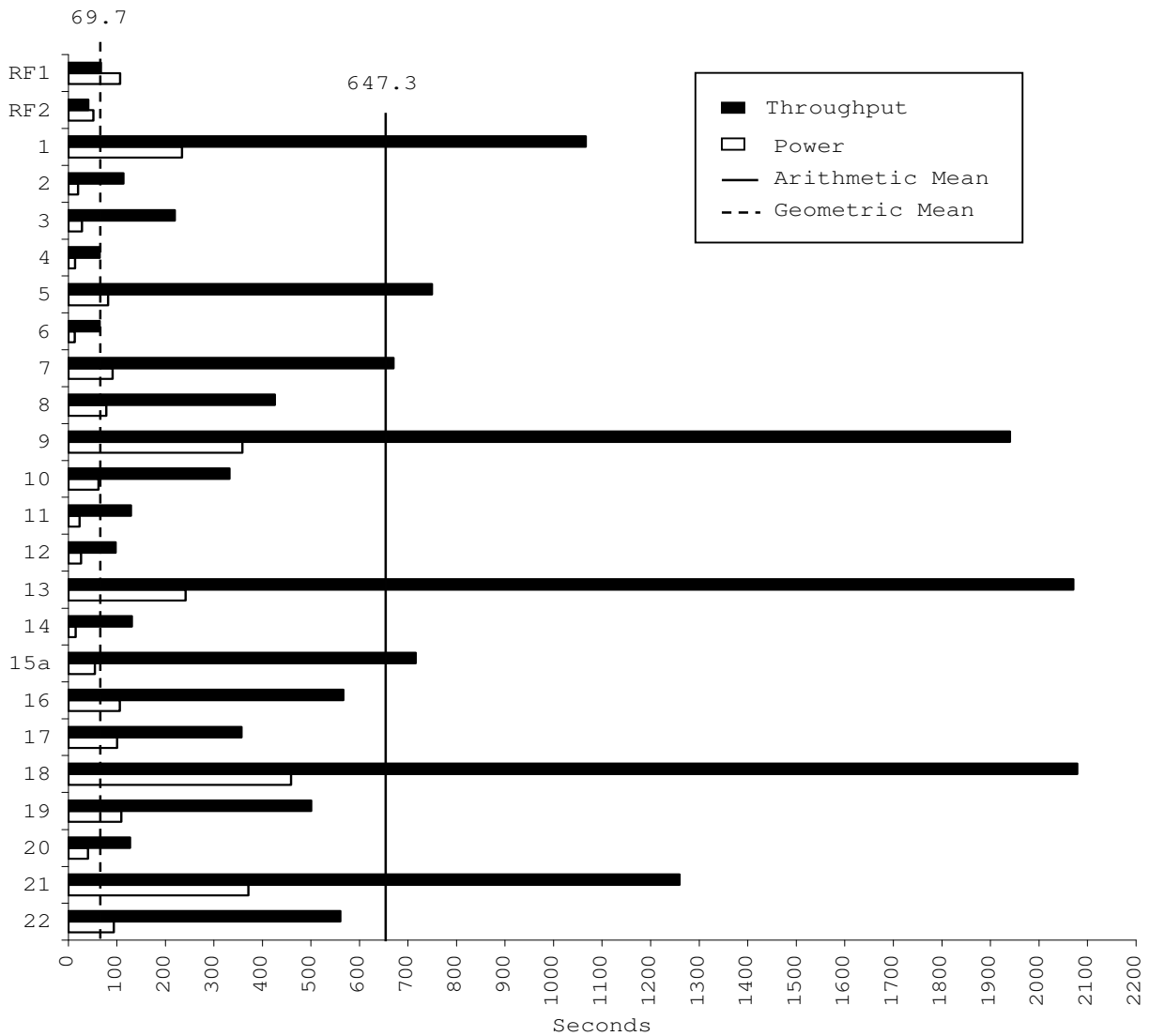


# IBM @server OpenPower 720 with DB2 UDB V8.2

TPC-H Rev. 2.1.0

Report Date: Dec. 16, 2004  
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Total System Cost	Composite Query per Hour Rating			Price/Performance
\$484,157	12,006.8 QphH@300GB			40 \$/QphH@300GB
Database Size	Database Manager	Operating System	Other Software	Availability Date
300 GB	DB2 UDB V8.2	SUSE LINUX Enterprise Server 9	None	January 28, 2005



Database Load Time: 3:26:33

Load included backup: Y

Total Data Storage/Database Size: 8.74

RAID (base tables): N

RAID (Base Tables and Auxiliary Data Structures): N

RAID (All): N

### System Configurations

2 IBM @server OpenPower 720, each server with

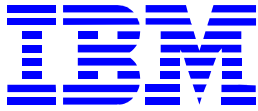
**Processors** 4 x 1650MHz POWER5 with 2x 36MB L3 Cache

**Memory** 32GB

**Disk Controllers** 8 x 2Gigabit Fibre Channel PCI-X Adapters & 2 x IBM TotalStorage 7311 Model DS20 I/O drawers & 4 x IBM TotalStorage DS4300 dual controllers

**Disk Drives** 34 x 36.4GB 15K 2Gb FC drives; 3 x 36.4GB 10K Ultra320 SCSI drives on node 1, 1 x 36.4 GB 10K Ultra320 SCSI drives on node 2

**Total Disk Storage** 2,620.80 GB (GB is defined as 1024 \* 1024 \* 1024 bytes)



# IBM @server OpenPower 720 with DB2 UDB V8.2

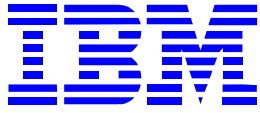
TPC-H Rev. 2.1.0

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Description	Part No.	Source	Unit Price	Qty	Ext Price	Maint Price
<b>Server Hardware</b>						
IBM eServer OpenPower 720	9124-720	1	50	2	100	2,736
Media Backplane Card	7877	1	120	2	240	0
Power Supply	7889	1	775	4	3,100	0
2-way 1.65GHz POWER5 Processor Card	5262	1	6,590	4	26,360	0
CPU Power Regulator	7876	1	160	4	640	0
IDE Slimline DVD-ROM Drive	2640	1	149	2	298	0
8GB (4x2048MB) DIMMS	1942	1	6,596	8	52,768	0
36.4GB 10,000K RPM Ultra320 SCSI Disk Drive	3273	1	275	4	1,100	0
Line Cords	6458	1	14	4	56	0
Rack Mount Drawer Rail Kit	7914	1	150	2	300	0
Hardware Management Console - 3631, 6458, 7801, 8800, 8841	7310-C03	1	2251	1	2,251	1,152
Model D20 I/O Drawer	7311-D20	1	4,270	4	17,080	27,028
Remote I/O Cable, 3.5M	3147	1	550	6	3,300	0
SPCN 2m Cable: Drawer to Drawer	6001	1	25	6	150	0
AC Power Supply, 435W	6268	1	625	4	2,500	0
RIO-2 Ports to I/O Planar Riser Card	6417	1	800	4	3,200	0
2 Gigabit Fibre Channel PCI-X Adapter	5716	1	2,267	16	36,272	0
Rack Model T00 - 6098, 6246, 7176	7014-T00	1	4,188	2	8,376	1,536
				<b>Subtotal</b>	<b>158,091</b>	<b>32,452</b>
<b>Storage</b>						
Storage Server DS4300	1722-60U	1	14,999	8	119,992	19,992
SHORT WAVE SFP GBIC	2210	1	499	16	7,984	0
2GB FC, 36.4GB / 15K Drive Module	5212	1	1,115	68	75,820	0
Linux for POWER Host Kit	7714	1	4,000	1	4,000	0
5m Fibre Optic Cable	5605	1	129	16	2,064	0
DS4300 4-Storage Partitions Activation	8804	1	3,000	8	24,000	0
				<b>Subtotal</b>	<b>233,860</b>	<b>19,992</b>
<b>Software</b>						
HMC Software Support 3 Year	5773-RS3	1	675	1	675	0
HMC Software Support 24x7 3 Year	5773-0570	1	236	1	0	236
DB2 UDB ESE 8.2 SW Lic. & Maint. 12 months for OpenPower 720		1	22,260	8	178,080	0
DB2 UDB EXE SW Maint. Renewal 1 year for OpenPower 720		1	1,060	16	0	16,960
DB2 UDB ESE DPF 8.2 SW Lic. & Maint. 12 months for OpenPower 720		1	6,686	8	53,488	0
DB2 UDB ESE DPF SW Maint. Renewal 1 year for OpenPower 720		1	318	16	0	5,088
				<b>Subtotal</b>	<b>232,243</b>	<b>22,284</b>
<b>Third Party Software</b>						
SUSE LINUX Enterprise Server 9 for POWER, to 16 CPUs/ YR		2	1,299	6	7,794	0
SUSE LINUX Enterprise Server 9 SW Media Kit for IBM POWER		2	35	2	70	0
Novell SUSE LINUX Server Support 24x7x4		2	900	6	0	5,400
				<b>Subtotal</b>	<b>7,864</b>	<b>5,400</b>
				<b>Total</b>	<b>632,058</b>	<b>80,128</b>
				<b>IBM Total System Discounts*</b>		<b>-228029</b>
				<b>Three-Year Cost of Ownership</b>		<b>484,157</b>
					<b>QpH</b>	<b>12,006</b>
					<b>\$/QpH</b>	<b>40</b>

\*Discounts are based on US list prices for similar quantities & configurations



# IBM @server OpenPower 720 with DB2 UDB V8.2

TPC-H Rev. 2.1.0

Report Date: Dec. 16, 2004

Revision Date: Feb. 9, 2005

Pricing Sources:

1 IBM: Bala Ekambaram, WW Marketing Manager, OpenPower Offerings bala.ekambaram@us.ibm.com, 1-512-838-7137

1 IBM: Jonathan Prial, Vice President, Marketing, Information Management, jonprial@us.ibm.com, 1-914-766-1576

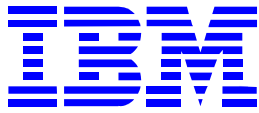
2 Novell SLES 9: <http://www.novell.com/products/linuxenterpriseserver/pricing.html>

2 Novell 24x7x4 Support: [http://support.novell.com/linux/linux\\_server\\_support.html](http://support.novell.com/linux/linux_server_support.html)

Audited by: Francois Raab of InfoSizing ([www.sizing.com](http://www.sizing.com))

The System as configured for the test was available on January 28, 2005.

Prices used in the 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 the stated prices are not available according to these terms, please notify the TPC at [pricing@tpc.org](mailto:pricing@tpc.org). Thank You.



# IBM @server OpenPower 720 with DB2 UDB V8.2

TPC-H Rev. 2.1.0

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## Numerical Quantities Summary

### Measurement Results

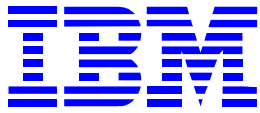
Database Scaling (SF/Size)	=	300
Total Data Storage/Database Size	=	8.74
Start of Database Load	=	12/7/2004 19:07:16
End of Database Load	=	12/7/2004 22:33:49
Database Load Time	=	3:26:33
Query Streams for Throughput Test	=	6
TPC-H Power Metric (QppH@300GB)	=	15,502.5
TPC-H Throughput Metric (QthH@300GB)	=	9,299.4
Composite Query-per-Hour Rating (QphH@300GB)	=	12,006.8
Total System Price over 3 years	=	\$484,157
TPC-H Price/Performance Metric (\$/QphH@300GB)	=	40

### Measurement Intervals

Measurement Interval in Throughput Test (Ts) = 15,330 seconds

### Duration of Stream Execution

Stream Id	Seed Used	Query Start	Date/Time	RF1 Start	Date/Time	RF2 Start	Date/Time	Duration
		Query End	Date/Time	RF1 End	Date/Time	RF2 End	Date/Time	
Stream 00	1206223349	12/6/2004	23:14:53	12/6/2004	23:13:06	12/6/2004	23:58:37	0:46:23
		12/6/2004	23:58:37	12/6/2004	23:14:53	12/6/2004	23:59:29	
Stream 01	1206223350	12/6/2004	23:59:34	12/6/2004	23:59:40	12/7/2004	4:05:53	4:04:37
		12/7/2004	4:04:11	12/7/2004	4:05:53	12/7/2004	4:06:44	
Stream 02	1206223351	12/6/2004	23:59:34	12/7/2004	4:06:44	12/7/2004	4:07:37	4:02:34
		12/7/2004	4:02:08	12/7/2004	4:07:37	12/7/2004	4:08:13	
Stream 03	1206223352	12/6/2004	23:59:34	12/7/2004	4:08:13	12/7/2004	4:09:05	3:50:21
		12/7/2004	3:49:55	12/7/2004	4:09:05	12/7/2004	4:09:39	
Stream 04	1206223353	12/6/2004	23:59:34	12/7/2004	4:09:39	12/7/2004	4:10:31	3:48:26
		12/7/2004	3:48:00	12/7/2004	4:10:31	12/7/2004	4:11:05	
Stream 05	1206223354	12/6/2004	23:59:35	12/7/2004	4:11:05	12/7/2004	4:12:27	3:59:10
		12/7/2004	3:58:45	12/7/2004	4:12:27	12/7/2004	4:13:25	
Stream 06	1206223355	12/6/2004	23:59:34	12/7/2004	4:13:25	12/7/2004	4:14:29	3:58:54
		12/7/2004	3:58:28	12/7/2004	4:14:29	12/7/2004	4:15:04	



# IBM @server OpenPower 720 with DB2 UDB V8.2

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Report Date: Dec. 16, 2004

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## Timing Interval (in seconds)

Stream ID	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Stream 00	234.4	19.9	28.4	14.1	82.4	13.6	91.1	78.0	358.5	62.2	22.9	26.2
Stream 01	535.9	149.3	340.4	14.7	679.6	47.5	633.1	505.1	2293.5	459.3	77.3	66.2
Stream 02	1188.8	171.8	199.4	46.0	640.4	114.3	741.4	331.8	2247.7	240.0	137.8	156.9
Stream 03	865.7	93.5	231.7	50.0	848.7	52.1	593.1	650.0	2138.0	219.2	79.3	114.3
Stream 04	927.1	67.7	196.3	32.4	886.6	48.6	700.8	390.6	1510.9	369.9	87.8	89.7
Stream 05	1390.3	119.5	113.1	157.0	687.4	70.0	666.7	277.2	1663.7	270.8	164.6	80.7
Stream 06	1487.8	78.1	236.8	85.8	755.6	55.9	685.5	398.8	1787.5	432.9	228.1	77.0
Minimum	535.9	67.7	113.1	14.7	640.4	47.5	593.1	277.2	1510.9	219.2	77.3	66.2
Average	1065.9	113.3	219.6	64.3	749.7	64.7	670.1	425.6	1940.2	332.0	129.2	97.5
Maximum	1487.8	171.8	340.4	157.0	886.6	114.3	741.4	650.0	2293.5	459.3	228.1	156.9
Stream ID	Q13	Q14	Q15a	Q16	Q17	Q18	Q19	Q20	Q21	Q22	RF1	RF2
Stream 00	242.2	15.6	54.9	105.6	100.6	459.1	109.2	40.7	370.8	93.8	107.0	51.3
Stream 01	1907.3	117.8	1018.4	516.2	221.6	2523.8	444.7	109.9	1469.6	545.3	102.0	51.7
Stream 02	1804.9	224.2	587.8	693.5	555.6	2291.1	604.3	119.8	847.5	608.9	52.6	35.6
Stream 03	1624.7	95.5	344.9	602.4	544.9	2362.5	449.7	114.5	1130.6	614.7	52.7	33.6
Stream 04	2290.2	104.2	371.6	528.0	314.8	1820.0	589.7	180.5	1550.6	647.2	52.4	33.7
Stream 05	2153.2	146.1	1132.2	487.0	231.9	1886.5	506.1	143.3	1493.7	509.5	81.8	58.6
Stream 06	2646.7	96.7	840.1	572.7	271.7	1588.9	407.6	95.0	1066.0	438.8	63.4	34.9
Minimum	1624.7	95.5	344.9	487.0	221.6	1588.9	407.6	95.0	847.5	438.8	52.4	33.6
Average	2071.2	130.8	715.8	566.6	356.8	2078.8	500.4	127.2	1259.7	560.7	67.5	41.4
Maximum	2646.7	224.2	1132.2	693.5	555.6	2523.8	604.3	180.5	1550.6	647.2	102.0	58.6