适用于对性能要求高、查询开发高的业务场景。
【存储密集型】以字母S开头, 采用存储计算分离架构, 数据存储在HDD磁盘中, 适用于开发阶段、性能要求不高 (可接受数据查询响应时间超过10秒以上) 的业务场景。

网络类型

专有网络

专有网络 (VPC)

默认vpc-uf6jcv60ahdgar1q2o...

如果在当前区域还未创建专有网络, 请前往阿里云VPC控制台创建VPC实例

专有网络交换机

vsw-uf6g1dcy9cxypgta0hr2e (40...

如果在当前可用区还未创建专有网络交换机, 请前往阿里云VPC控制台创建交换机

规格

C8	C24	C52	S8
----	-----	-----	----

52核384GB

节点(组)数

6

【集群版】每节点组包含三个在线节点 (副本), 相比于主备节点或者双副本而言, 不仅增加了可靠性, 查询开发也大幅提升。
计费方面, 只需花费两个节点的费用即可买到一个节点组。
参与计算总CPU核数计算方式: 规格核数 x 节点组个数 x 3。
【基础版】与集群版不同, 基础版没有节点组概念, 只有单节点提供服务。

存储空间

8000

【集群版】此处选择的是每个节点组的空间大小, 实际总空间需要乘以节点组个数。
C4规格节点组磁盘空间可选范围为100GB-200GB。
C8、C24规格节点组磁盘空间可选范围为100GB-1000GB。
C52规格节点组磁盘空间可选范围为8000GB。
S8规格节点组磁盘空间可选范围为1000GB-12000GB。
【基础版】与集群版不同, 基础版只有一个节点, 所买空间即为用户总空间。
根据规格不同, 磁盘空间可选范围从100GB起, 最大到8000GB-4000GB不等。

购买时长

1 2 3 4 5 6 7 8 9 首1年 首2年 首3年 自动续费

当前配置

版本: 3.0
地域: 华东2 (上海)
可用区: 华东2 可用区 F
系列: 集群版
网络类型: 专有网络
专有网络 (VPC): 默认vpc-uf6jcv60ahdgar1q2o... (1)
专有网络交换机: vsw-uf6g1dcy9cxypgta... (4092)
规格: C52
节点(组)数量: 6
存储空间: 8000
购买时长: 3年
配置费用: **¥1,122,709.68**
原¥1,122,709.68
分析型数据库指定规格3年5折优惠

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免费套餐	云数据库RDS	云存储OSS	NAT网关	负载均衡	域名注册	网站建设	大数据
云计算							

用户热搜

网站备案	网安法	CDN加速	API网关	企业邮箱	whois查询	视频直播	视频转码
------	-----	-------	-------	------	---------	------	------

更多推荐

数据科研社区	阿里云大学	学生机	IT论坛	数据可视化	云服务器	com域名	cn域名
合规安全解决方案							

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浙公网安备 33010602009875号

English version (Chrome translated)



Shopping Cart ticket record bybean ****

Analytical database (yearly and monthly)

Annual and monthly subscription

Pay-as-you-go

Not sure how to buy, the billing is too complicated? [Click the price details](#) to help you understand the charging standards.

The 3.0 cluster version is in progress, with a promotion of 1 yuan in the first month within 8 nodes (limited to first-time purchase customers, 20% off monthly renewal fee and 30% off annually)

Try MySQL AnalyticDB Basic Edition without moving! The basic version greatly reduces the user's access threshold, and only needs 10 yuan for 3 months (the purchase time of MySQL analysis instance must be selected for 3 months to enjoy the activity). The difference between the basic version and the cluster version.

version 3.0 2.0

area

South China 1 (Shenzhen)	East China 1 (Hangzhou)	North China 2 (Beijing)	East China 2 (Shanghai)	Southwest 1 (Chengdu)
Kuala Lumpur, Malaysia	Singapore	China Hong Kong (Zhangjiahou)	North China 3 (Silicon Valley)	
North China 1 (Qingdao)	London, England	United States (Virginia)	Japan (Tokyo)	Frankfurt, Germany
Sydney, Australia	Mumbai, India	Jakarta Indonesia		

The intranets of products between different regions are not interoperable; after ordering, regions cannot be changed, please choose carefully and [teach me to choose](#)

Availability Zone East China 2 Availability Zone F

series Basic Edition Cluster version

The cluster version includes two types of specifications:
 [Computation-intensive] Starting with the letter C, all data is stored in the SSD disk. It is applicable to business scenarios with high performance requirements and high query concurrency.
 [Storage-intensive] Starting with the letter S, a storage-computing separation architecture is adopted, and the data is stored in the HDD disk. It is suitable for business scenarios with slightly lower concurrency and lower performance requirements (acceptable data query response time of more than 10 seconds).

Network Type Private network

VPC [Default] vpc-uf6jcv60ahdgar1q...

If you have not created a VPC in the current region, please go to the Alibaba Cloud VPC console to create a VPC Instance

Proprietary network vsw-uf6j1dcy9cxypgta0r2e (4092)

If you have not created a private network switch in the current availability zone, please go to the Alibaba Cloud VPC console to create a switch

specification C8 C24 **C52** S8

52-core 384GB

Number of nodes (groups) 6

[Cluster version] Each node group contains three online nodes (copy). Compared with the active and standby nodes or dual copies, not only the reliability is increased, but the query concurrency is also greatly improved.
 In terms of billing, a node group can be bought for only two nodes.
 Participate in the calculation of the total CPU core calculation method: specification core number x node group number x 3.

[Basic version] Unlike the cluster version, the basic version does not have the concept of a node group, only a single node provides services.

storage 8000

[Cluster version] The size of each node group is selected here. The actual total space needs to be multiplied by the number of node groups.
 The disk space of the C4 specification node group can be selected from 100GB to 200GB.
 The disk space of C8 and C24 specification node groups can be selected from 100GB to 1000GB.
 The disk space of the C52 specification node group can be selected from 8000GB.
 The disk space of the S8 specification node group can be selected from 1000GB to 12000GB.

[Basic version] Unlike the cluster version, the basic version has only one node, and the space purchased is the total user space.
 According to different specifications, the available disk space ranges from 100GB to a maximum of 500GB ~ 4000GB.

Purchase duration Automatic renewal

Current configuration

Version: 3.0
 Region: East 2 (Shanghai)
 available District: East 2 usable area F
 Series: Cluster Edition
 network types: private network
 private network (VPC): [default] vpc-uf6jcv60ahdgar1q... (1)
 proprietary network switch: VSW - uf6j1dcy9cxypgta... (4092)
 specifications: C52
 nodes (group) number: 6
 storage space: 8000
 purchase time: 3 years

Configuration costs:
¥ 1,122,709.68
 Save ¥ 1,122,709.68
 3 years 50% discount on specified specifications

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more recommendations Aliyun University, Student machine, IT Forum, data visualization, Cloud Virtual Machine, com domain name, cn domain name, Community, Compliance security solution

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 Zhejiang Public Security No. 33010602009975

Appendix B: Third Party Price Quotes

Lenovo MIX 210 tablet (Chinese version)

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麒麟980芯片/电脑模式
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00:11 | 00:12

★ 收藏商品 (1711人气) 举报

Lenovo/联想 MIIX 320/210四核平板电脑二合一笔记本10.1英寸Win10
学习办公娱乐pc轻薄便携笔记本电脑
三期分期免息&下单享暖心好礼&大量现货速发

价格 ¥ 1099.00

运费 上海 至 杭州 上城区 清波街道 快递: 0.00

月销量 **4** | 累计评价 **29** | 送天猫积分 **109**

颜色分类 银色

套餐类型 MIIX 210 【HD/2G/32G】

MIIX 320 【HD/2G/32G】
MIIX 320 【FHD/4G/64G】
MIIX 320 【FHD/4G/128G】
MIIX 320 【HD/2G/32G】 白色
MIIX 325 【HD/4G/64G】 黑色

数量 件 库存57件

服务 意外保修二年 ¥65.00 延长保修一年 ¥59.80
全面保修二年 ¥100.00
数码服务上门安装调试 ¥109.00

花呗分期 ❤ 该商品最高可享3期分期免息
① 登录后确认是否享有该服务 什么是花呗分期

¥366.33x3期
(0手续费)


¥191.40x6期
(含手续费)

¥98.44x12期
(含手续费)


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Lenovo MIX 210 tablet (Chrome translated English version)

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yuè xǐ shù mǎ zhuān yíng diàn
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新品上市MatePad Pro
麒麟990芯片/办公平板
立即购买 >



爆款华为Mate 10.8英寸
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all products
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Huawei laptop
Huawei Tablet
Lenovo Tablet
Smart Home / Original A Government and ent



★ collection of goods (1711 popularity) Report

Lenovo / Lenovo MIIX 320/210 quad-core tablet PC 2-in-1 notebook 10.1-inch Win10 learning office entertainment pc light and thin portable laptop

Three installments of interest-free & ordering to enjoy heartwarming gifts & a large number of spot quick delivery

price ¥ 1099.00

Freight Shanghai to Hangzhou on city streets Shiba Express: 0.00

Monthly sales **4** | Cumulative evaluation **29** | Tmall Points **109**

Color Classification Silver

Package Type

MIIX 210 [HD / 2G / 32G]	MIIX 320 [HD / 2G / 32G]
MIIX 320 [FHD / 4G / 64G]	MIIX 320 [FHD / 4G / 128G]
MIIX 320 [HD / 2G / 32G] white	MIIX 325 [HD / 4G / 64G] black

Quantity parts inventory 57

service

Accidental warranty for two years ¥ 65.00

One year extended warranty ¥ 59.80

Two-year comprehensive warranty ¥ 100.00

Digital service on-site installation and commissioning ¥ 109.00

Flower stage

The product can enjoy up to 3 installments of interest-free

Log confirm whether the service enjoys what is spent chanting stage

¥ 366.33 x3 period (0 handling fee)	¥ 191.40 x6 period (including handling fee)
¥ 98.44 x12 period (including handling fee)	

Buy now
Addcart