



**IBM® @server® xSeries® 365
with
IBM DB2® UDB 8.1**

TPC-H Rev 2.1.0

Report Date: May 18, 2004

Total System Cost

Composite Query-per-Hour Metric

Price/Performance

\$248,778

**5003.1
QphH @ 300GB**

**\$50
per QphH @ 300GB**

Database Size

Database Manager

Operating System

Other Software

Availability Date

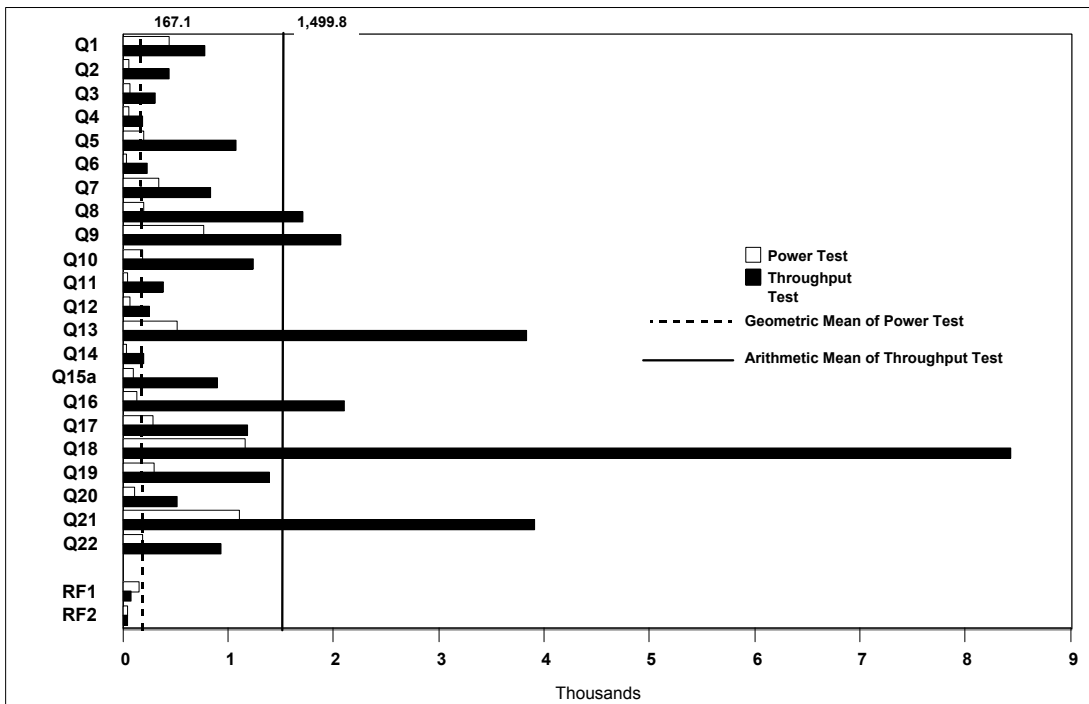
300GB

IBM DB2 UDB 8.1

**Microsoft®
Windows® Server
2003 Enterprise
Edition w/QFE
KB834628**

**Microsoft
Visual C++
.NET
Standard**

May 18, 2004



Database Load Time: 05:33:00

Load Included Backup: Y

Total Data Storage /
Database Size: 12.82

RAID (Base Tables Only): N

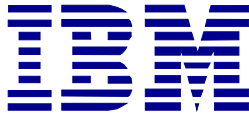
RAID (Base Tables and Auxiliary
Data Structures): N

RAID (All): N

Configuration

Processors/Cores/Threads 4/4/8
Memory 16
Disk Controllers 4
Disk Drives 112
2
Total Disk Storage

**Intel Xeon MP 3.0GHz / 4MB ECC L3 Cache
1GB PC2100 DDR ECC SDRAM RDIMM
ServeRAID-6M Ultra320 SCSI Adapter
36.4GB 15K Ultra320 SCSI Drive
36.4GB 15K Ultra320 SCSI Drive
3864.6GB**



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TPC-H 2.1.0 Executive Summary

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Description	Part Number	Third Party Brand	Pricing	Unit Price	Quantity	Extended Price	3-Yr. Maint. Price
Server Hardware							
IBM e(logo)server xSeries 365 w/3.0GHz Xeon MP w/2 x 3.0GHz/4MB Xeon MP Processors w/4 x 512MB ECC SDRAM RDIMMs	8862-6RX	IBM		15,599	1	15,599	1,000
xSeries 3.0GHz/4MB Processor	13N0710	IBM		5,749	2	11,498	
1GB PC2100 DDR ECC SDRAM RDIMM	73P2031	IBM		659	16	10,544	
Memory Upgrade Card	73P9710	IBM		999	1	999	
36.4GB 15K Ultra320 SCSI Hot-Swap Drive	32P0734	IBM		495	2	990	
ServeRAID-6M Ultra320 SCSI Contoller	32P0033	IBM		999	4	3,996	
APC Smart-UPS Model 1400	32P1020	IBM		855	1	855	
Netfinity 4.2M Ultra2 SCSI Cable	03K9311	IBM		105	8	840	
IBM Preferred Pro Full-Size Keyboard	31P7415	IBM		29	1	29	
IBM Sleek 2-Button Mouse	28L3673	IBM		15	1	15	
E54 15" (13.8" Viewable) Color Monitor	633147N	IBM		119	1	119	90
NetBAY42S Enterprise Rack	9306421	IBM		1,439	1	1,439	168
Subtotal						46,923	1,258
Server Storage							
IBM EXP400 Rack Storage Exp. Enclosure	17331RU	IBM		3,099	8	24,792	6,080
36.4GB 15K Ultra320 SCSI Hot-Swap Drive	32P0734	IBM		495	112	55,440	
Subtotal						80,232	6,080
Server Software							
DB2 UDB ESE 8.1 SW Lic.& Maintenance 12 Months	D518GLL	IBM		21,425	4	85,700	
SW Maintenance Renewal - 1 Year	E00BILL	IBM		1,020	8		8,160
DPF SW License & Maintenance 12 Months	D518JLL	IBM		6,436	4	25,744	
DPF SW Maintenance Renewal - 1 Year	E00BILL	IBM		306	8		2,448
Microsoft Windows Server 2003 Enterprise Edition	P7200264	Microsoft		2,399	1	2,399	Incl Below
Operating System Support Package	PRO-PRORS-16U-01	Microsoft		1,950	3		5,850
Microsoft Visual C++ .NET Standard		Microsoft		90	1	90	
Subtotal						113,933	16,458
Discount						16,106	
Total						224,982	23,796

Three-Year Cost of Ownership: 248,778

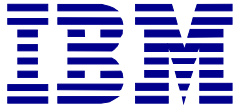
Pricing: 1 - Compsat Technology; 2 - Microsoft; 3 - Amazon.com
Warranty and Maintenance: The standard warranty has been upgraded to 3 years of 24x7x4 coverage.

QpH@300GB: 5,003.1

\$/QpH@300GB: \$50

Audited by Francois Raab, InfoSizing, Inc.

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 stated prices are not available according to these terms, please inform the TPC at pricing@tpc.org. Thank you.



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Measurement Results:

Database Scale Factor	300
Total Data Storage/Database Size	12:82
Start of Database Load	14:38:37
End of Database Load	20:11:05
Database Load Time	5:33
Query Streams for Throughput Test	6
TPC-H Power	6,463.9
TPC-H Throughput	3,872.4
TPC-H Composite Query-per-Hour (QphH@300GB)	5,003.1
Total System Price over 3 Years	\$248,778
TPC-H Price/Performance Metric (\$/QphH@300GB)	\$50

Measurement Interval:

Measurement Interval in Throughput Test (Ts) = 36,814

Duration of Stream Execution:

	Seed	Query Start Date/Time Query End Date/Time	RF1 Start Date/Time RF1 End Date/Time	RF2 Start Date/Time RF2 End Date/Time	Duration
Stream 00	514201105	05/14/04 21:15:29 05/14/04 23:07:05	05/14/04 21:15:29 05/14/04 21:18:03	05/14/04 23:06:13 05/14/04 23:07:05	01:51:36
Stream 01	514201106	05/14/04 23:07:08 05/15/04 09:07:24	05/14/04 23:07:08 05/15/04 09:08:48	05/15/04 09:08:48 05/15/04 09:09:52	10:00:16
Stream 02	514201107	05/14/04 23:07:08 05/15/04 06:37:40	05/15/04 09:09:52 05/15/04 09:11:02	05/15/04 09:11:02 05/15/04 09:11:51	07:30:32
Stream 03	514201108	05/14/04 23:07:08 05/15/04 08:55:05	05/15/04 09:11:51 05/15/04 09:13:10	05/15/04 09:13:10 05/15/04 09:14:06	09:47:57
Stream 04	514201109	05/14/04 23:07:08 05/15/04 07:35:18	05/15/04 09:14:06 05/15/04 09:15:28	05/15/04 09:15:28 05/15/04 09:16:19	08:28:10
Stream 05	514201110	05/14/04 23:07:08 05/15/04 09:07:14	05/15/04 09:16:19 05/15/04 09:17:44	05/15/04 09:17:44 05/15/04 09:18:39	10:00:06
Stream 06	514201111	05/14/04 23:07:08 05/15/04 08:19:37	05/15/04 09:18:39 05/15/04 09:19:50	05/15/04 09:19:50 05/15/04 09:20:42	09:12:29



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TPC-H Timing Intervals (in seconds):

Query	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Stream 00	447.2	61.2	72.8	58.3	206.9	38.2	340.6	206.6	775.3	192.5	50.6	75.6
Stream 01	724.6	331.3	227.4	84.1	432.1	67.5	349.3	1,916.4	1,172.1	1,249.5	240.2	385.0
Stream 02	568.8	652.1	246.2	148.5	1,025.0	398.0	709.4	1,028.8	2,093.7	1,144.9	603.6	171.5
Stream 03	1,051.8	492.9	521.9	366.2	1,748.5	317.0	1,087.1	2,300.8	2,237.5	1,225.7	465.4	265.8
Stream 04	870.3	361.8	200.9	191.5	1,162.7	234.6	882.1	1,739.3	2,388.1	844.8	237.6	305.1
Stream 05	1,003.5	351.8	220.8	194.9	640.9	169.3	1,203.5	1,723.3	1,661.7	731.9	499.3	188.2
Stream 06	491.4	460.6	425.2	172.2	1,491.7	256.8	794.9	1,559.6	2,866.7	2,271.1	310.1	248.6
Minimum	447.2	61.2	72.8	58.3	206.9	38.2	340.6	206.6	775.3	192.5	50.6	75.6
Average	785.1	441.8	307.1	192.9	1,083.5	240.6	837.7	1,711.4	2,070.0	1,244.7	392.7	260.1
Maximum	1,051.8	652.1	521.9	366.2	1,748.5	398.0	1,203.5	2,300.8	2,866.7	2,271.1	603.6	385.0

Stream ID	Q13	Q14	Q15a	Q16	Q17	Q18	Q19	Q20	Q21	Q22	RF1	RF2
Stream 00	517.5	43.2	101.0	134.7	286.5	1,163.4	298.3	119.8	1,112.3	188.2	154.3	51.9
Stream 01	2,635.8	141.7	718.4	2,698.9	1,363.3	13,154.1	925.8	592.9	5,893.0	713.3	84.0	64.0
Stream 02	1,733.0	224.0	930.7	3,187.5	1,805.8	5,215.1	1,648.5	430.8	2,282.0	784.2	69.4	49.3
Stream 03	3,290.5	125.9	846.1	1,046.5	1,686.2	11,099.8	1,660.6	618.8	2,086.9	734.8	78.6	56.4
Stream 04	6,717.9	188.0	789.3	802.2	1,015.7	3,745.9	1,344.0	435.8	5,045.1	991.0	82.1	51.1
Stream 05	4,968.7	340.7	703.6	2,903.0	631.2	8,261.5	1,506.8	546.7	6,263.9	1,290.9	84.6	55.1
Stream 06	3,709.7	174.4	1,408.6	1,989.6	624.5	9,110.2	1,266.7	525.6	1,882.9	1,107.6	71.6	51.2
Minimum	517.5	43.2	101.0	134.7	286.5	1,163.4	298.3	119.8	1,112.3	188.2	69.4	49.3
Average	3,842.6	199.1	899.5	2,104.6	1,187.8	8,431.1	1,392.1	525.1	3,909.0	937.0	78.4	54.5
Maximum	6,717.9	340.7	1,408.6	3,187.5	1,805.8	13,154.1	1,660.6	618.8	6,263.9	1,290.9	154.3	64.0