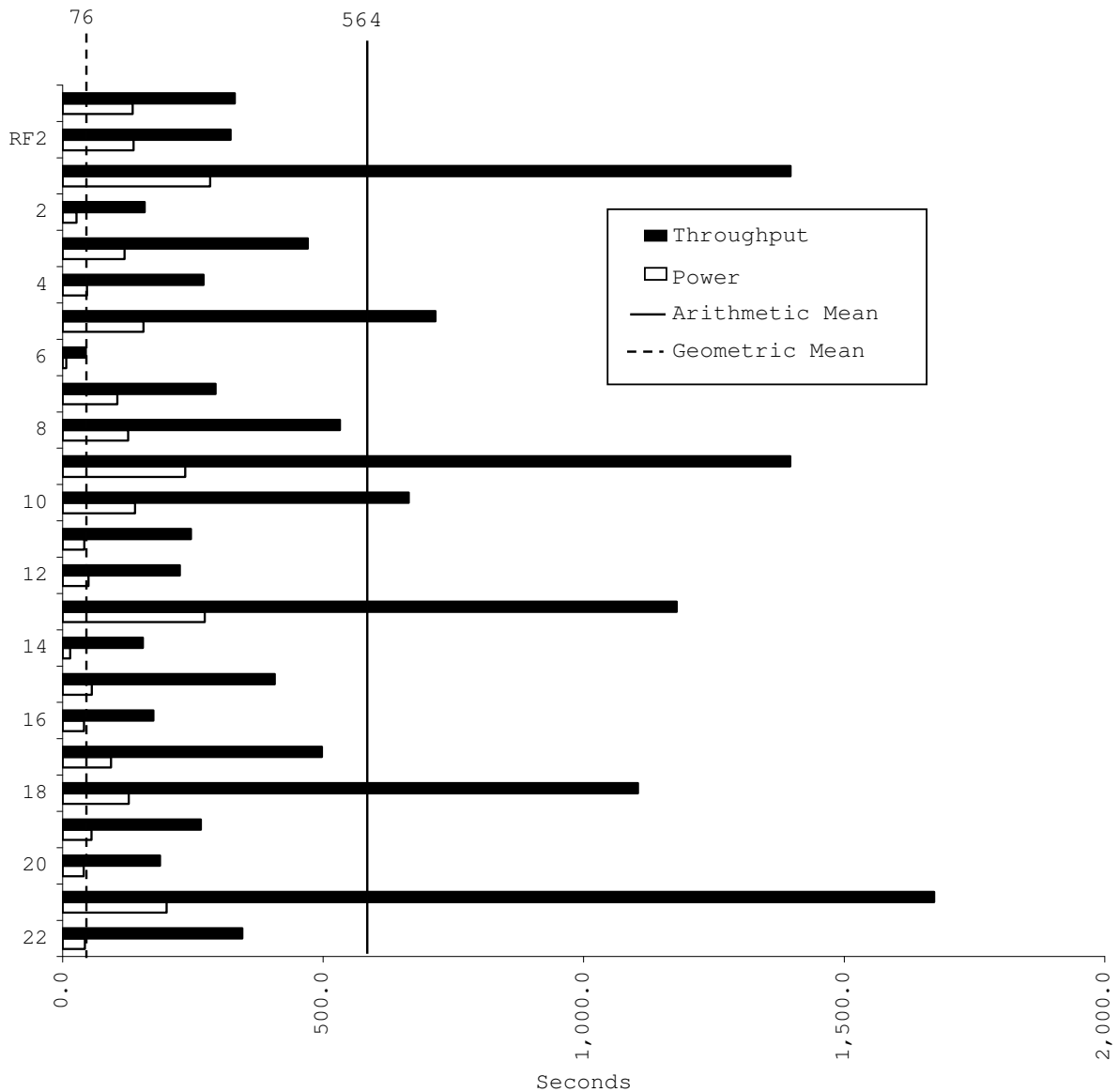


# IBM Power 595 Model 9119-FHA

TPC-H Rev. 2.8.0

**Report Date:  
September 16, 2009**

Total System Cost	Composite Query per Hour Rating			Price/Performance
3,344,093 USD	154,115.8 QphH@3000GB			21.70 USD Price/QphH@3000GB
Database Size	Database Manager	Operating System	Other Software	Availability Date
3000GB	Sybase IQ Single Application Server Edition v.15.1 ESD #1	AIX 6L V6.1	None	September 30, 2009



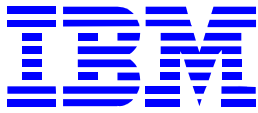
Database Load Time: 9:34:28      Load included backup: N      Total Data Storage/Database Size: 6.72

RAID (base tables): Y      RAID (Base Tables and Auxiliary Data Structures): Y      RAID (All): Y

**System Configurations**

**1 IBM Power 595 Model 9119-FHA**

- Processors**      64 5.0GHz POWER6 Cores with 32MB L3 Cache per chip
- Memory**      512GB
- Disk Controllers**      24 x 4Gigabit Fibre Channel PCI-X Adapters & 12 IBM TotalStorage DS4800 dual controllers
- Disk Drives**      6 x 146GB, 282 x 73GB 15K 4Gb FC drives; 5 x 146.8GB SAS drives
- Network**      1 Integrated 10Gigabit Ethernet
- Total Disk Storage**      20,636.46 GB (GB is defined as 1024 \* 1024 \* 1024 bytes)



# IBM Power 595 Model 9119-FHA

TPC-H Rev. 2.8.0

Report Date:  
September 16, 2009

Description	Part No.	Source	Unit Price	Qty	Ext Price	Maint Price
<b>Server Hardware</b>						
Server 1:9119 Model 595	9119-FHA		91,000	1	91,000	63,192
GX Dual-port 12x HCA	1816		4,000	6	24,000	
2.5M Enhanced 12X Cable (to connect to a gx card in node	1831		650	12	7,800	
146.8 GB Ultra320 15K RPM	3279		1,299	5	6,495	
0/8 - core POWER6 5.0GHz CoD, 0-core Active	4695		33,900	8	271,200	99,840
Single Processor Activation for FC 4695 (5.0 GHz)	4755		30,300	64	1,939,200	430,080
256GB Bundle DDR2 Activations	5681		387,840	2	775,680	
2-PORT BASETX ETHT.PCI-X A	5706		999	1	999	
4.7 GB IDE Slimline DVD-RAM Drive	5757		660	1	660	
4 Gigabit Dual-port Fibre Channel PCI-X Adapter	5759		3,308	24	79,392	
PCI-X DDR Dual - x4 SAS Adapter	5912		1,092	1	1,092	
12xI/O Drawer PCI-X, with repeater	5797		32,000	2	64,000	
12xI/O Drawer PCI-X, with no repeater	5798		32,000	1	32,000	
Bulk Power Regulator	6333		4,200	8	33,600	
Bulk Power Distribution Assembly	6334		2,500	4	10,000	
Slimline Doors (F&R), H CEC AND I/O Expansion Racks	6869		8,000	1	8,000	
UPIC Cable Group, BPD1 to I/O Drawer at A01	6941		500	1	500	
UPIC Cable Group, BPD1 to I/O Drawer A05	6942		500	1	500	
UPIC Cable Group, BPD1 to I/O Drawer A09	6943		500	1	500	
3rd & 4th AMDs + UPIC Y-Cable Group (BPC to Fans)	6952		5,000	1	5,000	
UPIC Y-Cable Group BPD1 to 1st Processor Node	6961		650	1	650	
UPIC Y-Cable Group BPD1 to 2nd Processor Node	6962		650	1	650	
UPIC Y-Cable Group BPD1 to 3rd Processor Node	6963		650	1	650	
UPIC Y-Cable Group BPD1 to 4th Processor Node	6964		650	1	650	
UPIC Y-Cable Group BPD1 to 5th Processor Node	6965		650	1	650	
UPIC Y-Cable Group BPD1 to 6th Processor Node	6966		650	1	650	
UPIC Y-Cable Group BPD1 to 7th Processor Node	6967		650	1	650	
UPIC Y-Cable Group BPD1 to 8th Processor Node	6968		650	1	650	
Ethernet Cable, 15M, Hardware Management	7802		34	2	68	
0/256 GB 667 DDR2 Memory Package (16x#5695)	8201		97,120	2	194,240	
Line Cord, 6AWG/Type W, 14ft, IEC309 100A Plug	8686		2,500	4	10,000	
HMC 1:7042-C07 Desktop Hardw.Mgmt.Console	7042-C07		1,830	1	1,830	1,344
IBM T117 TFT 17 inch Color Display	3645		875	1	875	
Quiet Touch Keyboard - USB, Business Black,	5951		104	1	104	
Power Cord (6-foot), To Wall (125V, 15A), Plug Type #4	6470		18	2	36	
Ethernet Cable, 6M, Hardware Management	7801		15	1	15	
Mouse - Business Black with Keyboard Attachment	8841		78	1	78	
PCI-e 1Gb Ethernet UTP 2Port	5767		699	1	699	
				<b>Subtotal</b>	<b>3,564,763</b>	<b>594,456</b>
<b>Storage</b>						
DS4800 Disk System Model 82 (4 GB Cache)	1815-82A		53,995	12	647,940	
DS4800 8-Storage Partitions	8870		10,000	12	120,000	
(22R4255) DS4800 AIX Host Kit	7711		7,000	12	84,000	
DS4000 EXP810 Enclosure	1812-81A		6,000	48	288,000	
Short Wave SFP	2410		998	96	95,808	
16-PAK 4 GBPS 73GB GB/15K	5433		14,816	17	251,872	
4 GBPS FC,73.4 GB/15K	5413		1,301	10	13,010	
4 GBPS FC,146.8 GB/15K	5414		1,605	6	9,630	
Fiber Cable 25m	5625		189	48	9,072	
Fiber Cable 1m	5601		79	96	7,584	
3 Year Warranty Service Upgrade 1812-81A 24x7x4			960	48	0	46,080
3 Year Warranty Service Upgrade 1815-82A 24x7x4			3,200	12	0	38,400
ServicePac for 3-Year 24x7x4 Support (Rack)	41L2760		300	5	0	1,500
IBM S2 42U Standard Rack	93074RX		1,489	5	7,445	
				<b>Subtotal</b>	<b>1,534,361</b>	<b>85,980</b>



# IBM Power 595 Model 9119-FHA

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Report Date:  
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**Server Software**

AIX 6.1 (media only)	5692-A6P	1	50	1	50	
AIX Software per Processor	5765-G62	1	2,495	64	159,680	
AIX IBM Management Edition for AIX	5765-AME	1	490	64	31,360	
AIX Software Maintenance (3Y)	773-SM3-474	1	2,836	64		181,504
AIX Software Maintenance 24x7 Upgrade (3Y)	773-SM3-476	1	732	64		46,848
AIX IBM Mgmt Edition of AIX Software Maintenance (3Y)	773-AME-989	1	196	64		12,544
HMC Software SUB (3Y)	5773-0570	1	236	1		236
HMC Software Support (3Y)	5773-0569	1	675	1		675
C for AIX user Lic+SW maint 12 MO	D5A1DLL	1	975	1	975	
C for AIX user annual SW maint renewal	E1A1FLL	1	195	2		390
			<b>Subtotal</b>		<b>192,065</b>	<b>242,197</b>

**Third Party Hardware/Software**

Sybase IQ Single Application Server Edition v.15.1 ESD #1		2	2,595	64	166,080	
Sybase IQ Single Application Server Edition v.15.1 ESD #1 (3 years)		2	1,713	64		109,632
			<b>Subtotal</b>		<b>166,080</b>	<b>109,632</b>
			<b>Total</b>		<b>5,457,269</b>	<b>1,032,265</b>
			<b>Total IBM Discounts*</b>			<b>-3,104,084</b>
			<b>Sybase Discount (15%)</b>			<b>-41,357</b>

**Three-Year Cost of Ownership 3,344,093**

**Notes:**

For pricing details and contact information please see appendix E

Pricing Sources: 1) IBM 2) Sybase

**QphH@3000GB 154,115**

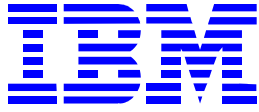
**\$/QphH@3000GB 21.70**

\*Discounts are based on US list prices for similar quantities & configurations including pre-payment for maintenance. The discount applies to the totality of all items with price source of \*1\*.

Audited by: Francois Raab of Infosizing (www.sizing.com)

The system as configured for the test will be available September 30, 2009.

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 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 Power 595 Model 9119-FHA

TPC-H Rev. 2.8.0

Report Date:  
September 16, 2009

## Numerical Quantities Summary

### Measurement Results

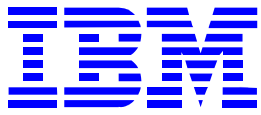
Database Scaling (SF/Size)	=	3000
Total Data Storage/Database Size	=	6.72
Start of Database Load	=	7/8/09 18:21:02
End of Database Load	=	7/9/09 3:55:30
Database Load Time	=	9:34:28
Query Streams for Throughput Test	=	9
TPC-H Power Metric (QppH@3000GB)	=	141,694.9
TPC-H Throughput Metric (QthH@3000GB)	=	167,625.6
Composite Query-per-Hour Rating (QphH@3000GB)	=	154,115.8
Total System Price over 3 years	=	3,344,093 USD
TPC-H Price/Performance Metric (\$/QphH@3000GB)	=	21.70 USD

### Measurement Intervals

Measurement Interval in Throughput Test (Ts) = 12,757 seconds

### Duration of Stream Execution

Stream ID	Seed Used	Date and Time Stamps						Duration
		Query Start		RF1 Start		RF2 Start		Queries
		Query End		RF1 End		RF2 End		RFs
Stream 00	709035530	7/9/2009	07:13:40	7/9/2009	7:11:21	7/9/2009	7:51:36	0:37:56
		7/9/2009	07:51:36	7/9/2009	7:13:35	7/9/2009	7:53:52	0:04:30
Stream 01	709035531	7/9/2009	07:53:52	7/9/2009	7:54:53	7/9/2009	8:00:42	3:27:21
		7/9/2009	11:21:13	7/9/2009	8:00:42	7/9/2009	08:05:54	0:11:01
Stream 02	709035532	7/9/2009	7:53:52	7/9/2009	8:05:54	7/9/2009	08:22:26	3:23:43
		7/9/2009	11:17:35	7/9/2009	8:11:21	7/9/2009	08:28:21	0:22:27
Stream 03	709035533	7/9/2009	7:53:52	7/9/2009	8:28:21	7/9/2009	08:39:13	3:32:36
		7/9/2009	11:26:28	7/9/2009	8:33:43	7/9/2009	08:43:56	0:15:35
Stream 04	709035534	7/9/2009	7:53:52	7/9/2009	8:43:57	7/9/2009	08:54:59	3:26:05
		7/9/2009	11:19:57	7/9/2009	8:49:27	7/9/2009	09:00:47	0:16:50
Stream 05	709035535	7/9/2009	7:53:52	7/9/2009	9:06:36	7/9/2009	09:12:30	3:17:29
		7/9/2009	11:11:21	7/9/2009	9:12:30	7/9/2009	09:17:49	0:11:13
Stream 06	709035536	7/9/2009	7:53:52	7/9/2009	9:23:27	7/9/2009	09:34:35	3:23:47
		7/9/2009	11:17:39	7/9/2009	9:28:57	7/9/2009	09:39:30	0:16:03
Stream 07	709035537	7/9/2009	7:53:52	7/9/2009	9:39:31	7/9/2009	09:44:40	3:31:03
		7/9/2009	11:24:55	7/9/2009	9:44:40	7/9/2009	09:50:05	0:10:34
Stream 08	709035538	7/9/2009	7:53:52	7/9/2009	10:06:50	7/9/2009	10:12:50	3:24:53
		7/9/2009	11:18:45	7/9/2009	10:12:49	7/9/2009	10:17:23	0:10:33
Stream 09	709035539	7/9/2009	7:53:52	7/9/2009	10:17:25	7/9/2009	10:28:07	3:32:31
		7/9/2009	11:26:23	7/9/2009	10:22:16	7/9/2009	10:34:36	0:17:11



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## Timing Interval (in seconds)

StreamID	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Stream0	283.0	26.6	119.2	46.6	154.8	7.0	104.7	126.0	235.2	139.0	41.3	49.5
Stream01	1168.8	214.5	366.3	90.4	864.2	40.1	351.8	555.9	1381.7	622.4	320.7	266.7
Stream02	1551.1	95.5	503.1	362.3	853.6	125.3	312.4	503.3	1146.7	561.8	306.2	236.3
Stream03	1332.9	68.2	304.9	307.0	919.3	51.4	235.7	636.2	1626.1	595.5	277.6	72.3
Stream04	1552.7	204.1	355.1	293.9	751.1	64.9	279.7	553.7	1423.7	799.7	268.1	253.9
Stream05	1412.1	119.2	478.5	176.5	746.8	29.9	216.3	465.4	1350.2	609.0	151.5	354.4
Stream06	1379.9	131.0	505.4	359.9	751.6	18.5	294.4	379.8	1475.1	636.9	228.2	274.7
Stream07	1369.6	297.7	593.0	284.1	709.8	12.9	321.8	610.1	1635.0	612.8	241.7	66.9
Stream08	1203.2	128.1	556.0	291.7	588.0	43.8	324.1	444.6	1173.2	717.4	255.5	201.4
Stream09	1601.5	161.8	569.6	265.7	252.6	14.2	307.1	640.4	1355.0	822.5	166.5	298.7
Minimum	1168.8	68.2	304.9	90.4	252.6	12.9	216.3	379.8	1146.7	561.8	151.5	66.9
Average	1396.9	157.8	470.2	270.2	715.2	44.6	293.7	532.2	1396.3	664.2	246.2	225.0
Maximum	1601.5	297.7	593.0	362.3	919.3	125.3	351.8	640.4	1635.0	822.5	320.7	354.4
StreamID	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	RF1	RF2
Stream0	273.2	14.5	56.2	40.5	92.9	127.0	55.5	40.1	199.4	43.0	134.2	135.8
Stream01	1243.8	141.4	463.5	257.5	339.3	1103.0	272.0	252.5	1734.5	390.1	348.4	311.9
Stream02	1103.4	150.8	401.1	170.8	403.0	1273.4	329.3	157.9	1434.3	241.3	327.5	354.4
Stream03	1106.9	159.4	424.2	91.3	862.7	1166.5	199.6	227.5	1764.7	326.3	321.3	283.7
Stream04	1068.2	148.7	365.4	164.9	331.3	949.6	218.9	102.2	1878.4	337.0	330.6	348.0
Stream05	1160.5	180.7	477.2	140.6	358.5	963.9	226.5	175.9	1730.2	324.7	353.2	319.2
Stream06	1093.2	243.6	367.5	361.9	381.1	879.1	219.2	160.8	1608.6	476.3	330.2	294.6
Stream07	1448.0	87.6	173.5	136.5	475.3	1432.5	327.3	113.5	1508.2	204.4	309.1	325.2
Stream08	1356.7	175.4	525.1	179.0	307.9	1064.2	290.1	239.0	1756.3	472.1	359.0	273.8
Stream09	1023.4	97.8	463.1	64.7	1018.1	1103.9	302.9	251.0	1639.5	331.2	291.0	389.4
Minimum	1023.4	87.6	173.5	64.7	307.9	879.1	199.6	102.2	1434.3	204.4	291.0	273.8
Average	1178.2	153.9	406.7	174.1	497.5	1104.0	265.1	186.7	1672.7	344.8	330.0	322.2
Maximum	1448.0	243.6	525.1	361.9	1018.1	1432.5	329.3	252.5	1878.4	476.3	359.0	389.4