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Intel Core i9-12900K testing with a ASUS ROG STRIX Z690-E GAMING WIFI (1601 BIOS) and AMD Radeon RX 6800 XT 16GB on Ubuntu 22.04 via the Phoronix Test Suite.

Automated Executive Summary

B had the most wins, coming in first place for 30% of the tests.

Based on the geometric mean of all complete results, the fastest (A) was 1.165x the speed of the slowest (D). B was 0.931x the speed of A, C was 0.923x the speed of B, D was 0.999x the speed of C.

The results with the greatest spread from best to worst included:

Apache Spark (Row Count: 20000000 - Partitions: 2000 - Broadcast Inner Join Test Time) at 196.667x
Apache Spark (Row Count: 20000000 - Partitions: 2000 - Inner Join Test Time) at 108.727x
Apache Spark (Row Count: 1000000 - Partitions: 2000 - Broadcast Inner Join Test Time) at 26.6x
Apache Spark (Row Count: 20000000 - Partitions: 2000 - SHA-512 Benchmark Time) at 25.381x
Apache Spark (Row Count: 1000000 - Partitions: 2000 - Inner Join Test Time) at 14x
Apache Spark (Row Count: 20000000 - Partitions: 2000 - Group By Test Time) at 10.667x
Apache Spark (Row Count: 20000000 - Partitions: 2000 - Repartition Test Time) at 8.44x
Apache Spark (Row Count: 1000000 - Partitions: 2000 - SHA-512 Benchmark Time) at 5x
Apache Spark (Row Count: 1000000 - Partitions: 2000 - Group By Test Time) at 4.791x

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Apache Spark (Row Count: 1000000 - Partitions: 1000 - Broadcast Inner Join Test Time) at 1.505x.

Test Systems:

A

B

C

D

Processor: Intel Core i9-12900K @ 5.20GHz (16 Cores / 24 Threads), Motherboard: ASUS ROG STRIX Z690-E GAMING WIFI (1601 BIOS), Chipset: Intel Alder Lake-S PCH, Memory: 32GB, Disk: 1000GB Western Digital WDS100T1X0E-00AFY0 + 2000GB, Graphics: AMD Radeon RX 6800 XT 16GB (2575/1000MHz), Audio: Intel Alder Lake-S HD Audio, Monitor: ASUS VP28U, Network: Intel I225-V + Intel Wi-Fi 6 AX210/AX211/AX411

OS: Ubuntu 22.04, Kernel: 5.19.0-051900-generic (x86_64), Desktop: GNOME Shell 42.2, Display Server: X Server 1.21.1.3 + Wayland, OpenGL: 4.6 Mesa 22.3.0-devel (git-42a52a8 2022-08-04 jammy-oibaf-ppa) (LLVM 14.0.6 DRM 3.47), Vulkan: 1.3.219, Compiler: GCC 11.2.0, File-System: ext4, Screen Resolution: 3840x2160

Kernel Notes: Transparent Huge Pages: madvise
Processor Notes: Scaling Governor: intel_pstate performance (EPP: performance) - CPU Microcode: 0x1f - Thermald 2.4.9
Java Notes: OpenJDK Runtime Environment (build 11.0.15+10-Ubuntu-0ubuntu0.22.04.1)
Python Notes: Python 3.10.4
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + mmio_stale_data: Not affected + retbleed: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Enhanced IBRS IBPB: conditional RSB filling + srbds: Not affected + tsx_async_abort: Not affected

	A	B	C	D
Apache Spark - 1000000 - 100 - S.5.B.T (sec)	**2.12**	2.21	2.21	**2.22**
Normalized	100%	95.93%	95.93%	95.5%
Apache Spark - 1000000 - 100 - C.P.B (sec)	**81.45**	82.77	82.472849923	**82.97**
Normalized	100%	98.41%	98.76%	98.17%
Apache Spark - 1000000 - 100 - C.P.B.U.D (sec)	5.04	**5.01**	**5.10**	**5.10**
Normalized	99.4%	100%	98.24%	98.24%
Apache Spark - 1000000 - 100 - Group By Test Time (sec)	**2.71**	2.74	**2.76**	2.72
Normalized	100%	98.91%	98.19%	99.63%

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Apache Spark - 1000000 - 100 - R.T.T (sec)	**1.25**	**1.22**	**1.25**	1.24
Normalized	97.6%	100%	97.6%	98.39%
Apache Spark - 1000000 - 100 - I.J.T.T (sec)	**0.97**	**1.05**	0.98	1.02
Normalized	100%	92.38%	98.98%	95.1%
Apache Spark - 1000000 - 100 - B.I.J.T.T (sec)	**0.82**	0.84	0.86	**0.92**
Normalized	100%	97.62%	95.35%	89.13%
Apache Spark - 1000000 - 500 - S.5.B.T (sec)	2.29	**2.26**	**2.32**	2.30
Normalized	98.69%	100%	97.41%	98.26%
Apache Spark - 1000000 - 500 - C.P.B (sec)	84.800545422	**84.4113598**	**85.013937598**	84.44
Normalized	99.54%	100%	99.29%	99.97%
Apache Spark - 1000000 - 500 - C.P.B.U.D (sec)	5.07	4.763385925	**4.71**	**5.10**
Normalized	92.9%	98.88%	100%	92.35%
Apache Spark - 1000000 - 500 - Group By Test Time (sec)	2.79	**2.75**	**2.81**	2.77
Normalized	98.57%	100%	97.86%	99.28%
Apache Spark - 1000000 - 500 - R.T.T (sec)	**1.31**	**1.36**	1.34	**1.36**
Normalized	100%	96.32%	97.76%	96.32%
Apache Spark - 1000000 - 500 - I.J.T.T (sec)	1.01	**1.000558709**	**1.05**	1.02
Normalized	99.07%	100%	95.29%	98.09%
Apache Spark - 1000000 - 500 - B.I.J.T.T (sec)	**0.88**	**0.91**	0.89	**0.91**
Normalized	100%	96.7%	98.88%	96.7%
Apache Spark - 1000000 - 1000 - S.5.B.T (sec)	2.56	2.48	**2.58**	**2.38**
Normalized	92.97%	95.97%	92.25%	100%
Apache Spark - 1000000 - 1000 - C.P.B (sec)	**84.361830344**	85.47	84.46	**85.81**
Normalized	100%	98.7%	99.88%	98.31%
Apache Spark - 1000000 - 1000 - C.P.B.U.D (sec)	4.59	**4.96**	4.94	**4.50**
Normalized	98.04%	90.73%	91.09%	100%
Apache Spark - 1000000 - 1000 - Group By Test Time (sec)	2.94	**2.92**	**2.98**	2.96
Normalized	99.32%	100%	97.99%	98.65%
Apache Spark - 1000000 - 1000 - R.T.T (sec)	**1.45**	1.42	**1.38**	1.43
Normalized	95.17%	97.18%	100%	96.5%
Apache Spark - 1000000 - 1000 - I.J.T.T (sec)	1.22	1.27	**1.28**	**1.20**
Normalized	98.36%	94.49%	93.75%	100%
Apache Spark - 1000000 - 1000 - B.I.J.T.T (sec)	**1.49**	1.12	**0.99**	1.04
Normalized	66.44%	88.39%	100%	95.19%

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Apache Spark - 1000000 - 2000 - S.5.B.T (sec)	2.63	**0.53**	**2.65**	2.54
Normalized	20.15%	100%	20%	20.87%
Apache Spark - 1000000 - 2000 - C.P.B (sec)	**84.51**	85.68	85.772644515	**86.593576543**
Normalized	100%	98.63%	98.53%	97.59%
Apache Spark - 1000000 - 2000 - C.P.B.U.D (sec)	**4.75**	**5.13**	5.02	5.06
Normalized	100%	92.59%	94.62%	93.87%
Apache Spark - 1000000 - 2000 - Group By Test Time (sec)	**3.21**	**0.67**	3.05	3.14
Normalized	20.87%	100%	21.97%	21.34%
Apache Spark - 1000000 - 2000 - R.T.T (sec)	**1.63**	**1.16**	1.59	1.62
Normalized	71.17%	100%	72.96%	71.6%
Apache Spark - 1000000 - 2000 - I.J.T.T (sec)	**1.54**	**0.11**	**1.54**	1.52
Normalized	7.14%	100%	7.14%	7.24%
Apache Spark - 1000000 - 2000 - B.I.J.T.T (sec)	1.28	**0.05**	**1.33**	1.31
Normalized	3.91%	100%	3.76%	3.82%
Apache Spark - 10000000 - 100 - S.5.B.T (sec)	8.16	**8.59**	8.00	**7.97**
Normalized	97.67%	92.78%	99.63%	100%
Apache Spark - 10000000 - 100 - C.P.B (sec)	85.75	**85.312196129**	**86.346556539**	86.067847462
Normalized	99.49%	100%	98.8%	99.12%
Apache Spark - 10000000 - 100 - C.P.B.U.D (sec)	**5.08**	5.03	**4.78**	5.07
Normalized	94.09%	95.03%	100%	94.28%
Apache Spark - 10000000 - 100 - Group By Test Time (sec)	**4.98**	4.99	5.04	**5.19**
Normalized	100%	99.8%	98.81%	95.95%
Apache Spark - 10000000 - 100 - R.T.T (sec)	**5.40**	5.25	5.39	**5.11**
Normalized	94.63%	97.33%	94.81%	100%
Apache Spark - 10000000 - 100 - I.J.T.T (sec)	6.13	**6.523776991**	6.33	**6.02**
Normalized	98.21%	92.28%	95.1%	100%
Apache Spark - 10000000 - 100 - B.I.J.T.T (sec)	**6.28**	**6.85**	6.55	6.45
Normalized	100%	91.68%	95.88%	97.36%
Apache Spark - 10000000 - 500 - S.5.B.T (sec)	**7.40**	7.46	7.42	**7.56**
Normalized	100%	99.2%	99.73%	97.88%
Apache Spark - 10000000 - 500 - C.P.B (sec)	**87.28**	86.093697249	**85.04**	85.675618513
Normalized	97.43%	98.78%	100%	99.26%
Apache Spark - 10000000 - 500 - C.P.B.U.D (sec)	5.08	5.03	**4.96**	**5.11**
Normalized	97.64%	98.61%	100%	97.06%

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Apache Spark - 10000000 - 500 - Group By Test Time (sec)	**4.65**	**4.43**	4.63	4.50
Normalized	95.27%	100%	95.68%	98.44%
Apache Spark - 10000000 - 500 - R.T.T (sec)	**5.10**	**4.81**	4.96	4.96
Normalized	94.31%	100%	96.98%	96.98%
Apache Spark - 10000000 - 500 - I.J.T.T (sec)	**6.21**	5.79	**5.58**	6.17
Normalized	89.86%	96.37%	100%	90.44%
Apache Spark - 10000000 - 500 - B.I.J.T.T (sec)	5.82	5.85	**5.49**	**5.90**
Normalized	94.33%	93.85%	100%	93.05%
Apache Spark - 20000000 - 100 - S.5.B.T (sec)	**14.326420697**	14.55	14.37	**15.04**
Normalized	100%	98.46%	99.7%	95.26%
Apache Spark - 20000000 - 100 - C.P.B (sec)	85.139703903	**85.48**	**84.84**	85.094043096
Normalized	99.65%	99.25%	100%	99.7%
Apache Spark - 20000000 - 100 - C.P.B.U.D (sec)	5.02	**4.70**	4.80	**5.03**
Normalized	93.63%	100%	97.92%	93.44%
Apache Spark - 20000000 - 100 - Group By Test Time (sec)	7.65	**7.66**	**7.61**	7.65
Normalized	99.48%	99.35%	100%	99.48%
Apache Spark - 20000000 - 100 - R.T.T (sec)	10.098177409	**10.20**	10.07	**9.95**
Normalized	98.53%	97.55%	98.81%	100%
Apache Spark - 20000000 - 100 - I.J.T.T (sec)	**12.67**	11.890685683	12.25	**11.58**
Normalized	91.4%	97.39%	94.53%	100%
Apache Spark - 20000000 - 100 - B.I.J.T.T (sec)	**12.40159508**	**12.64129401**	12.51	12.43
Normalized	100%	98.1%	99.13%	99.77%
Apache Spark - 20000000 - 500 - S.5.B.T (sec)	14.207804304	**15.29**	14.34	**14.17**
Normalized	99.73%	92.67%	98.81%	100%
Apache Spark - 20000000 - 500 - C.P.B (sec)	**85.69**	85.090602077	**85.02**	85.14
Normalized	99.22%	99.92%	100%	99.86%
Apache Spark - 20000000 - 500 - C.P.B.U.D (sec)	**5.03**	4.97	**4.48**	4.94
Normalized	89.07%	90.14%	100%	90.69%
Apache Spark - 20000000 - 500 - Group By Test Time (sec)	7.74	**7.84**	7.52	**7.41**
Normalized	95.74%	94.52%	98.54%	100%
Apache Spark - 20000000 - 500 - R.T.T (sec)	9.88	9.62	**10.05**	**9.52**
Normalized	96.36%	98.96%	94.73%	100%
Apache Spark - 20000000 - 500 - I.J.T.T (sec)	11.799657537	**11.847774087**	**11.43**	11.75
Normalized	96.87%	96.47%	100%	97.28%

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Apache Spark - 20000000 - 500 - B.I.J.T.T (sec)	12.24	12.32	**12.49**	**12.03**
Normalized	98.28%	97.65%	96.32%	100%
Apache Spark - 40000000 - 100 - S.5.B.T (sec)	**27.24**	**27.097468226**	27.10	27.11
Normalized	99.48%	100%	99.99%	99.95%
Apache Spark - 40000000 - 100 - C.P.B (sec)	84.931547925	**85.669825169**	**84.93**	85.22
Normalized	100%	99.14%	100%	99.66%
Apache Spark - 40000000 - 100 - C.P.B.U.D (sec)	**4.67**	5.04	4.72	**5.08**
Normalized	100%	92.66%	98.94%	91.93%
Apache Spark - 40000000 - 100 - Group By Test Time (sec)	**19.14**	18.842812858	**18.76**	18.87
Normalized	98.01%	99.56%	100%	99.42%
Apache Spark - 40000000 - 100 - R.T.T (sec)	19.24	**19.299186496**	19.27	**19.16**
Normalized	99.58%	99.28%	99.43%	100%
Apache Spark - 40000000 - 100 - I.J.T.T (sec)	23.04	23.13	**22.91**	**23.55**
Normalized	99.44%	99.05%	100%	97.28%
Apache Spark - 40000000 - 100 - B.I.J.T.T (sec)	23.81	24.26	**24.27**	**23.71**
Normalized	99.58%	97.73%	97.69%	100%
Apache Spark - 40000000 - 500 - S.5.B.T (sec)	**25.264777819**	24.356403173	**24.30**	24.31
Normalized	96.18%	99.77%	100%	99.96%
Apache Spark - 40000000 - 500 - C.P.B (sec)	**84.63**	85.03	85.02	**85.13**
Normalized	100%	99.53%	99.54%	99.41%
Apache Spark - 40000000 - 500 - C.P.B.U.D (sec)	4.94	5.05	**4.70**	**5.09**
Normalized	95.14%	93.07%	100%	92.34%
Apache Spark - 40000000 - 500 - Group By Test Time (sec)	**17.12**	16.84	16.989188878	**16.67**
Normalized	97.37%	98.99%	98.12%	100%
Apache Spark - 40000000 - 500 - R.T.T (sec)	18.475092188	**18.16**	**18.600499237**	18.28
Normalized	98.29%	100%	97.63%	99.34%
Apache Spark - 40000000 - 500 - I.J.T.T (sec)	21.138411296	**20.691751412**	**21.78**	21.55
Normalized	97.89%	100%	95%	96.02%
Apache Spark - 40000000 - 500 - B.I.J.T.T (sec)	21.252051853	**21.19**	21.30	**21.62**
Normalized	99.71%	100%	99.48%	98.01%
Apache Spark - 10000000 - 1000 - S.5.B.T (sec)	7.73	7.77	**7.78**	**7.65**
Normalized	98.97%	98.46%	98.33%	100%
Apache Spark - 10000000 - 1000 - C.P.B (sec)	**86.28**	86.02	85.82	**84.81**
Normalized	98.3%	98.59%	98.82%	100%

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Apache Spark - 10000000 - 1000 - C.P.B.U.D (sec)	5.06	5.080638849	4.98	4.72
Normalized	93.28%	92.9%	94.78%	100%
Apache Spark - 10000000 - 1000 - Group By Test Time (sec)	4.96	4.92	5.00	5.07
Normalized	99.19%	100%	98.4%	97.04%
Apache Spark - 10000000 - 1000 - R.T.T (sec)	5.06	5.02	5.23	5.16
Normalized	99.21%	100%	95.98%	97.29%
Apache Spark - 10000000 - 1000 - I.J.T.T (sec)	5.97	5.68	5.74	5.79
Normalized	95.14%	100%	98.95%	98.1%
Apache Spark - 10000000 - 1000 - B.I.J.T.T (sec)	5.62	5.33	5.35	5.39
Normalized	94.84%	100%	99.63%	98.89%
Apache Spark - 10000000 - 2000 - S.5.B.T (sec)	7.84	7.80	7.69	7.97
Normalized	98.09%	98.59%	100%	96.49%
Apache Spark - 10000000 - 2000 - C.P.B (sec)	86.821172323	85.28	86.04	85.51
Normalized	98.22%	100%	99.12%	99.73%
Apache Spark - 10000000 - 2000 - C.P.B.U.D (sec)	5.09	4.66	5.03	4.92
Normalized	91.55%	100%	92.64%	94.72%
Apache Spark - 10000000 - 2000 - Group By Test Time (sec)	5.00	4.97	4.98	5.03
Normalized	99.4%	100%	99.8%	98.81%
Apache Spark - 10000000 - 2000 - R.T.T (sec)	5.19	5.17	5.39	5.21
Normalized	99.61%	100%	95.92%	99.23%
Apache Spark - 10000000 - 2000 - I.J.T.T (sec)	6.08	6.12	6.32	6.17
Normalized	100%	99.35%	96.2%	98.54%
Apache Spark - 10000000 - 2000 - B.I.J.T.T (sec)	6.07	5.95	6.05	6.02
Normalized	98.02%	100%	98.35%	98.84%
Apache Spark - 20000000 - 1000 - S.5.B.T (sec)	13.43	13.24	13.12	13.28
Normalized	97.69%	99.09%	100%	98.8%
Apache Spark - 20000000 - 1000 - C.P.B (sec)	84.83	85.352606409	84.81	85.07
Normalized	99.98%	99.36%	100%	99.69%
Apache Spark - 20000000 - 1000 - C.P.B.U.D (sec)	5.00	5.07	4.99	4.99
Normalized	99.8%	98.42%	100%	100%
Apache Spark - 20000000 - 1000 - Group By Test Time (sec)	6.80	6.95	7.06	6.82
Normalized	100%	97.84%	96.32%	99.71%
Apache Spark - 20000000 - 1000 - R.T.T (sec)	9.46	9.21	9.47	9.57
Normalized	97.36%	100%	97.25%	96.24%

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Apache Spark - 20000000 - 1000 - I.J.T.T (sec)	**11.371578033**	11.15	11.073977287	**10.99**
Normalized	96.64%	98.57%	99.24%	100%
Apache Spark - 20000000 - 1000 - B.I.J.T.T (sec)	**10.55**	**11.72**	10.74	10.60
Normalized	100%	90.02%	98.23%	99.53%
Apache Spark - 20000000 - 2000 - S.5.B.T (sec)	**0.54**	13.68	**13.70550217**	13.68
Normalized	100%	3.95%	3.94%	3.95%
Apache Spark - 20000000 - 2000 - C.P.B (sec)	85.122994156	**84.888997196**	85.131798659	**85.345414321**
Normalized	99.73%	100%	99.71%	99.47%
Apache Spark - 20000000 - 2000 - C.P.B.U.D (sec)	**4.82**	4.93	**5.03**	4.97
Normalized	100%	97.77%	95.83%	96.98%
Apache Spark - 20000000 - 2000 - Group By Test Time (sec)	**0.69**	**7.32**	7.31	7.14
Normalized	100%	9.43%	9.44%	9.66%
Apache Spark - 20000000 - 2000 - R.T.T (sec)	**1.16**	**9.79**	9.57	9.39
Normalized	100%	11.85%	12.12%	12.35%
Apache Spark - 20000000 - 2000 - I.J.T.T (sec)	**0.11**	**11.96**	11.67	11.16
Normalized	100%	0.92%	0.94%	0.99%
Apache Spark - 20000000 - 2000 - B.I.J.T.T (sec)	**0.06**	11.60	**11.80**	10.75
Normalized	100%	0.52%	0.51%	0.56%
Apache Spark - 40000000 - 1000 - S.5.B.T (sec)	**24.94**	24.97	24.97	**25.156112784**
Normalized	100%	99.88%	99.88%	99.14%
Apache Spark - 40000000 - 1000 - C.P.B (sec)	85.271494834	**86.57**	85.71	**84.79**
Normalized	99.44%	97.94%	98.93%	100%
Apache Spark - 40000000 - 1000 - C.P.B.U.D (sec)	5.01	**5.06**	**4.69**	4.80
Normalized	93.61%	92.69%	100%	97.71%
Apache Spark - 40000000 - 1000 - Group By Test Time (sec)	15.40	**15.775853179**	**15.24**	15.58
Normalized	98.96%	96.6%	100%	97.82%
Apache Spark - 40000000 - 1000 - R.T.T (sec)	**18.684138822**	18.13	18.08	**17.87**
Normalized	95.64%	98.57%	98.84%	100%
Apache Spark - 40000000 - 1000 - I.J.T.T (sec)	21.878095867	21.867596614	**21.260827487**	**22.14**
Normalized	97.18%	97.23%	100%	96.03%
Apache Spark - 40000000 - 1000 - B.I.J.T.T (sec)	**22.41**	22.35	**22.00**	22.38
Normalized	98.17%	98.43%	100%	98.3%
Apache Spark - 40000000 - 2000 - S.5.B.T (sec)	24.786136683	24.712695848	**24.70**	**25.579009038**
Normalized	99.65%	99.95%	100%	96.56%

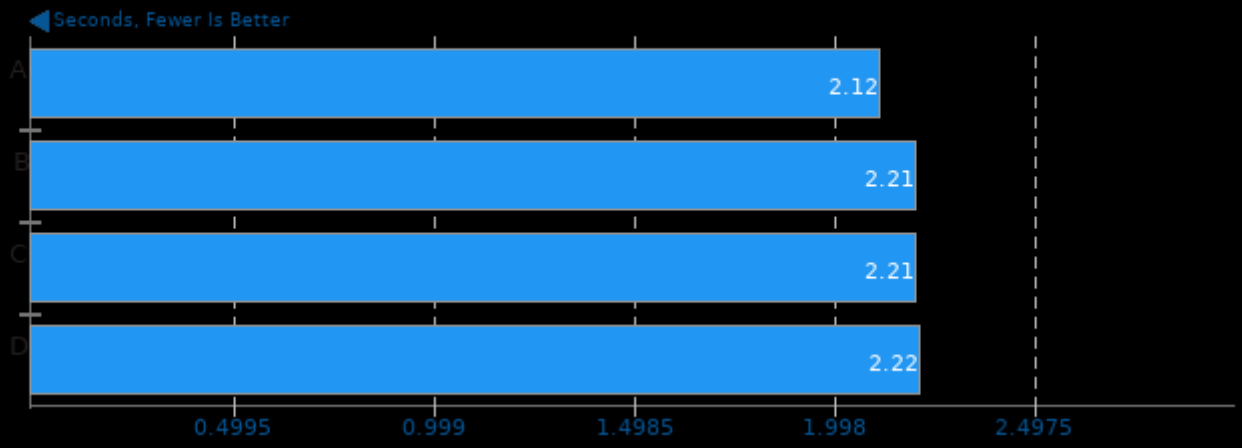
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Apache Spark - 40000000 - 2000 - C.P.B (sec)	85.35	**84.85**	85.55	**86.843310376**
Normalized	99.41%	100%	99.18%	97.7%
Apache Spark - 40000000 - 2000 - C.P.B.U.D (sec)	4.99	4.92	**4.89**	**5.04**
Normalized	98%	99.39%	100%	97.02%
Apache Spark - 40000000 - 2000 - Group By Test Time (sec)	14.768565164	**14.72**	**16.90**	15.25
Normalized	99.67%	100%	87.1%	96.52%
Apache Spark - 40000000 - 2000 - R.T.T (sec)	18.42	**17.55**	**18.5559665**	18.33
Normalized	95.28%	100%	94.58%	95.74%
Apache Spark - 40000000 - 2000 - I.J.T.T (sec)	**21.83**	22.01	22.09	**22.33**
Normalized	100%	99.18%	98.82%	97.76%
Apache Spark - 40000000 - 2000 - B.I.J.T.T (sec)	**21.99**	21.94	21.98	**21.93**
Normalized	99.73%	99.95%	99.77%	100%

spark 12900K Intel

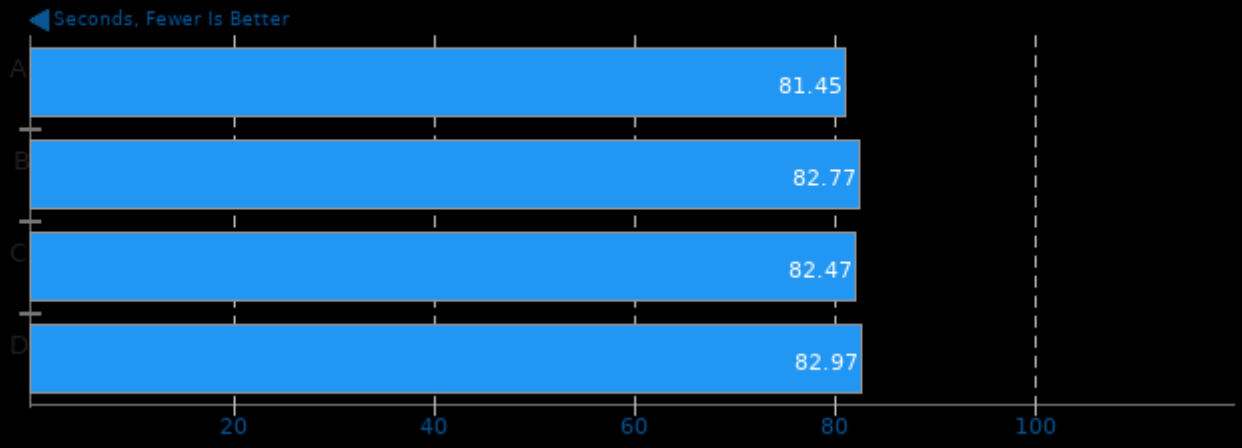
Apache Spark 3.3

Row Count: 1000000 - Partitions: 100 - SHA-512 Benchmark Time



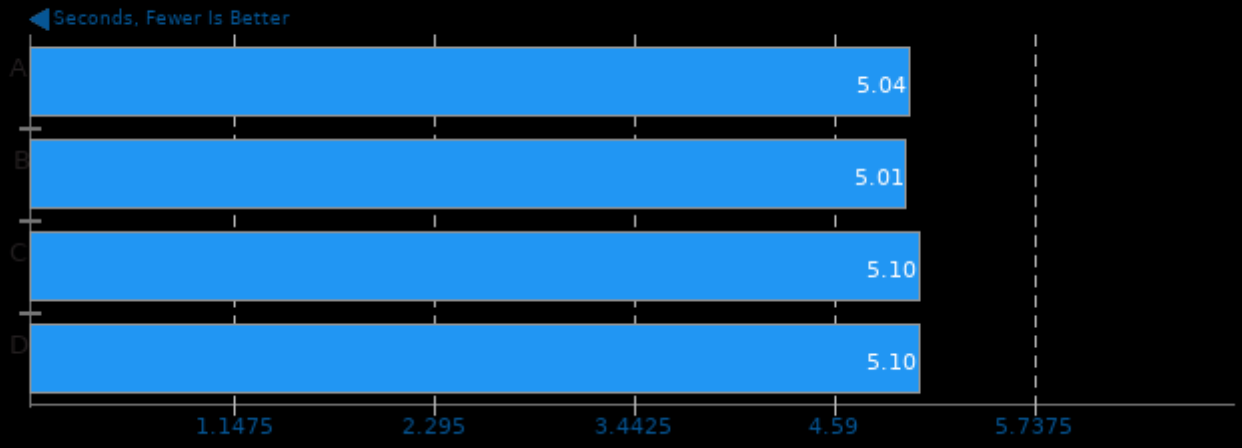
Apache Spark 3.3

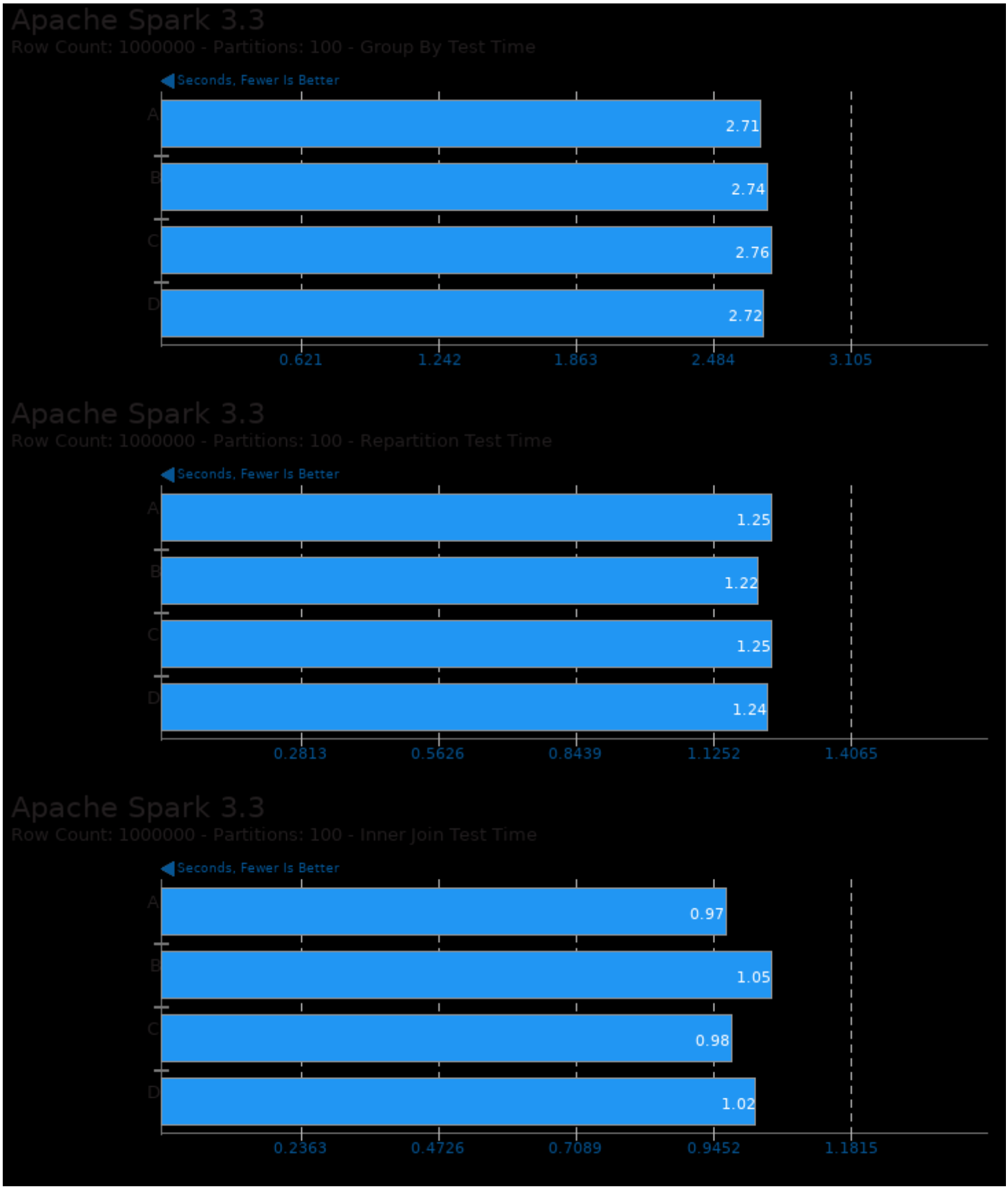
Row Count: 1000000 - Partitions: 100 - Calculate Pi Benchmark



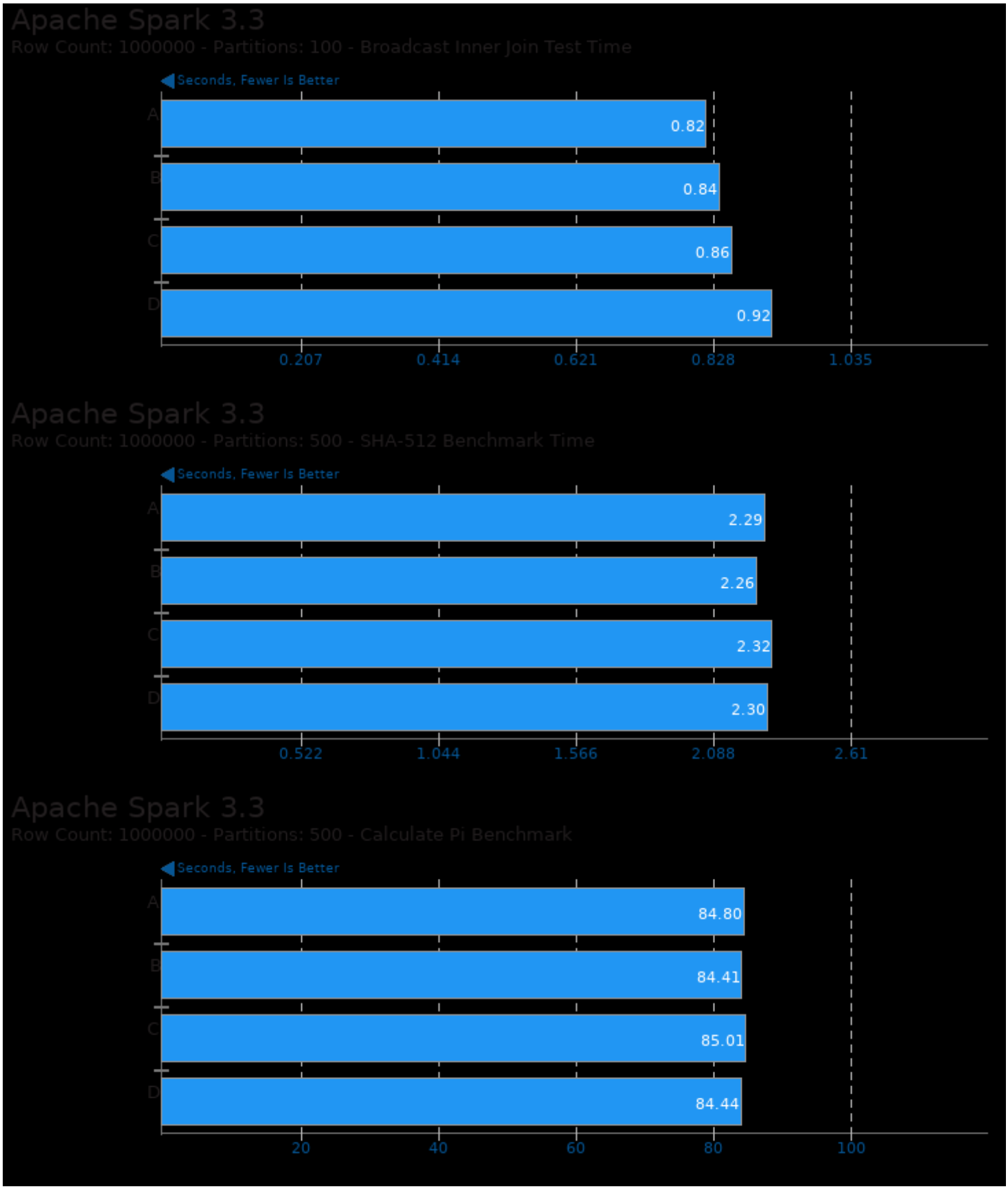
Apache Spark 3.3

Row Count: 1000000 - Partitions: 100 - Calculate Pi Benchmark Using Dataframe

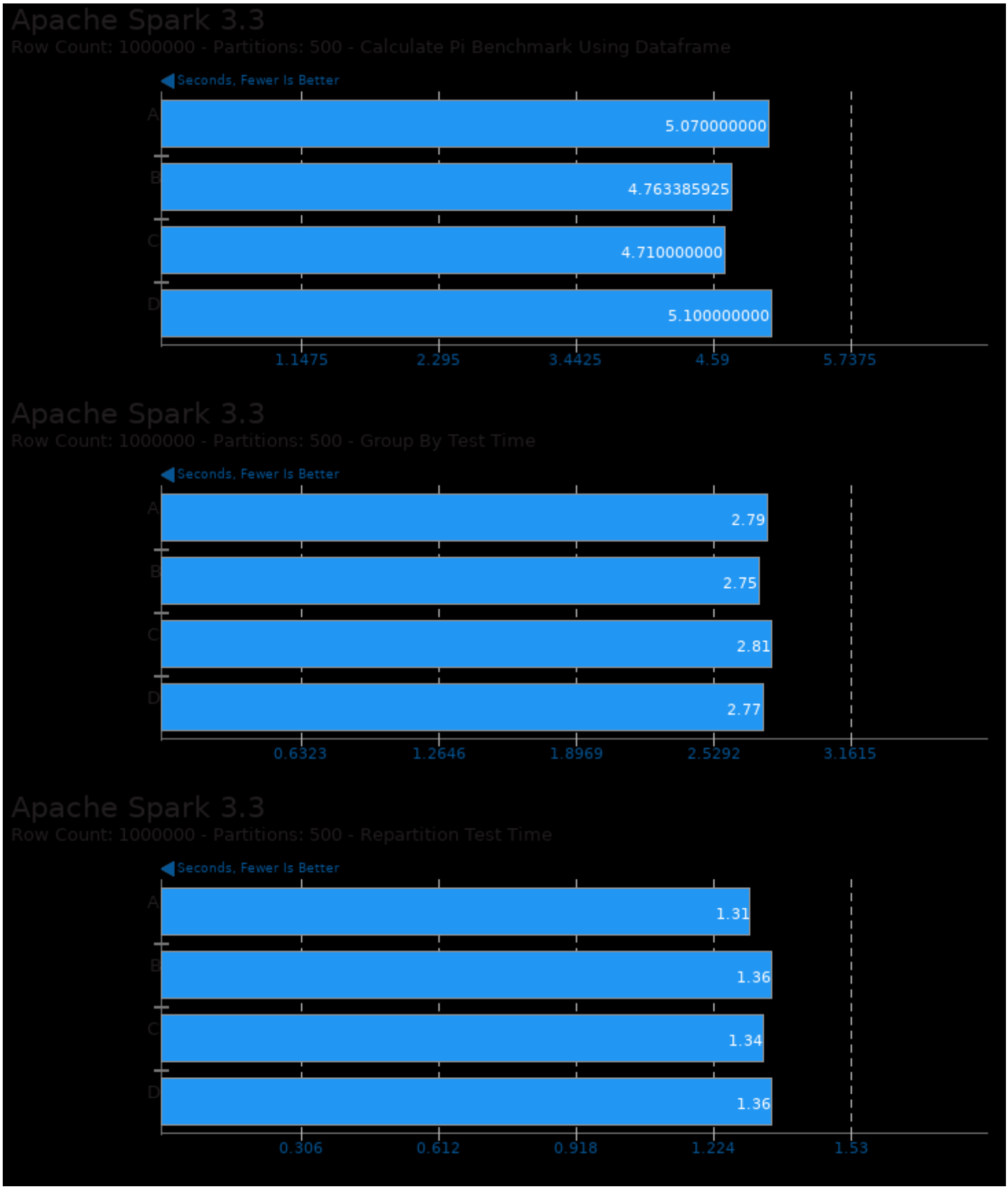



Apache Spark 3.3
Row Count: 1000000 - Partitions: 100 - Group By Test Time
Seconds, Fewer Is Better
A
2.71
B
2.74
C
2.76
D
2.72
0.621
1.242
1.863
2.484
3.105
Apache Spark 3.3
Row Count: 1000000 - Partitions: 100 - Repartition Test Time
Seconds, Fewer Is Better
A
1.25
B
1.22
C
1.25
D
1.24
0.2813
0.5626
0.8439
1.1252
1.4065
Apache Spark 3.3
Row Count: 1000000 - Partitions: 100 - Inner Join Test Time
Seconds, Fewer Is Better
A
0.97
B
1.05
C
0.98
D
1.02
0.2363
0.4726
0.7089
0.9452
1.1815

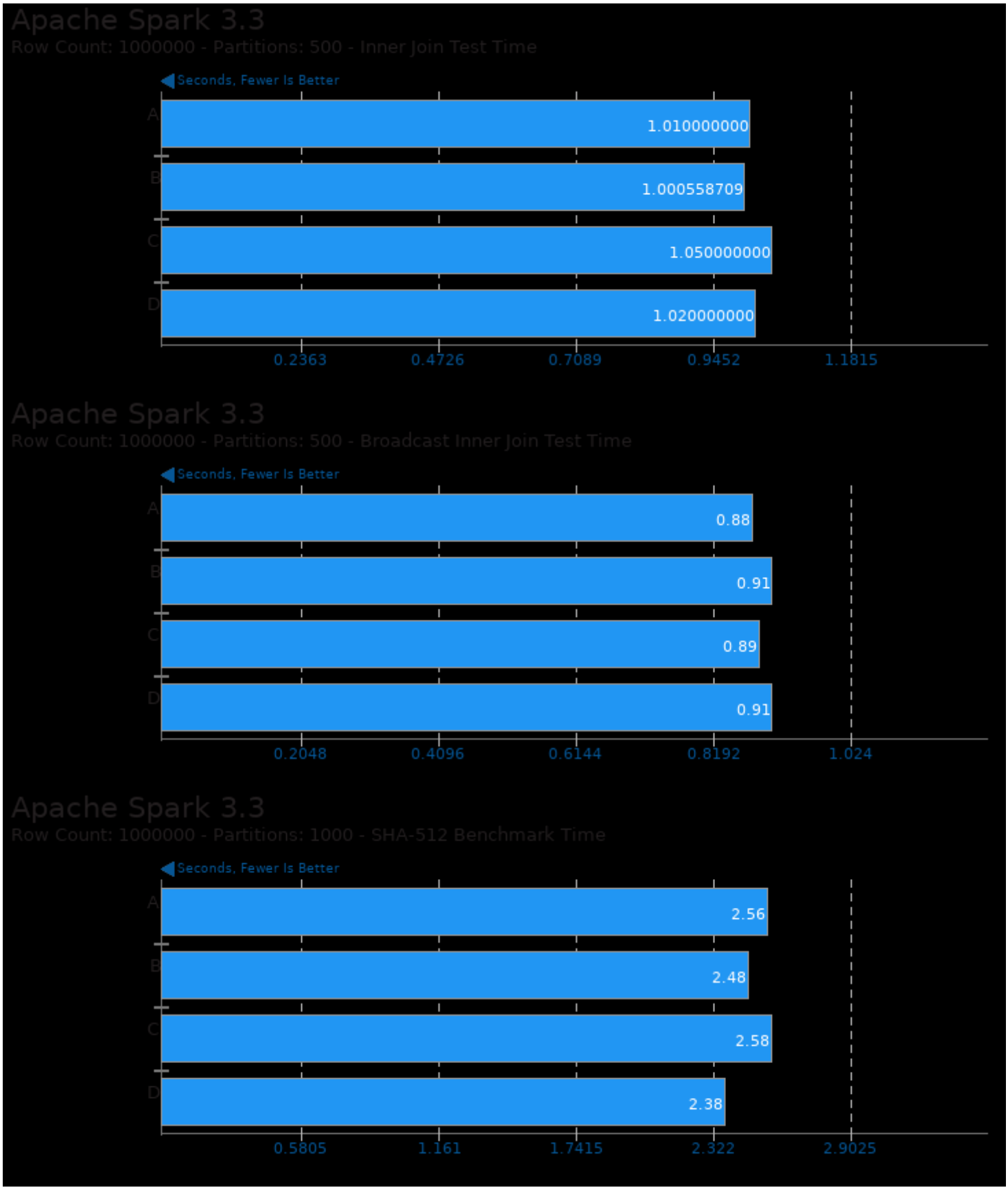
spark 12900K Intel

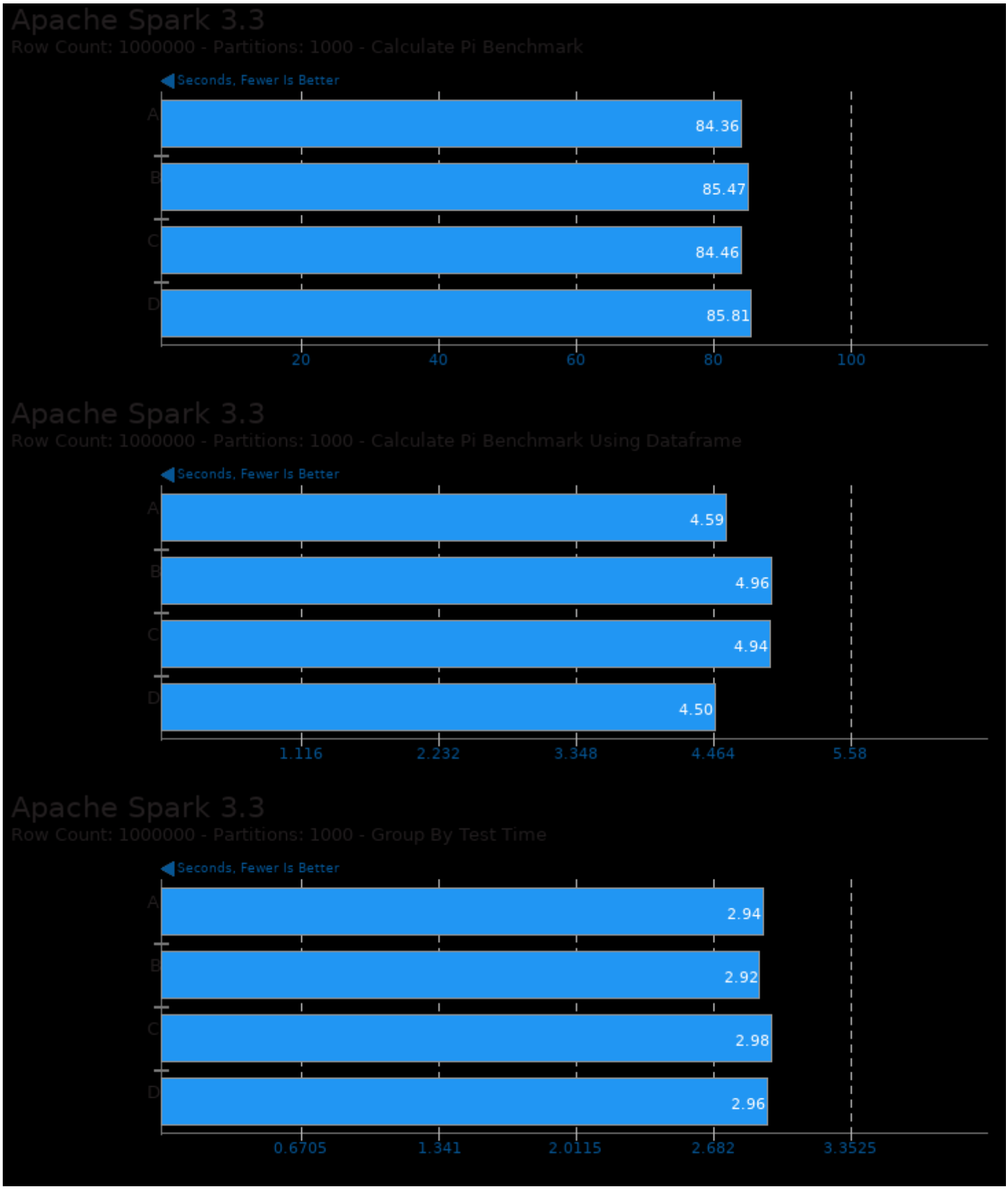


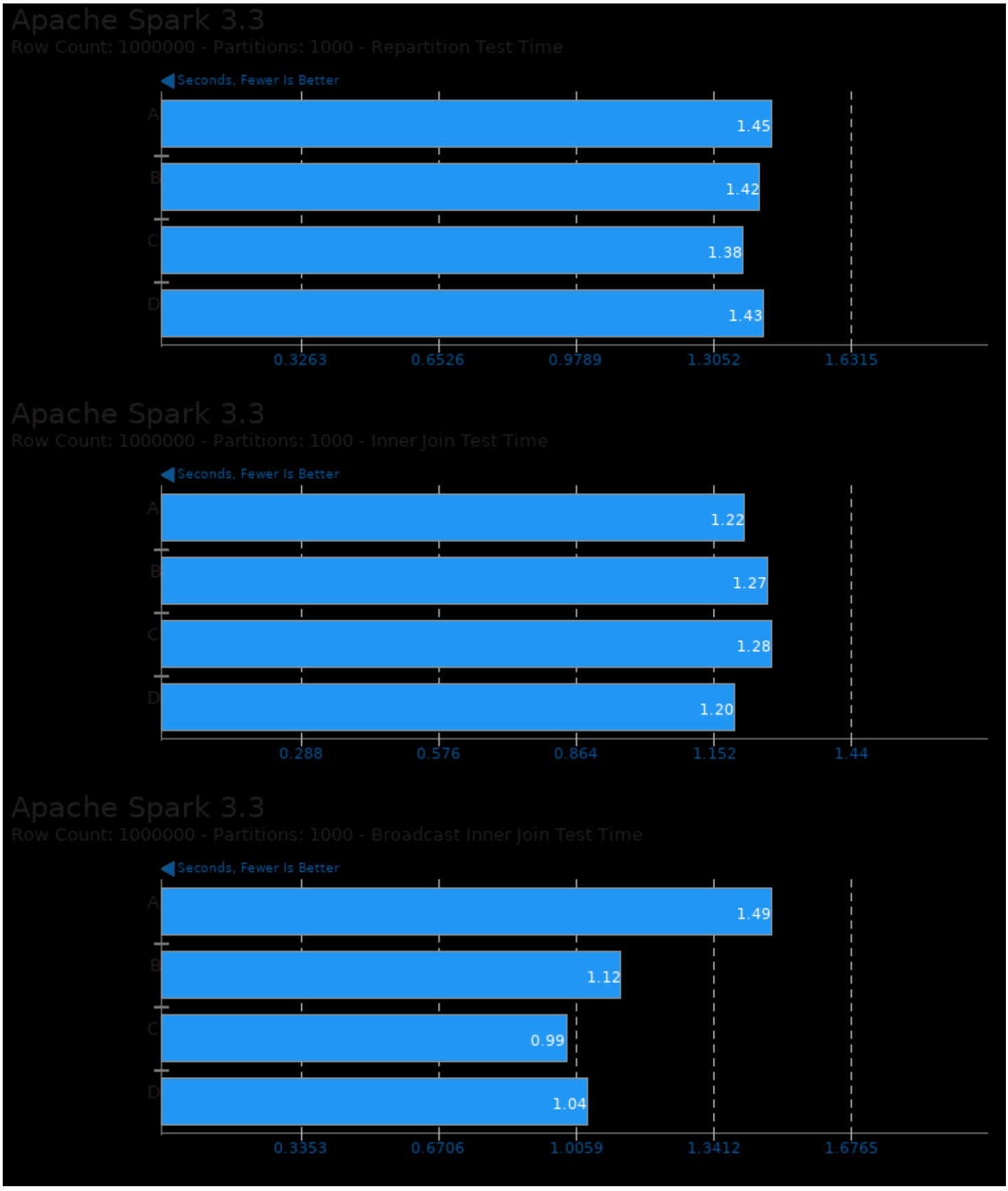
spark 12900K Intel

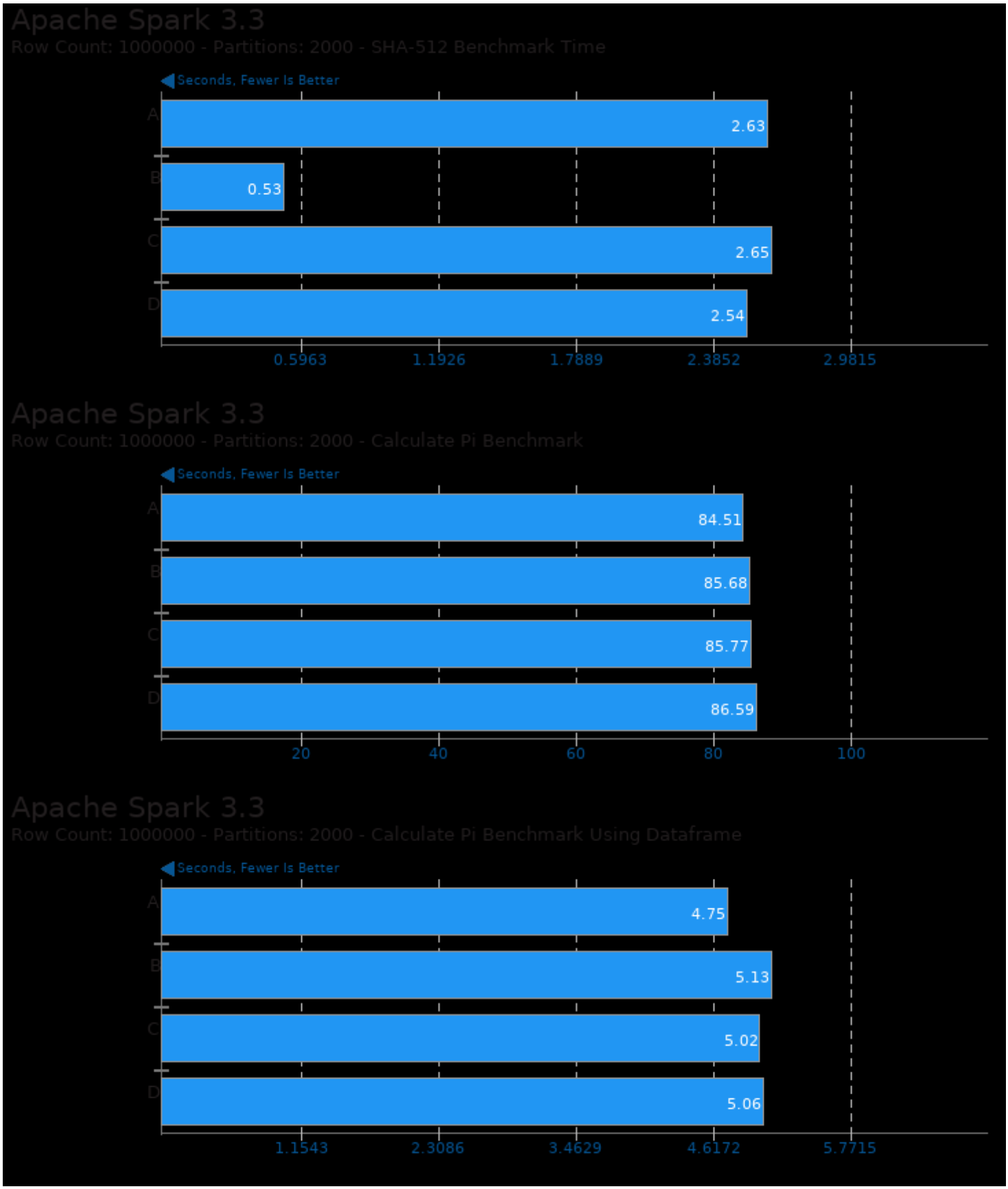


spark 12900K Intel

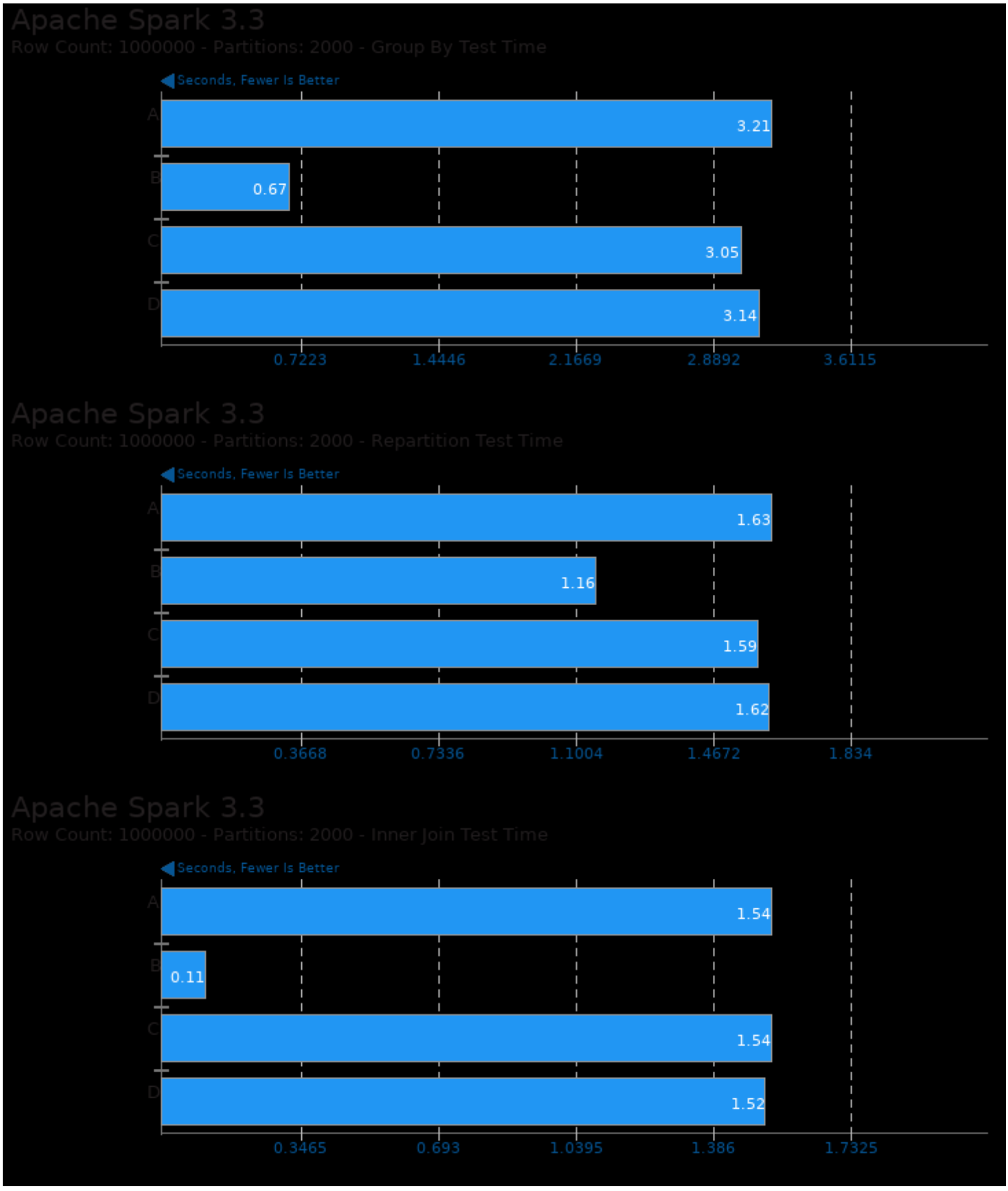


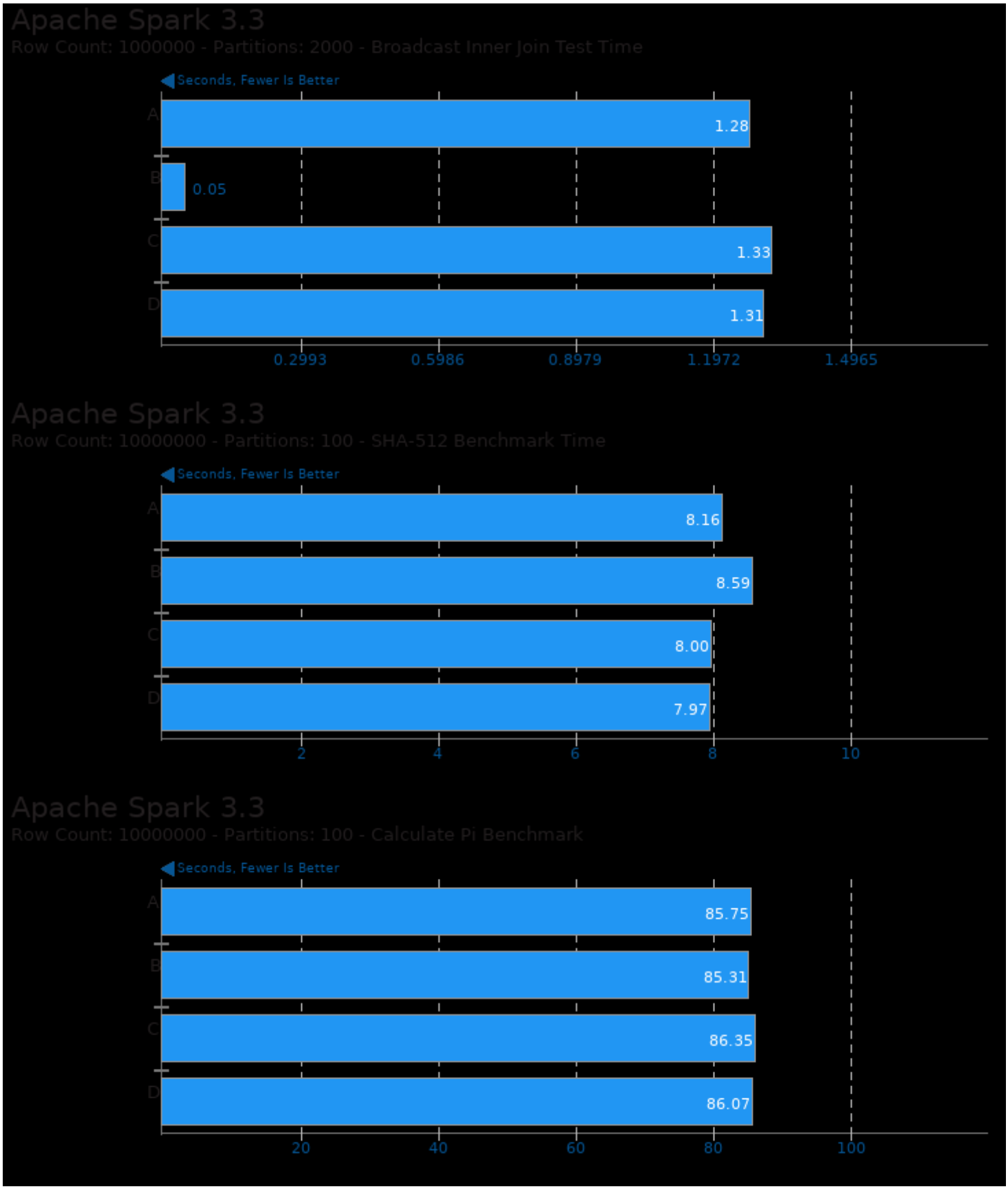

Apache Spark 3.3
Row Count: 1000000 - Partitions: 1000 - Calculate Pi Benchmark
Seconds, Fewer Is Better
A
84.36
B
85.47
C
84.46
D
85.81
20
40
60
80
100
Apache Spark 3.3
Row Count: 1000000 - Partitions: 1000 - Calculate Pi Benchmark Using Dataframe
Seconds, Fewer Is Better
A
4.59
B
4.96
C
4.94
D
4.50
1.116
2.232
3.348
4.464
5.58
Apache Spark 3.3
Row Count: 1000000 - Partitions: 1000 - Group By Test Time
Seconds, Fewer Is Better
A
2.94
B
2.92
C
2.98
D
2.96
0.6705
1.341
2.0115
2.682
3.3525

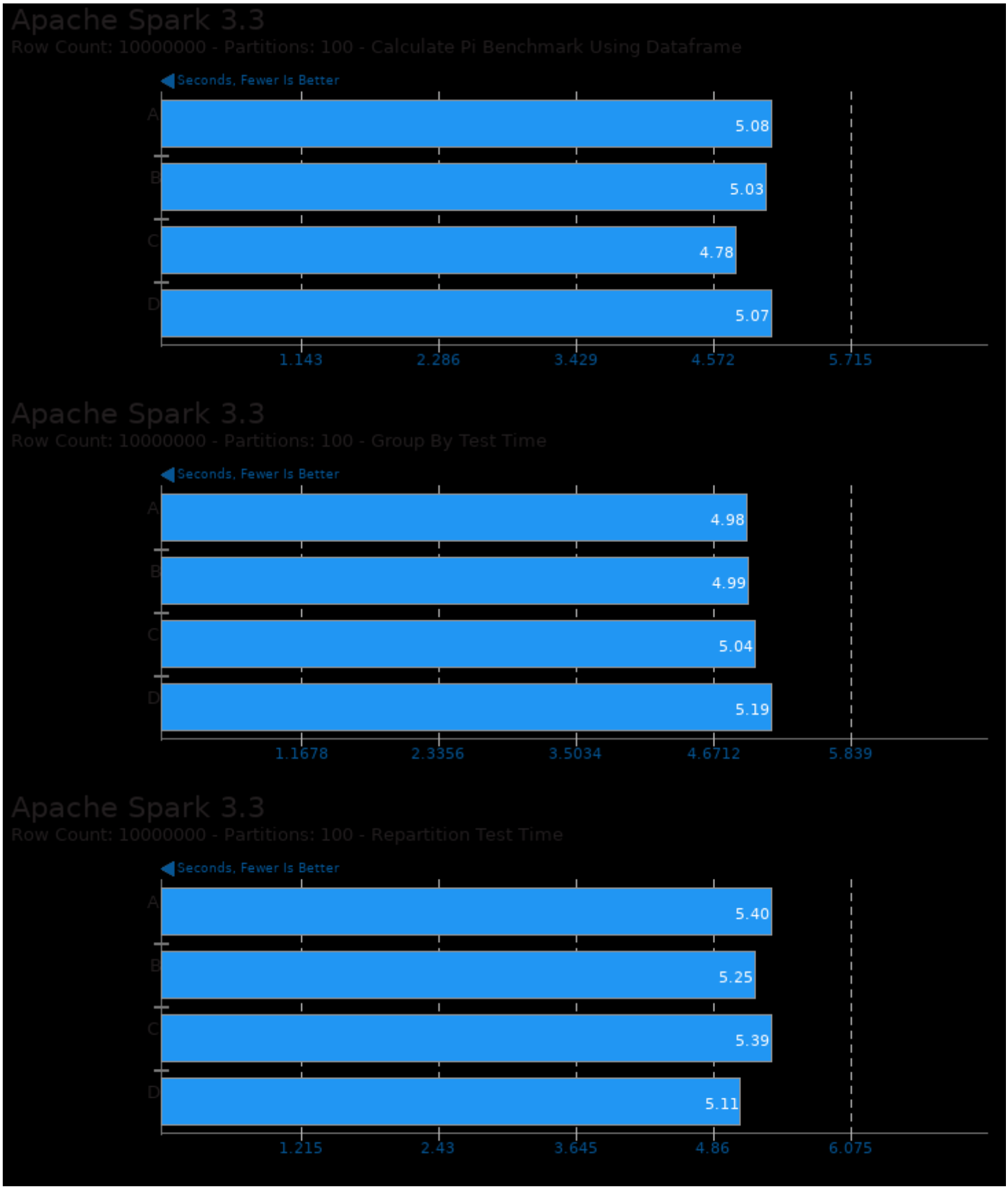

Apache Spark 3.3
Row Count: 1000000 - Partitions: 1000 - Repartition Test Time
Seconds, Fewer Is Better
A
1.45
B
1.42
C
1.38
D
1.43
0.3263
0.6526
0.9789
1.3052
1.6315
Apache Spark 3.3
Row Count: 1000000 - Partitions: 1000 - Inner Join Test Time
Seconds, Fewer Is Better
A
1.22
B
1.27
C
1.28
D
1.20
0.288
0.576
0.864
1.152
1.44
Apache Spark 3.3
Row Count: 1000000 - Partitions: 1000 - Broadcast Inner Join Test Time
Seconds, Fewer Is Better
A
1.49
B
1.12
C
0.99
D
1.04
0.3353
0.6706
1.0059
1.3412
1.6765

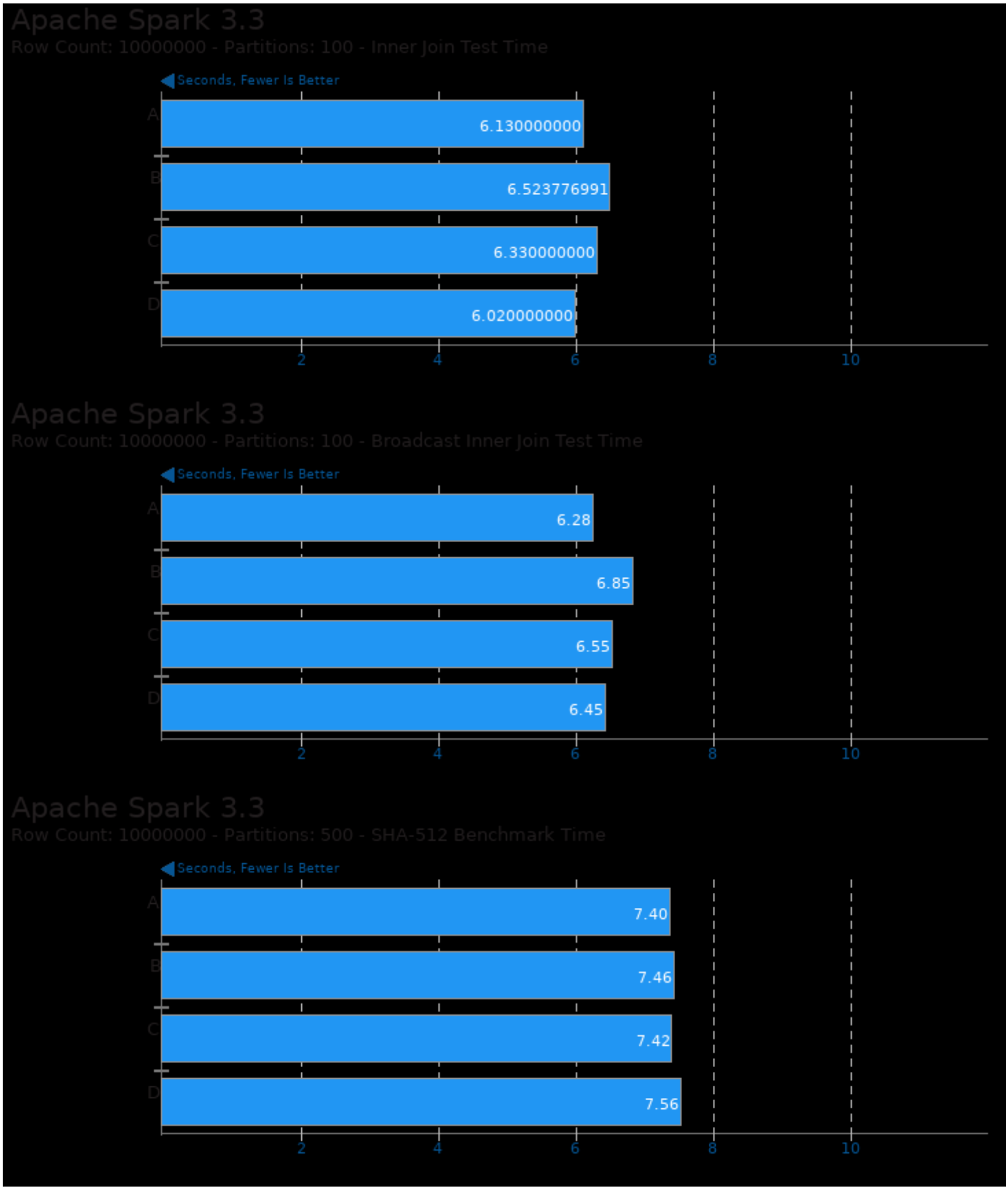

Apache Spark 3.3
Row Count: 1000000 - Partitions: 2000 - SHA-512 Benchmark Time
Seconds, Fewer Is Better
A
2.63
B
0.53
C
2.65
D
2.54
0.5963
1.1926
1.7889
2.3852
2.9815
Apache Spark 3.3
Row Count: 1000000 - Partitions: 2000 - Calculate Pi Benchmark
Seconds, Fewer Is Better
A
84.51
B
85.68
C
85.77
D
86.59
20
40
60
80
100
Apache Spark 3.3
Row Count: 1000000 - Partitions: 2000 - Calculate Pi Benchmark Using Dataframe
Seconds, Fewer Is Better
A
4.75
B
5.13
C
5.02
D
5.06
1.1543
2.3086
3.4629
4.6172
5.7715

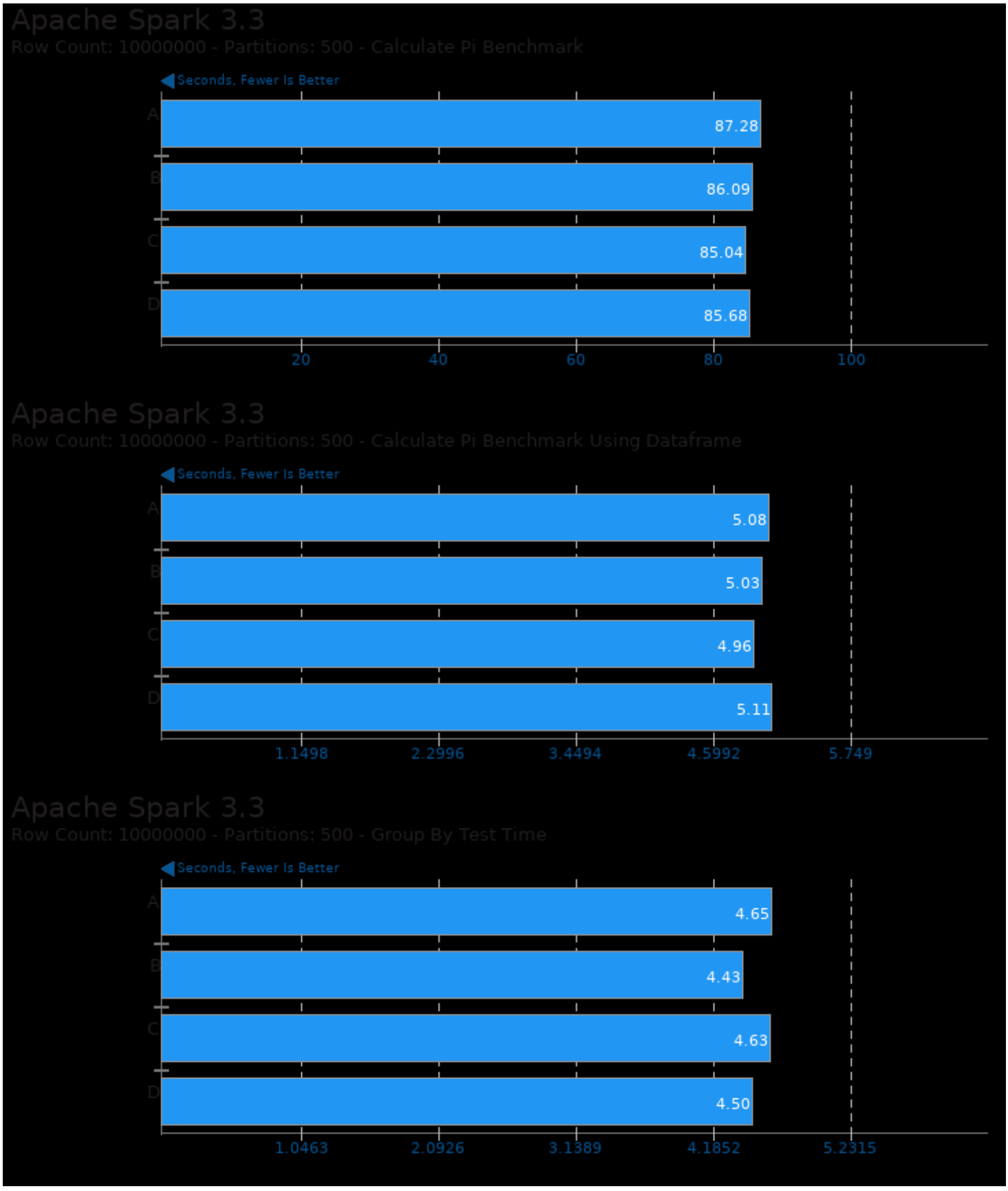
spark 12900K Intel

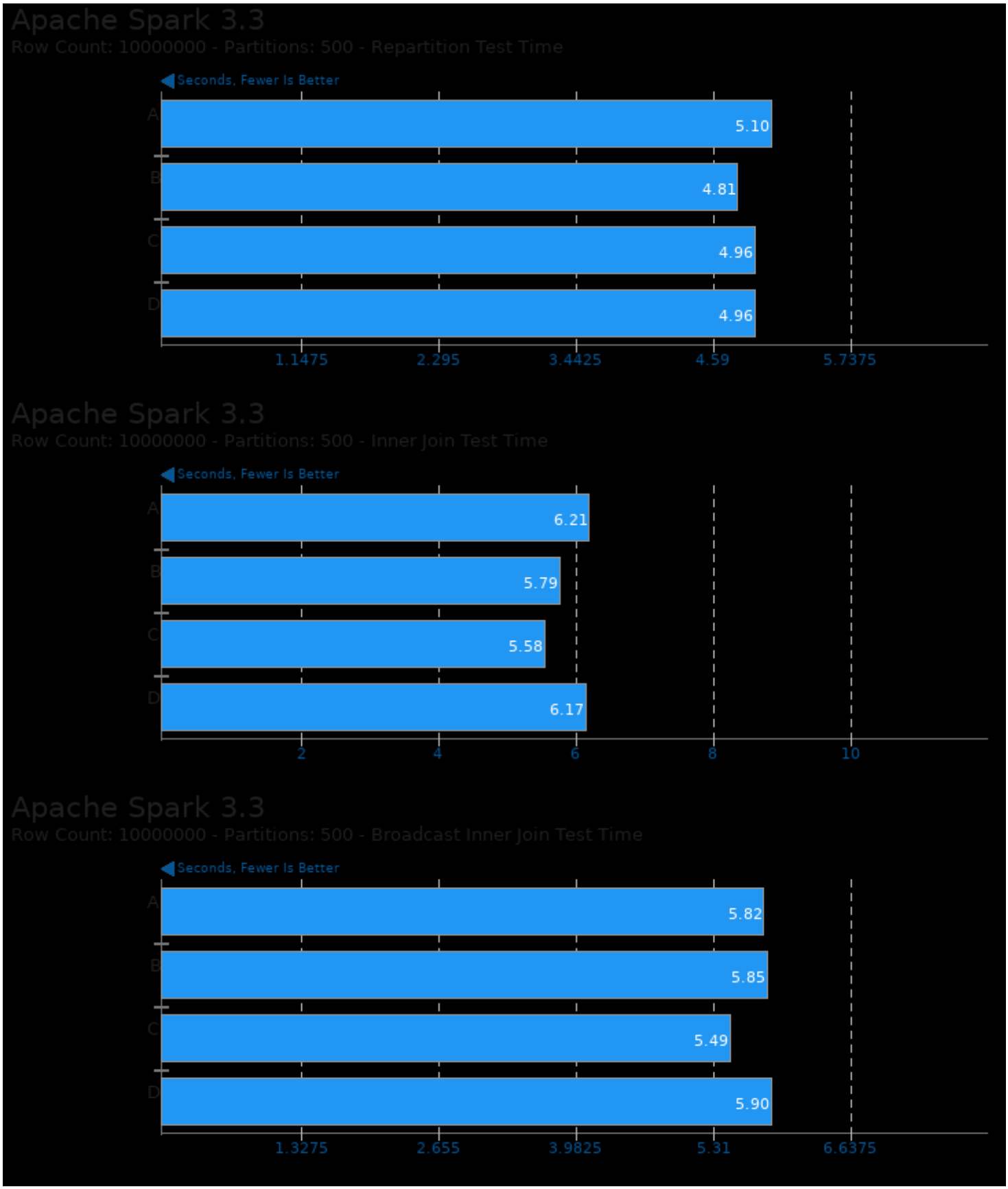


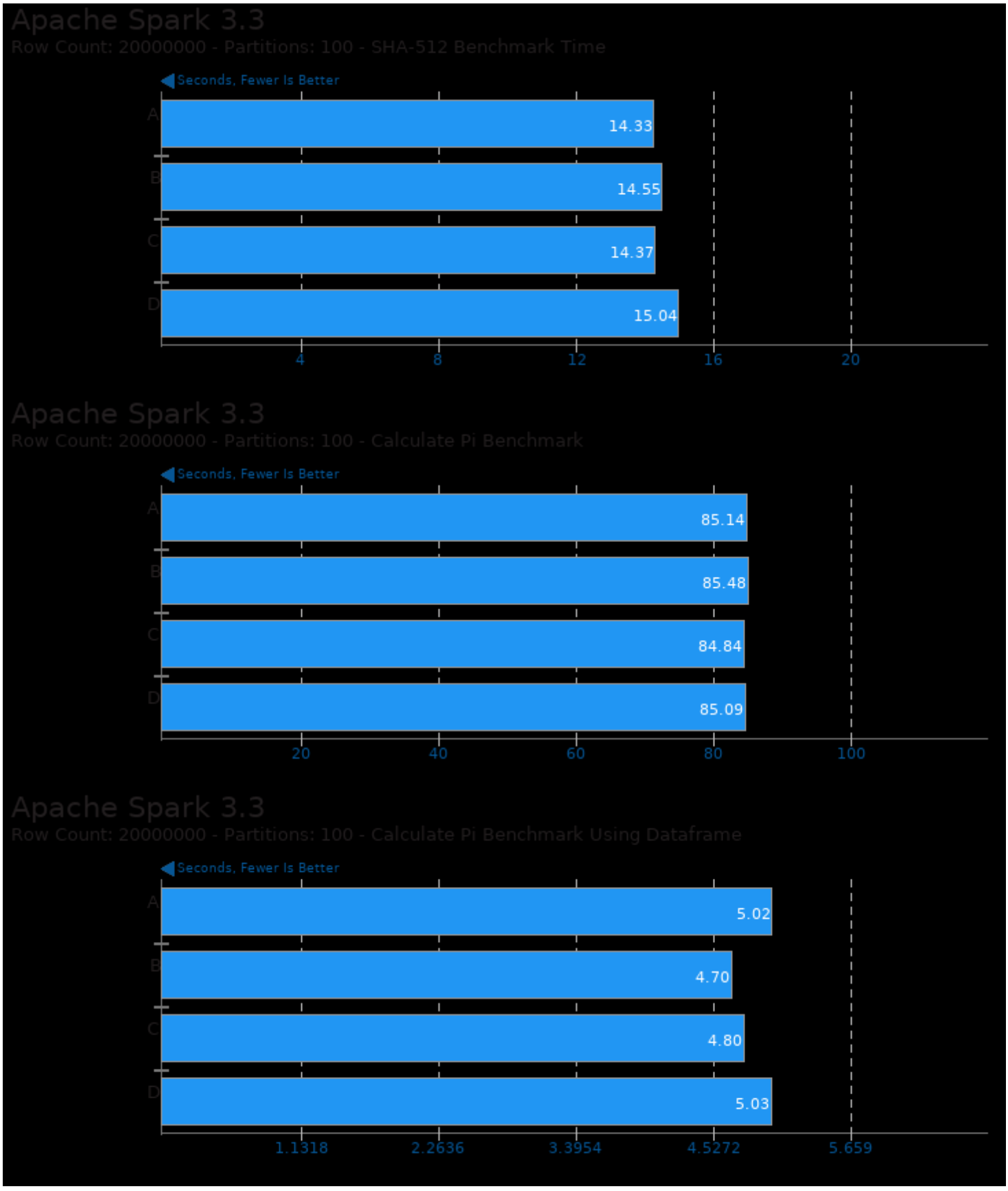

Apache Spark 3.3
Row Count: 1000000 - Partitions: 2000 - Broadcast Inner Join Test Time
Seconds, Fewer Is Better
A
1.28
B
0.05
C
1.33
D
1.31
0.2993
0.5986
0.8979
1.1972
1.4965
Apache Spark 3.3
Row Count: 10000000 - Partitions: 100 - SHA-512 Benchmark Time
Seconds, Fewer Is Better
A
8.16
B
8.59
C
8.00
D
7.97
2
4
6
8
10
Apache Spark 3.3
Row Count: 10000000 - Partitions: 100 - Calculate Pi Benchmark
Seconds, Fewer Is Better
A
85.75
B
85.31
C
86.35
D
86.07
20
40
60
80
100

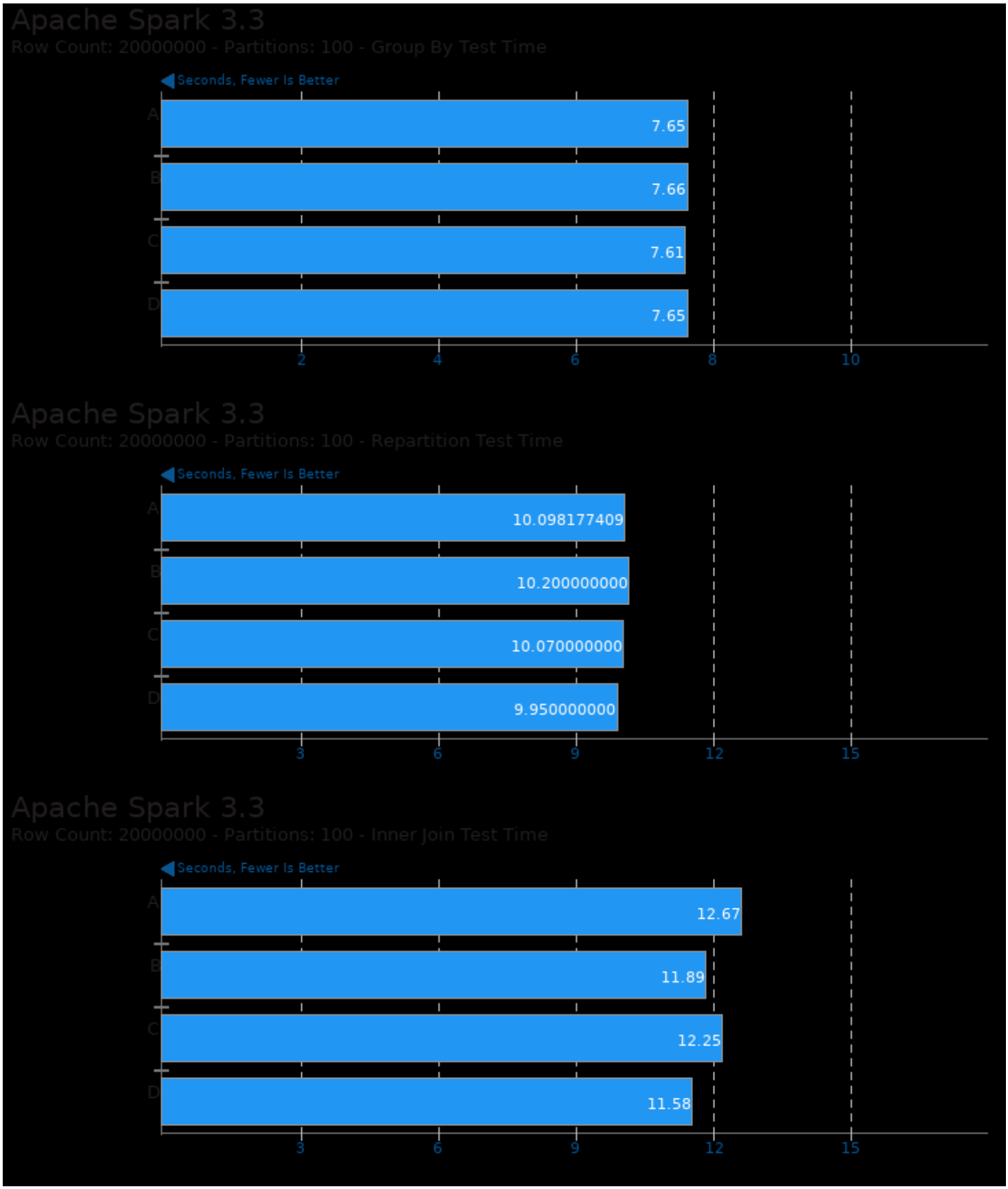

Apache Spark 3.3
Row Count: 10000000 - Partitions: 100 - Calculate Pi Benchmark Using Dataframe
Seconds, Fewer Is Better
A
5.08
B
5.03
C
4.78
D
5.07
1.143
2.286
3.429
4.572
5.715
Apache Spark 3.3
Row Count: 10000000 - Partitions: 100 - Group By Test Time
Seconds, Fewer Is Better
A
4.98
B
4.99
C
5.04
D
5.19
1.1678
2.3356
3.5034
4.6712
5.839
Apache Spark 3.3
Row Count: 10000000 - Partitions: 100 - Repartition Test Time
Seconds, Fewer Is Better
A
5.40
B
5.25
C
5.39
D
5.11
1.215
2.43
3.645
4.86
6.075

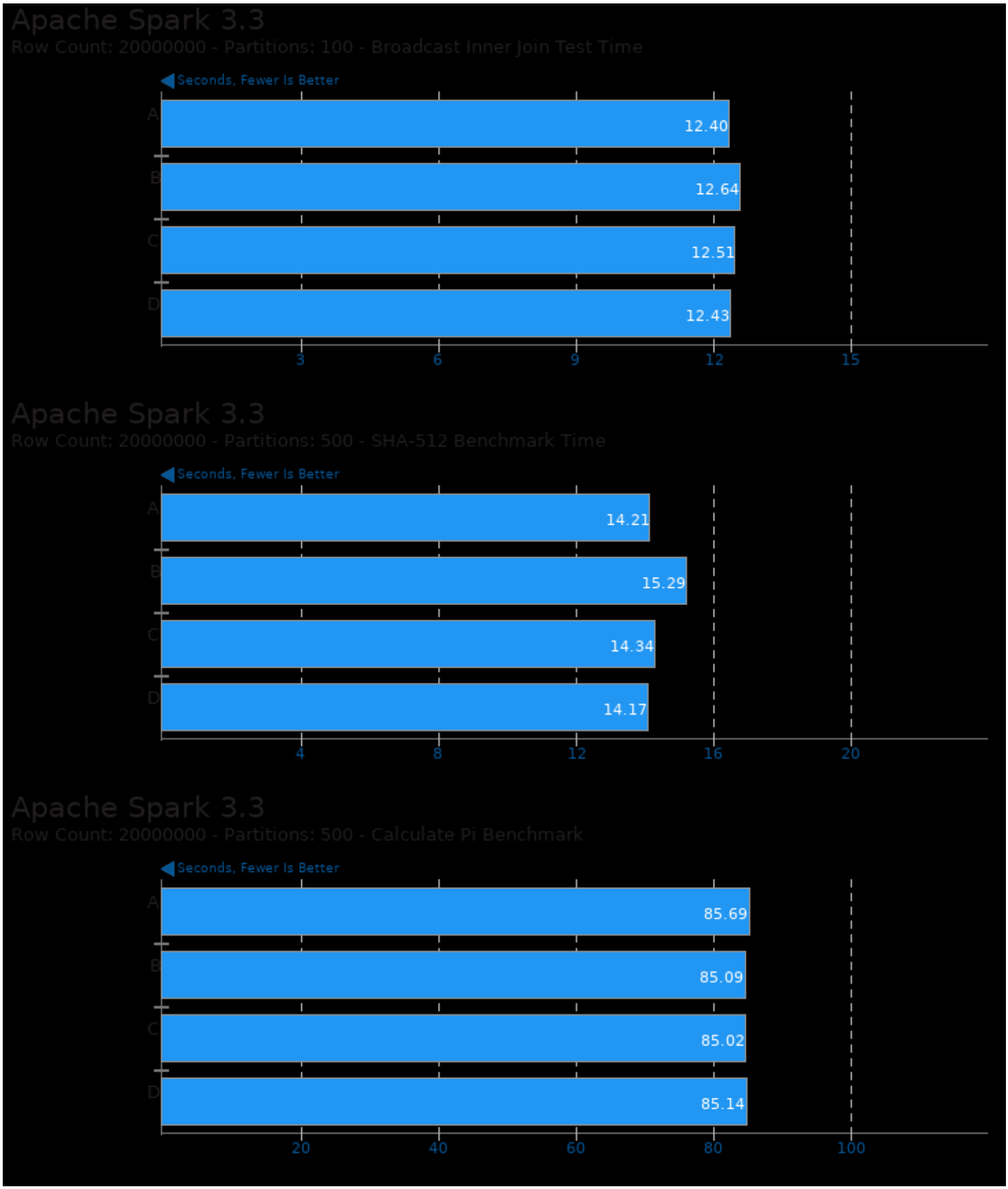

Apache Spark 3.3
Row Count: 10000000 - Partitions: 100 - Inner Join Test Time
Seconds, Fewer Is Better
A
6.130000000
B
6.523776991
C
6.330000000
D
6.020000000
2
4
6
8
10
Apache Spark 3.3
Row Count: 10000000 - Partitions: 100 - Broadcast Inner Join Test Time
Seconds, Fewer Is Better
A
6.28
B
6.85
C
6.55
D
6.45
2
4
6
8
10
Apache Spark 3.3
Row Count: 10000000 - Partitions: 500 - SHA-512 Benchmark Time
Seconds, Fewer Is Better
A
7.40
B
7.46
C
7.42
D
7.56
2
4
6
8
10

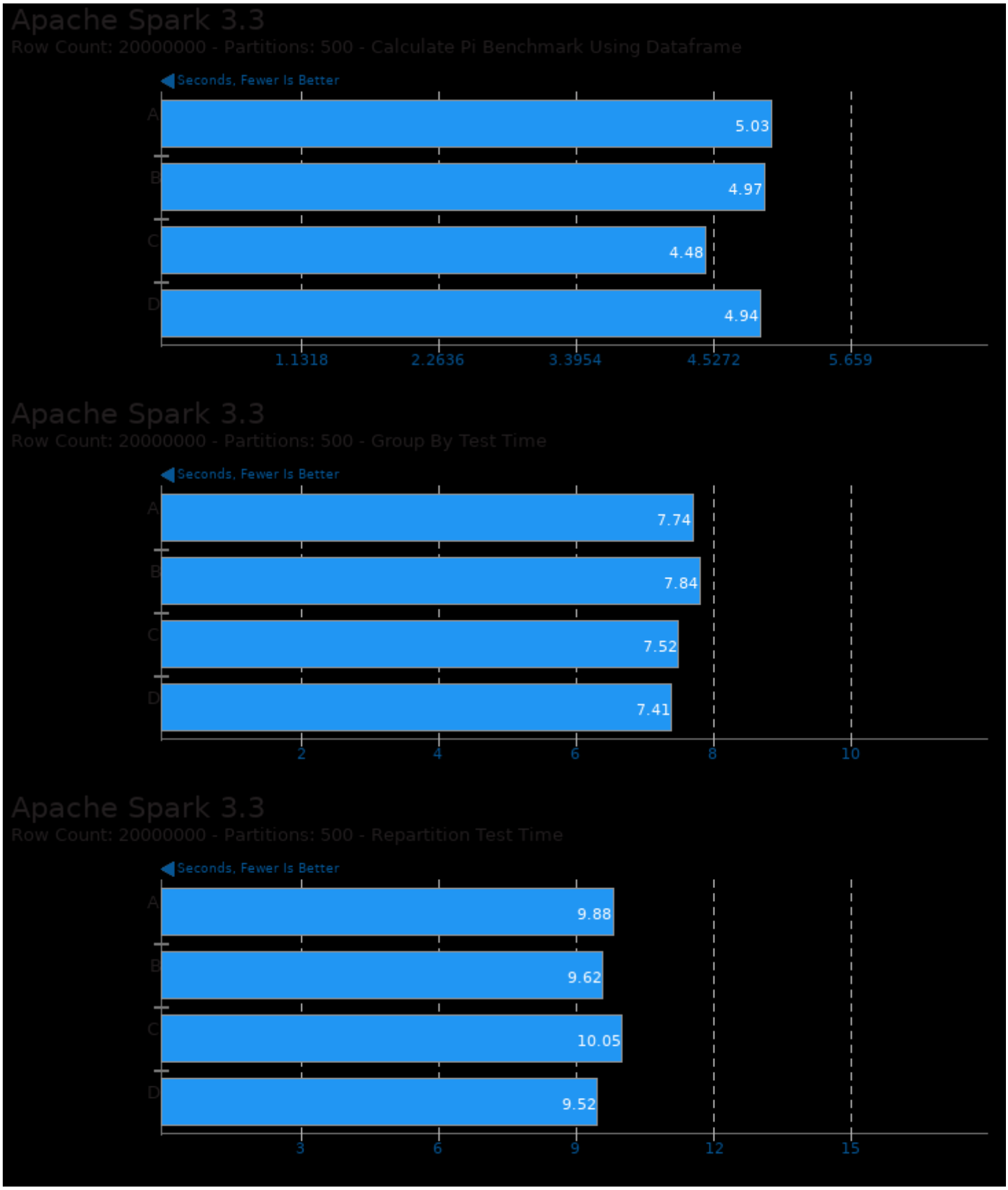

Apache Spark 3.3
Row Count: 10000000 - Partitions: 500 - Calculate Pi Benchmark
Seconds, Fewer Is Better
A
87.28
B
86.09
C
85.04
D
85.68
20
40
60
80
100
Apache Spark 3.3
Row Count: 10000000 - Partitions: 500 - Calculate Pi Benchmark Using Dataframe
Seconds, Fewer Is Better
A
5.08
B
5.03
C
4.96
D
5.11
1.1498
2.2996
3.4494
4.5992
5.749
Apache Spark 3.3
Row Count: 10000000 - Partitions: 500 - Group By Test Time
Seconds, Fewer Is Better
A
4.65
B
4.43
C
4.63
D
4.50
1.0463
2.0926
3.1389
4.1852
5.2315


Apache Spark 3.3
Row Count: 10000000 - Partitions: 500 - Repartition Test Time
Seconds, Fewer Is Better
A
5.10
B
4.81
C
4.96
D
4.96
1.1475
2.295
3.4425
4.59
5.7375
Apache Spark 3.3
Row Count: 10000000 - Partitions: 500 - Inner Join Test Time
Seconds, Fewer Is Better
A
6.21
B
5.79
C
5.58
D
6.17
2
4
6
8
10
Apache Spark 3.3
Row Count: 10000000 - Partitions: 500 - Broadcast Inner Join Test Time
Seconds, Fewer Is Better
A
5.82
B
5.85
C
5.49
D
5.90
1.3275
2.655
3.9825
5.31
6.6375


Apache Spark 3.3
Row Count: 20000000 - Partitions: 100 - SHA-512 Benchmark Time
Seconds, Fewer Is Better
A
14.33
B
14.55
C
14.37
D
15.04
4
8
12
16
20
Apache Spark 3.3
Row Count: 20000000 - Partitions: 100 - Calculate Pi Benchmark
Seconds, Fewer Is Better
A
85.14
B
85.48
C
84.84
D
85.09
20
40
60
80
100
Apache Spark 3.3
Row Count: 20000000 - Partitions: 100 - Calculate Pi Benchmark Using Dataframe
Seconds, Fewer Is Better
A
5.02
B
4.70
C
4.80
D
5.03
1.1318
2.2636
3.3954
4.5272
5.659


Apache Spark 3.3
Row Count: 20000000 - Partitions: 100 - Group By Test Time
Seconds, Fewer Is Better
A
7.65
B
7.66
C
7.61
D
7.65
2
4
6
8
10
Apache Spark 3.3
Row Count: 20000000 - Partitions: 100 - Repartition Test Time
Seconds, Fewer Is Better
A
10.098177409
B
10.200000000
C
10.070000000
D
9.950000000
3
6
9
12
15
Apache Spark 3.3
Row Count: 20000000 - Partitions: 100 - Inner Join Test Time
Seconds, Fewer Is Better
A
12.67
B
11.89
C
12.25
D
11.58
3
6
9
12
15

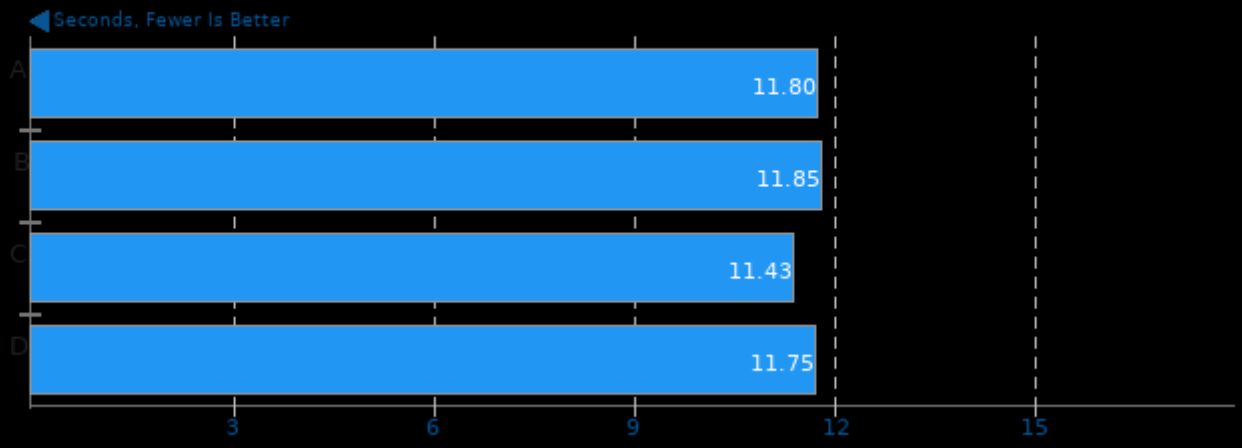

Apache Spark 3.3
Row Count: 20000000 - Partitions: 100 - Broadcast Inner Join Test Time
Seconds, Fewer Is Better
A
12.40
B
12.64
C
12.51
D
12.43
3
6
9
12
15
Apache Spark 3.3
Row Count: 20000000 - Partitions: 500 - SHA-512 Benchmark Time
Seconds, Fewer Is Better
A
14.21
B
15.29
C
14.34
D
14.17
4
8
12
16
20
Apache Spark 3.3
Row Count: 20000000 - Partitions: 500 - Calculate Pi Benchmark
Seconds, Fewer Is Better
A
85.69
B
85.09
C
85.02
D
85.14
20
40
60
80
100


Apache Spark 3.3
Row Count: 20000000 - Partitions: 500 - Calculate Pi Benchmark Using Dataframe
Seconds, Fewer Is Better
A
5.03
B
4.97
C
4.48
D
4.94
1.1318
2.2636
3.3954
4.5272
5.659
Apache Spark 3.3
Row Count: 20000000 - Partitions: 500 - Group By Test Time
Seconds, Fewer Is Better
A
7.74
B
7.84
C
7.52
D
7.41
2
4
6
8
10
Apache Spark 3.3
Row Count: 20000000 - Partitions: 500 - Repartition Test Time
Seconds, Fewer Is Better
A
9.88
B
9.62
C
10.05
D
9.52
3
6
9
12
15

spark 12900K Intel

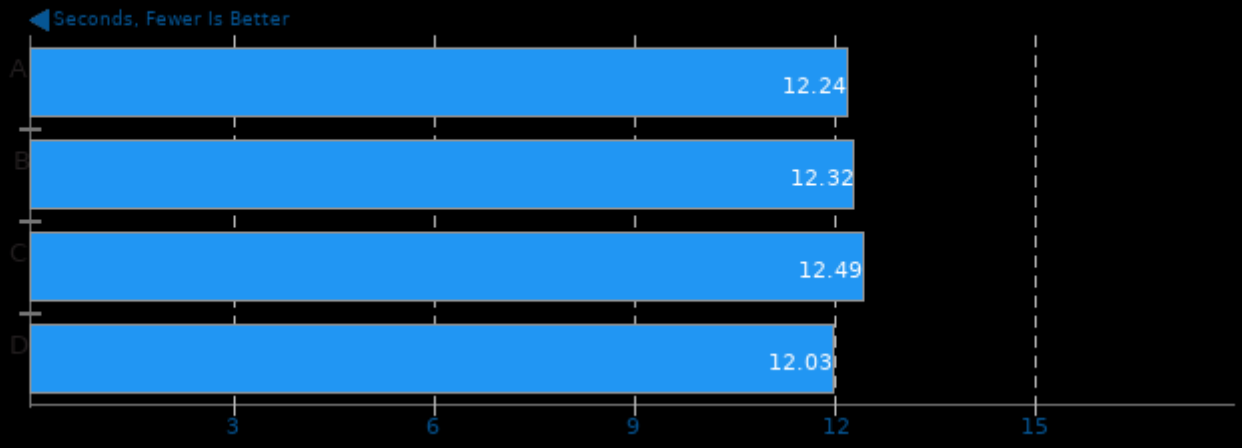
Apache Spark 3.3

Row Count: 20000000 - Partitions: 500 - Inner Join Test Time



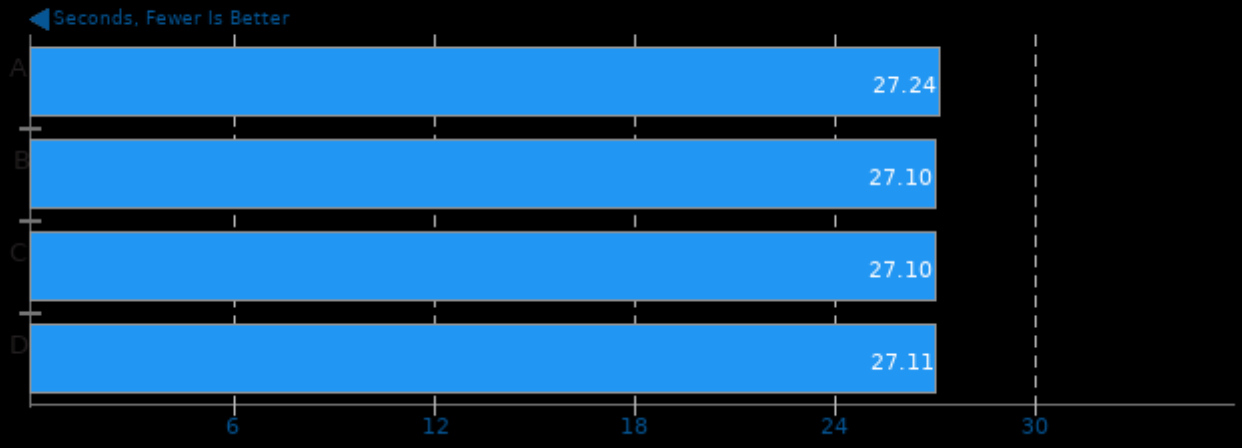
Apache Spark 3.3

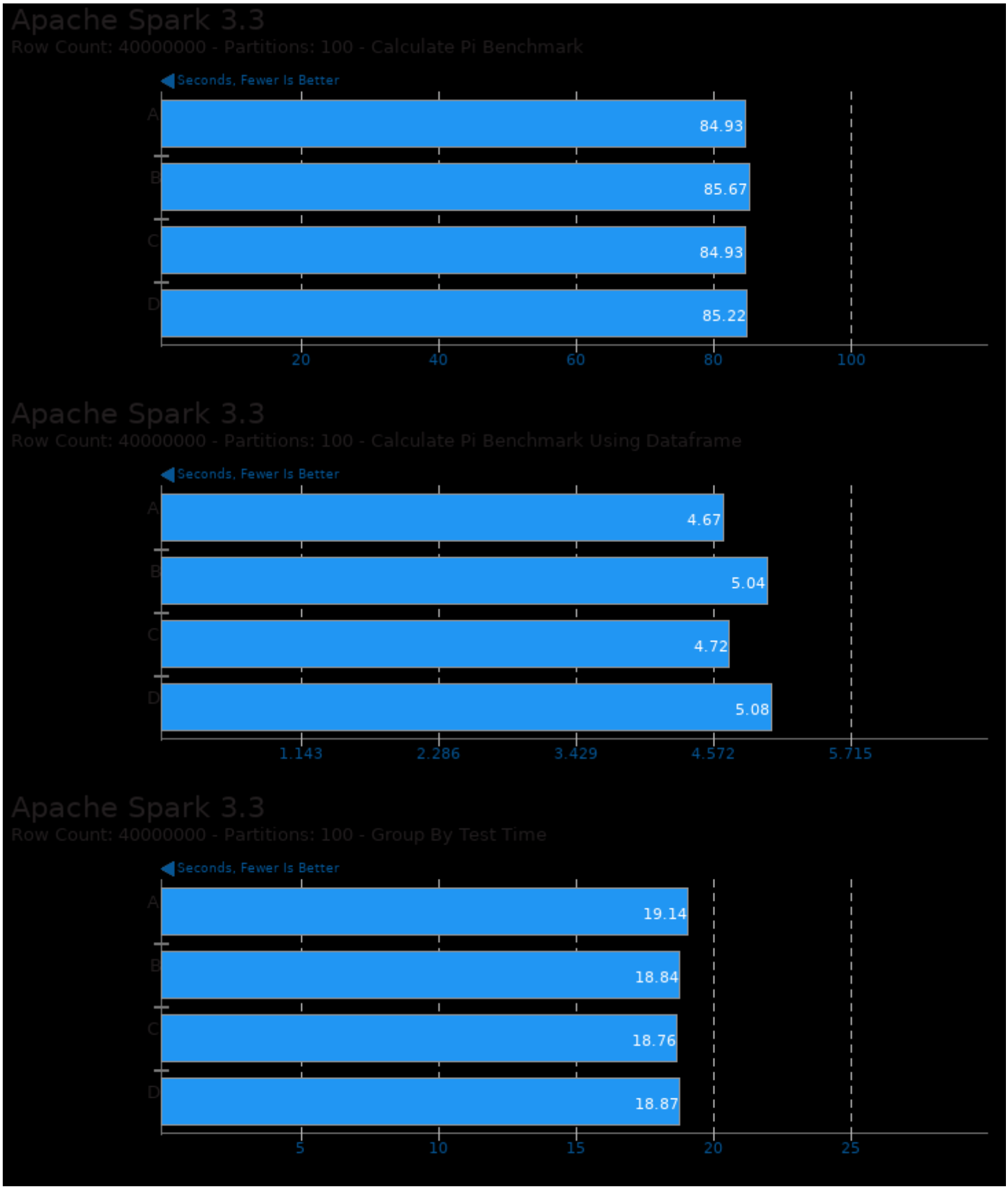
Row Count: 20000000 - Partitions: 500 - Broadcast Inner Join Test Time



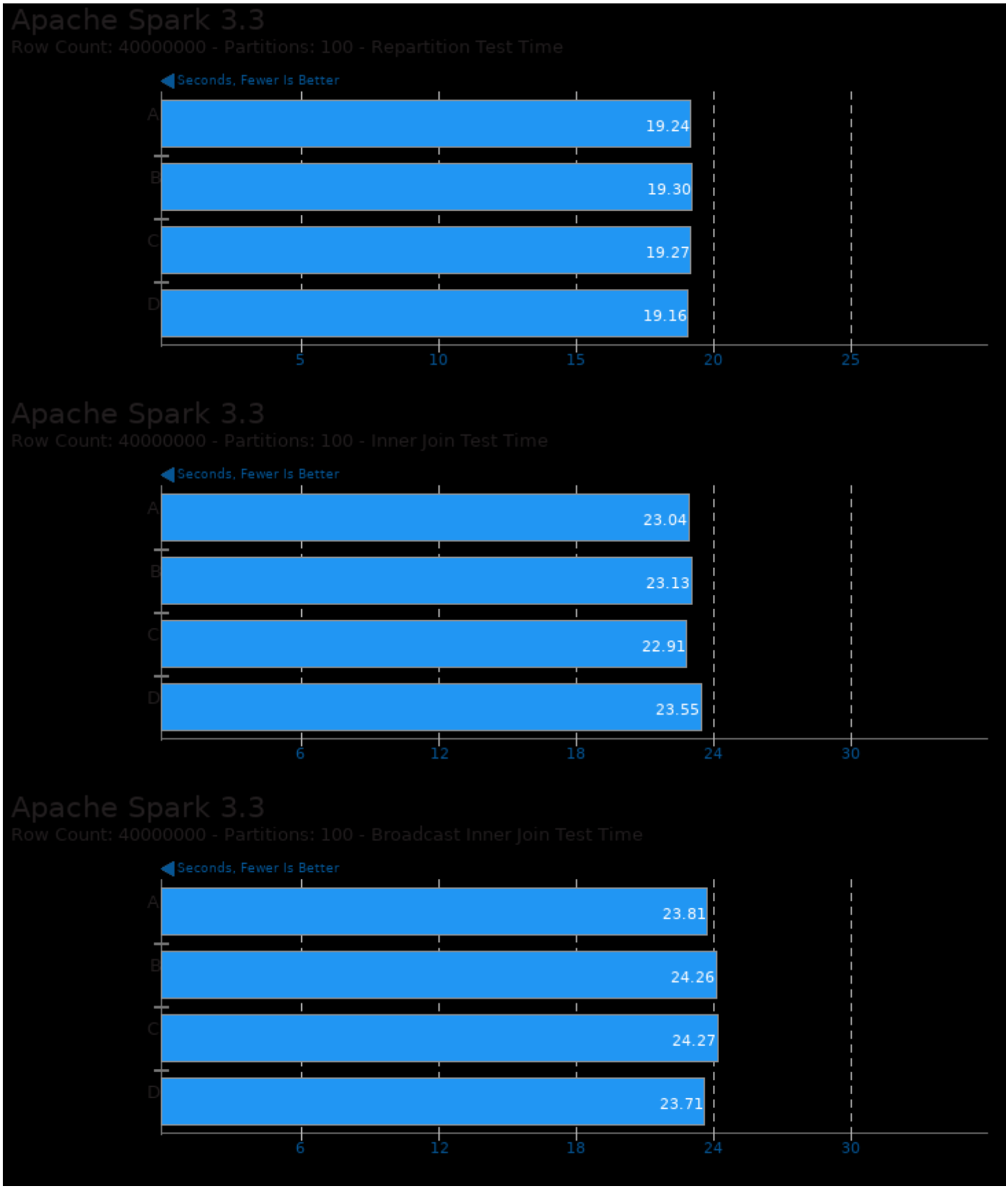
Apache Spark 3.3

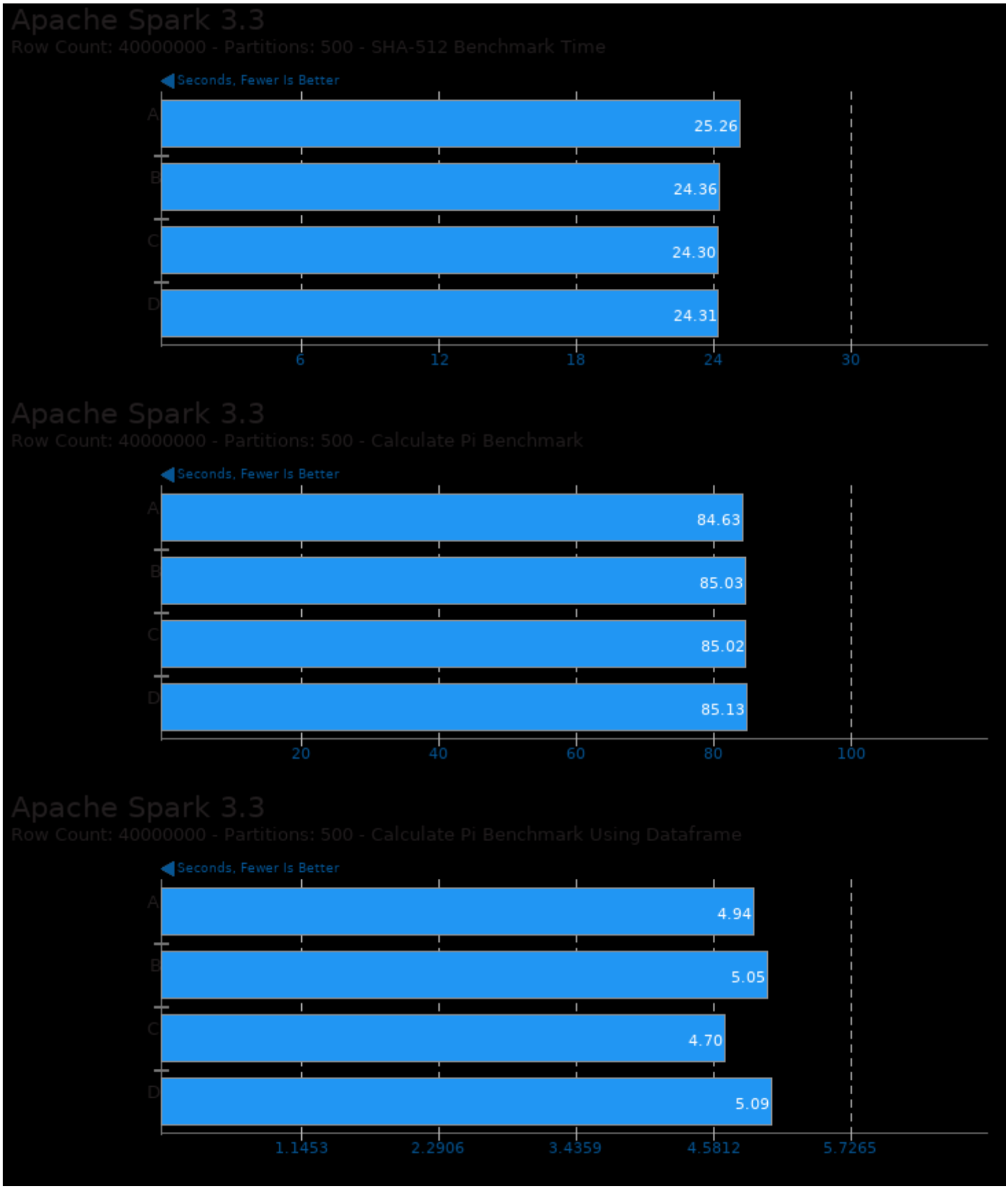
Row Count: 40000000 - Partitions: 100 - SHA-512 Benchmark Time



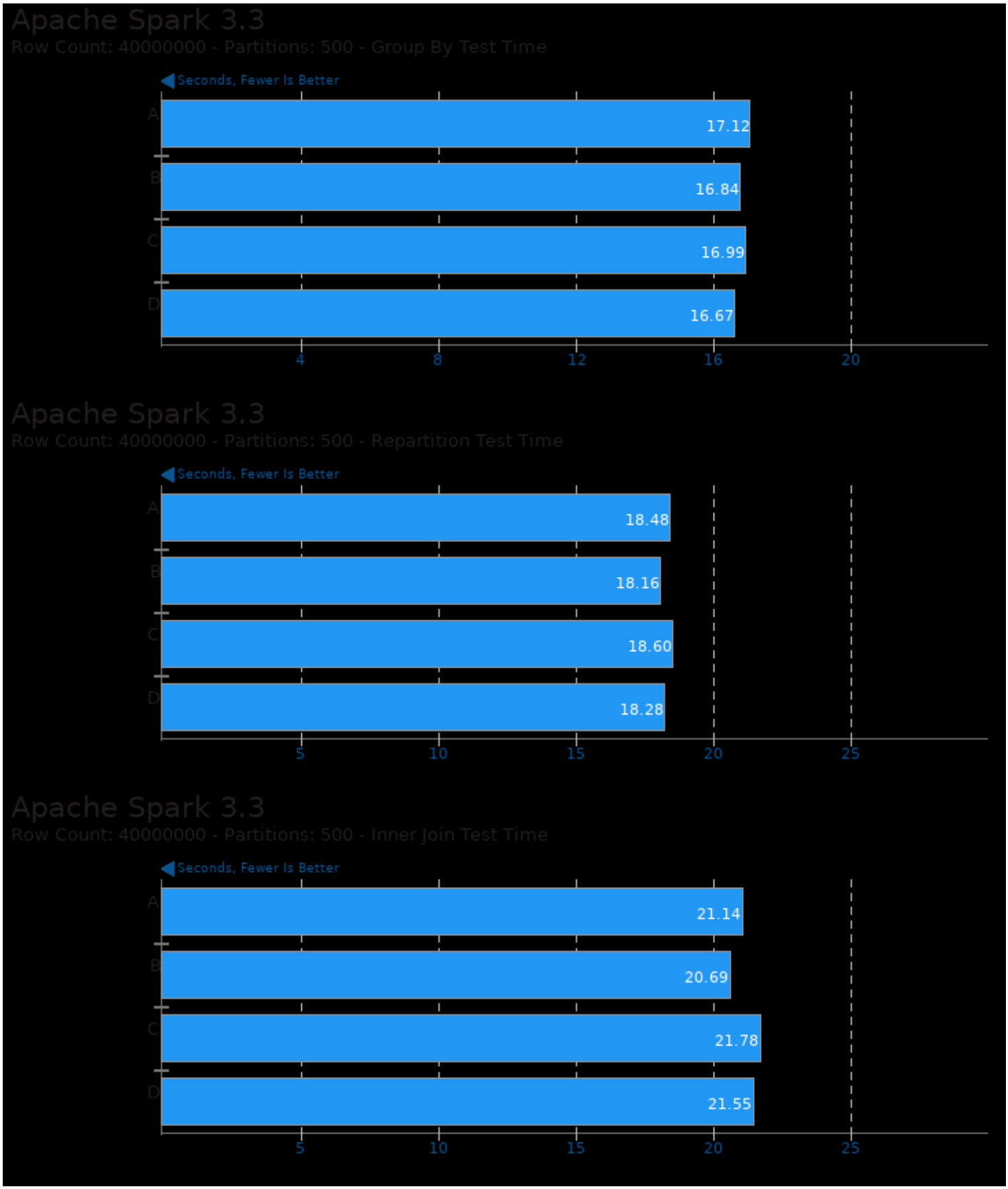

Apache Spark 3.3
Row Count: 40000000 - Partitions: 100 - Calculate Pi Benchmark
Seconds, Fewer Is Better
A
84.93
B
85.67
C
84.93
D
85.22
20
40
60
80
100
Apache Spark 3.3
Row Count: 40000000 - Partitions: 100 - Calculate Pi Benchmark Using Dataframe
Seconds, Fewer Is Better
A
4.67
B
5.04
C
4.72
D
5.08
1.143
2.286
3.429
4.572
5.715
Apache Spark 3.3
Row Count: 40000000 - Partitions: 100 - Group By Test Time
Seconds, Fewer Is Better
A
19.14
B
18.84
C
18.76
D
18.87
5
10
15
20
25

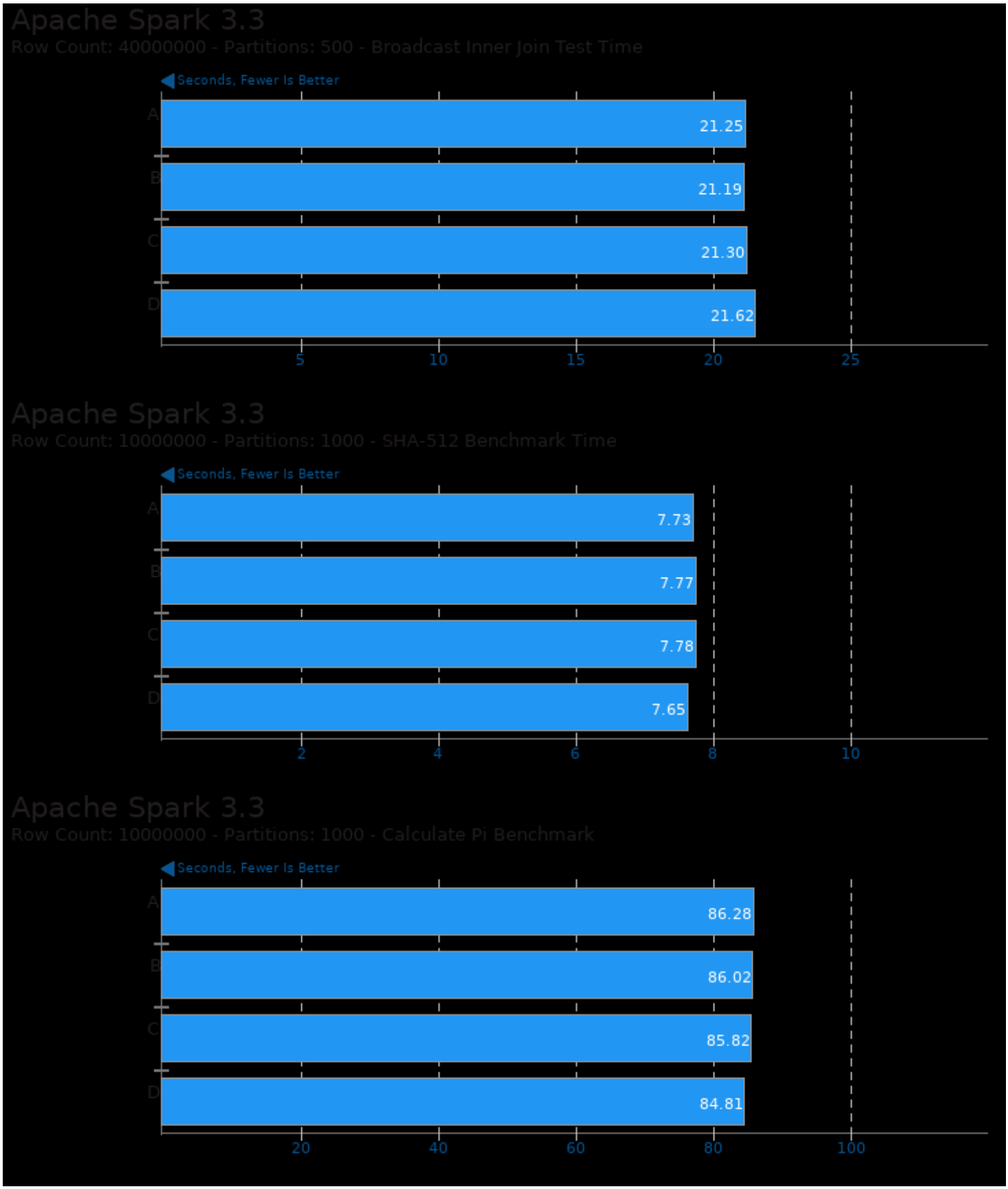
spark 12900K Intel

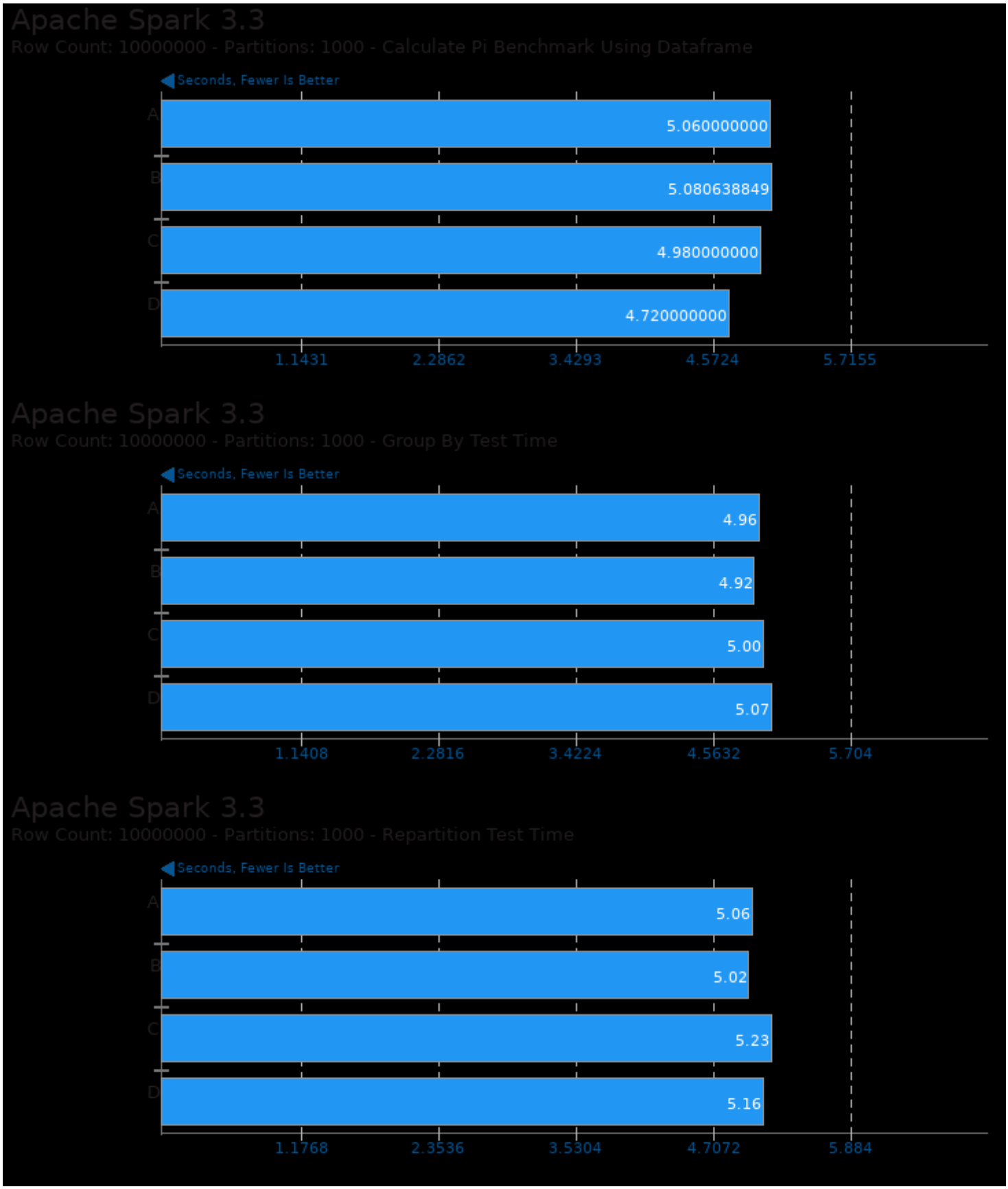


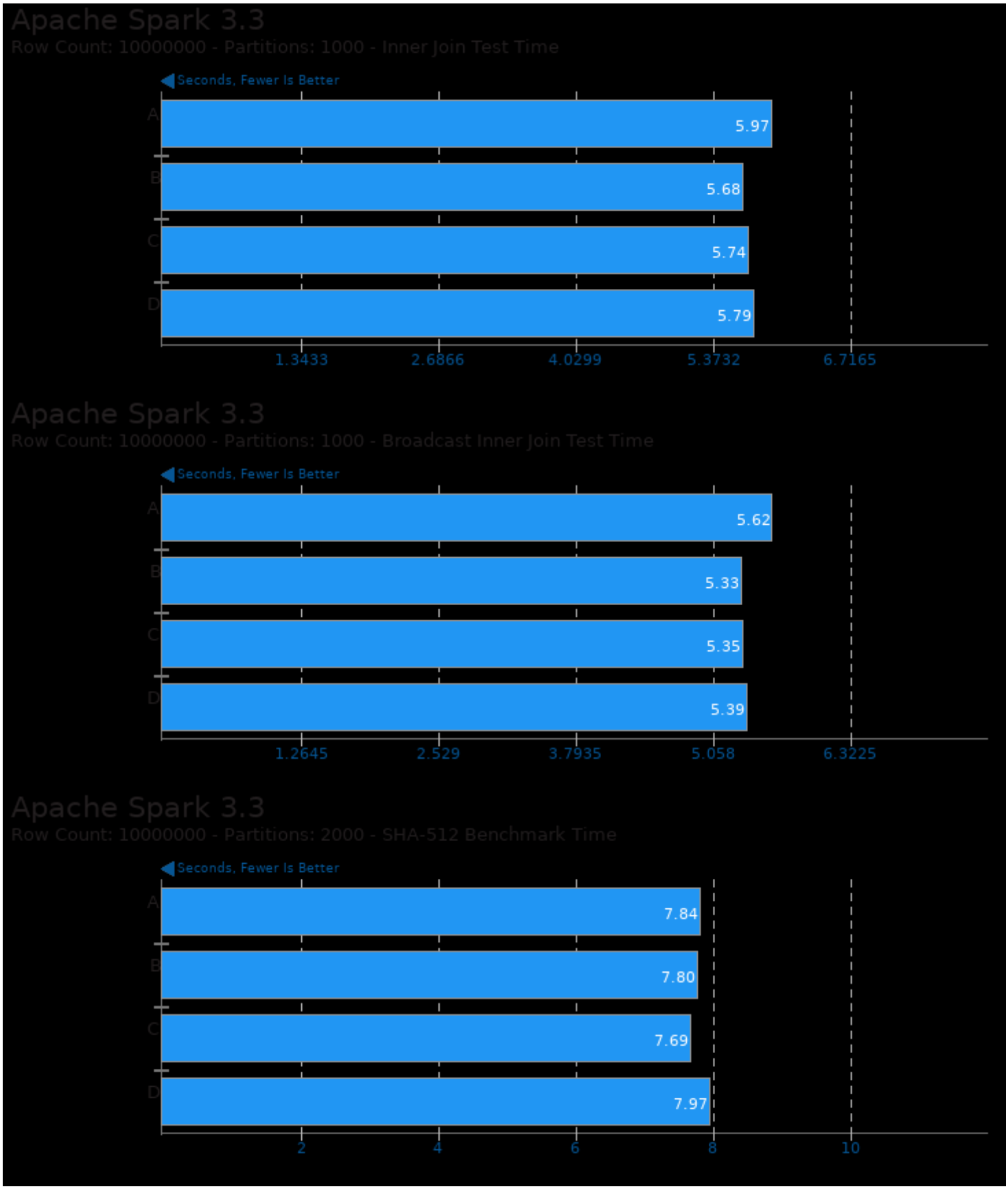

Apache Spark 3.3
Row Count: 40000000 - Partitions: 500 - SHA-512 Benchmark Time
Seconds, Fewer Is Better
A
25.26
B
24.36
C
24.30
D
24.31
6
12
18
24
30
Apache Spark 3.3
Row Count: 40000000 - Partitions: 500 - Calculate Pi Benchmark
Seconds, Fewer Is Better
A
84.63
B
85.03
C
85.02
D
85.13
20
40
60
80
100
Apache Spark 3.3
Row Count: 40000000 - Partitions: 500 - Calculate Pi Benchmark Using Dataframe
Seconds, Fewer Is Better
A
4.94
B
5.05
C
4.70
D
5.09
1.1453
2.2906
3.4359
4.5812
5.7265

spark 12900K Intel

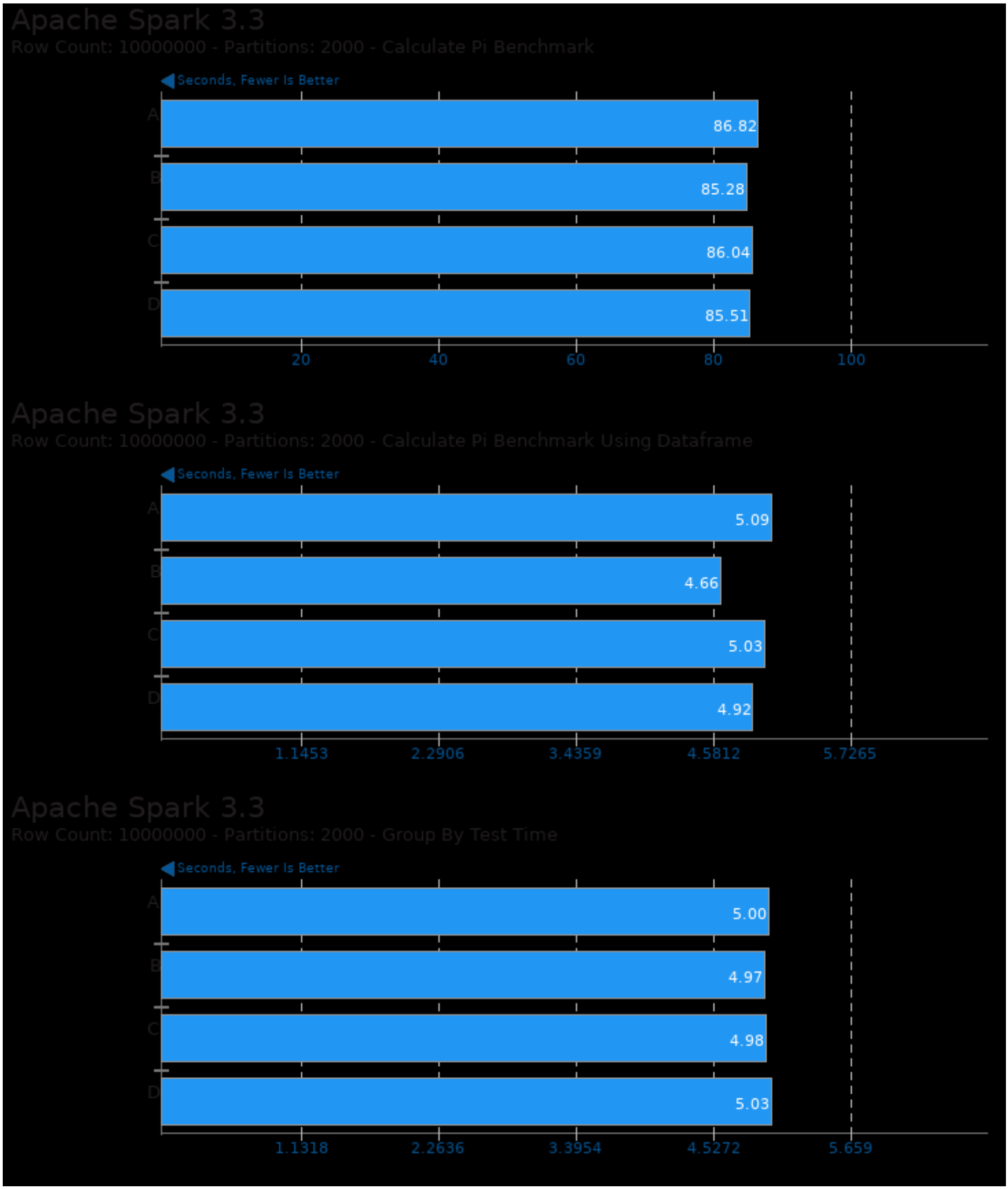


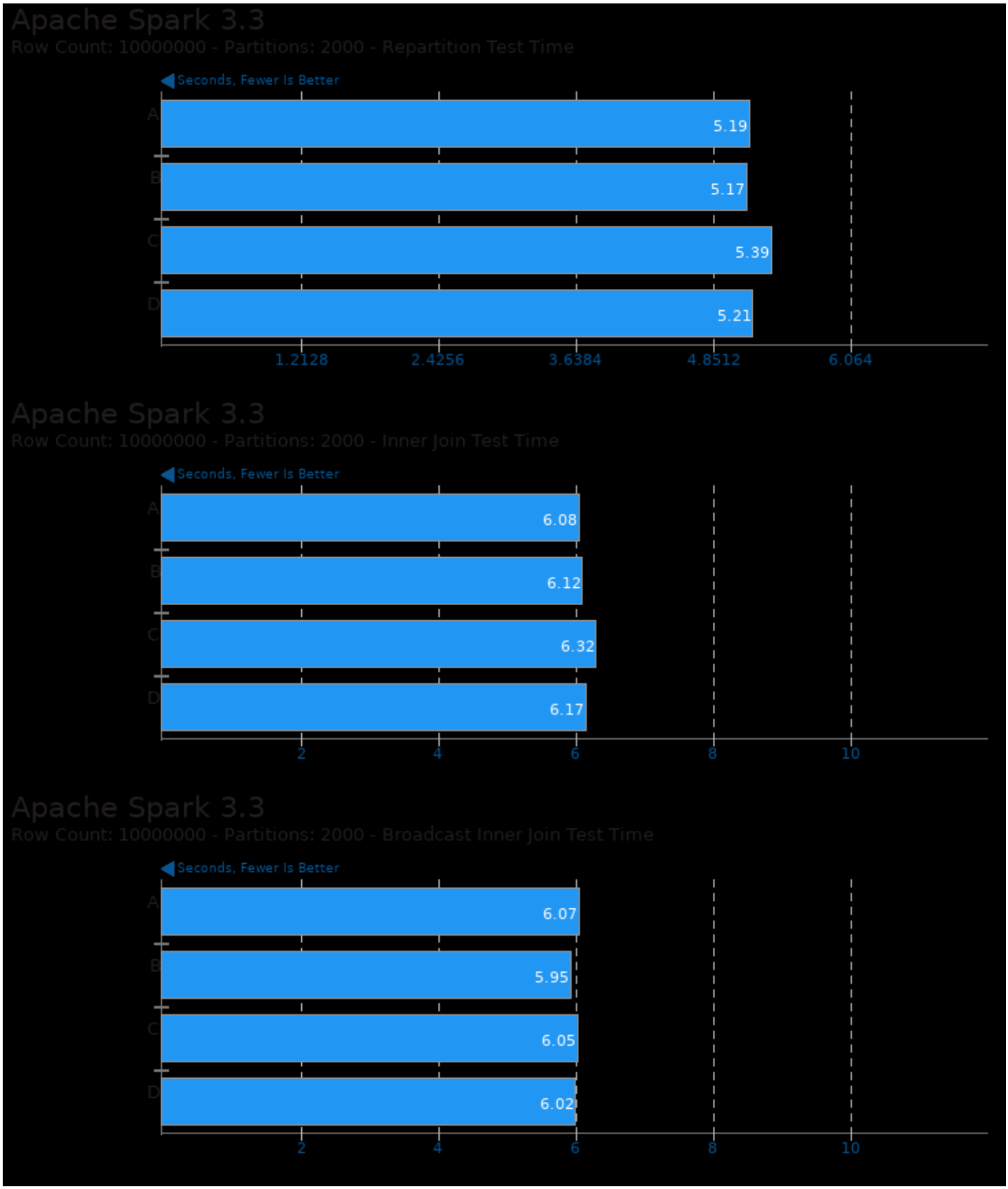

Apache Spark 3.3
Row Count: 40000000 - Partitions: 500 - Broadcast Inner Join Test Time
Seconds, Fewer Is Better
A
21.25
B
21.19
C
21.30
D
21.62
5
10
15
20
25
Apache Spark 3.3
Row Count: 10000000 - Partitions: 1000 - SHA-512 Benchmark Time
Seconds, Fewer Is Better
A
7.73
B
7.77
C
7.78
D
7.65
2
4
6
8
10
Apache Spark 3.3
Row Count: 10000000 - Partitions: 1000 - Calculate Pi Benchmark
Seconds, Fewer Is Better
A
86.28
B
86.02
C
85.82
D
84.81
20
40
60
80
100

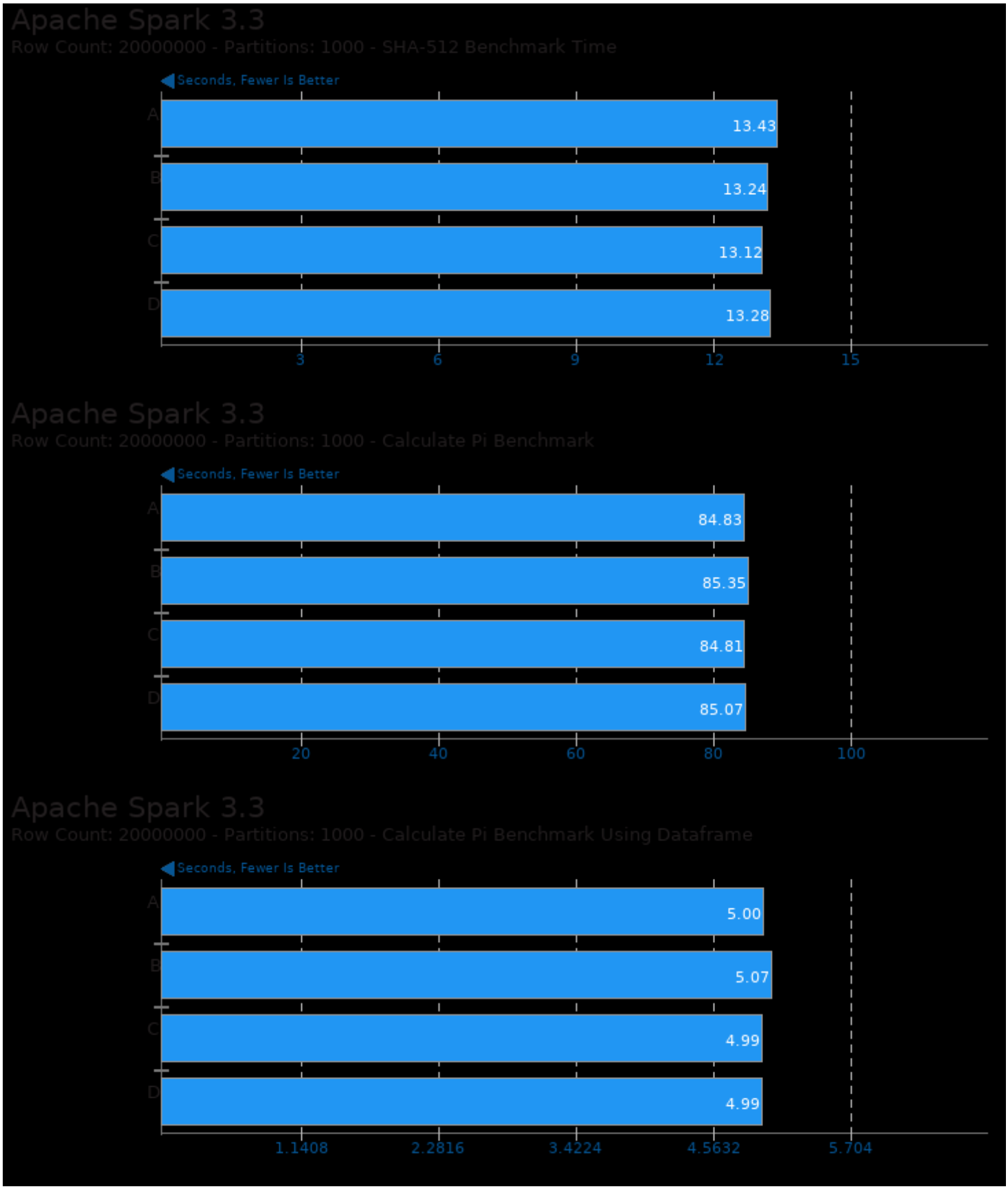

Apache Spark 3.3
Row Count: 10000000 - Partitions: 1000 - Calculate Pi Benchmark Using Dataframe
Seconds, Fewer Is Better
A
5.060000000
B
5.080638849
C
4.980000000
D
4.720000000
1.1431
2.2862
3.4293
4.5724
5.7155
Apache Spark 3.3
Row Count: 10000000 - Partitions: 1000 - Group By Test Time
Seconds, Fewer Is Better
A
4.96
B
4.92
C
5.00
D
5.07
1.1408
2.2816
3.4224
4.5632
5.704
Apache Spark 3.3
Row Count: 10000000 - Partitions: 1000 - Repartition Test Time
Seconds, Fewer Is Better
A
5.06
B
5.02
C
5.23
D
5.16
1.1768
2.3536
3.5304
4.7072
5.884


Apache Spark 3.3
Row Count: 10000000 - Partitions: 1000 - Inner Join Test Time
Seconds, Fewer Is Better
A
B
C
D
5.97
5.68
5.74
5.79
1.3433
2.6866
4.0299
5.3732
6.7165
Apache Spark 3.3
Row Count: 10000000 - Partitions: 1000 - Broadcast Inner Join Test Time
Seconds, Fewer Is Better
A
B
C
D
5.62
5.33
5.35
5.39
1.2645
2.529
3.7935
5.058
6.3225
Apache Spark 3.3
Row Count: 10000000 - Partitions: 2000 - SHA-512 Benchmark Time
Seconds, Fewer Is Better
A
B
C
D
7.84
7.80
7.69
7.97
2
4
6
8
10

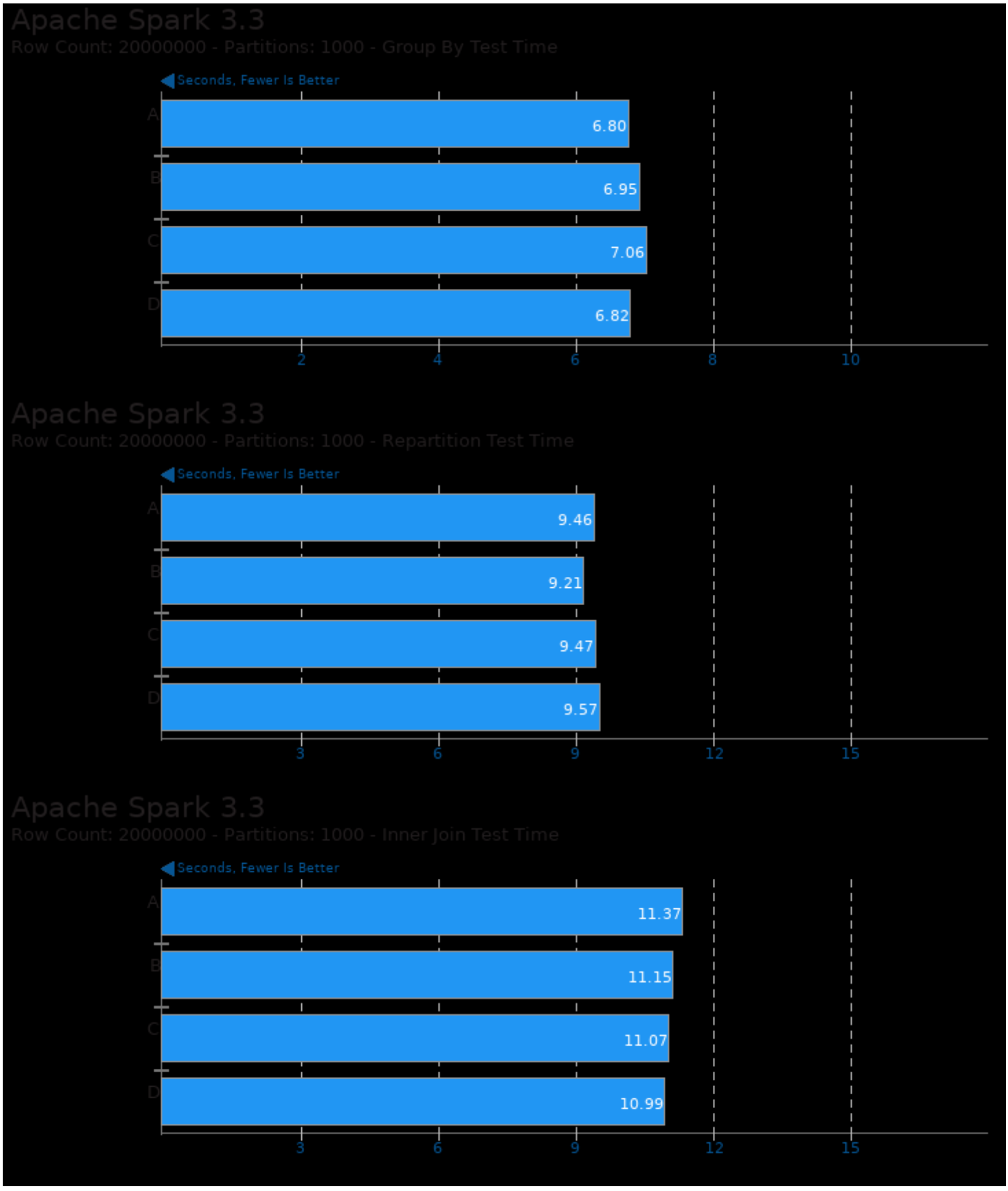
spark 12900K Intel

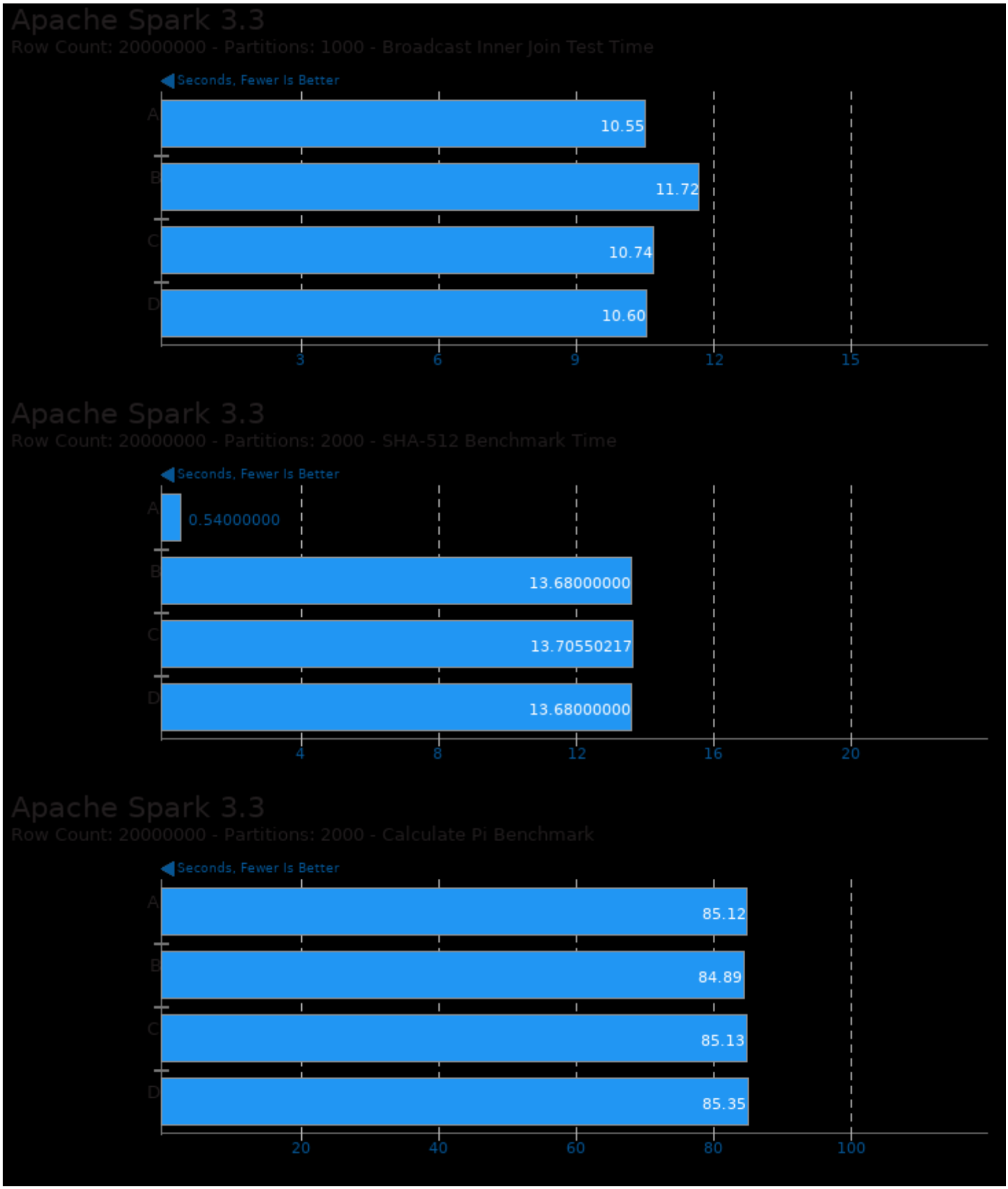


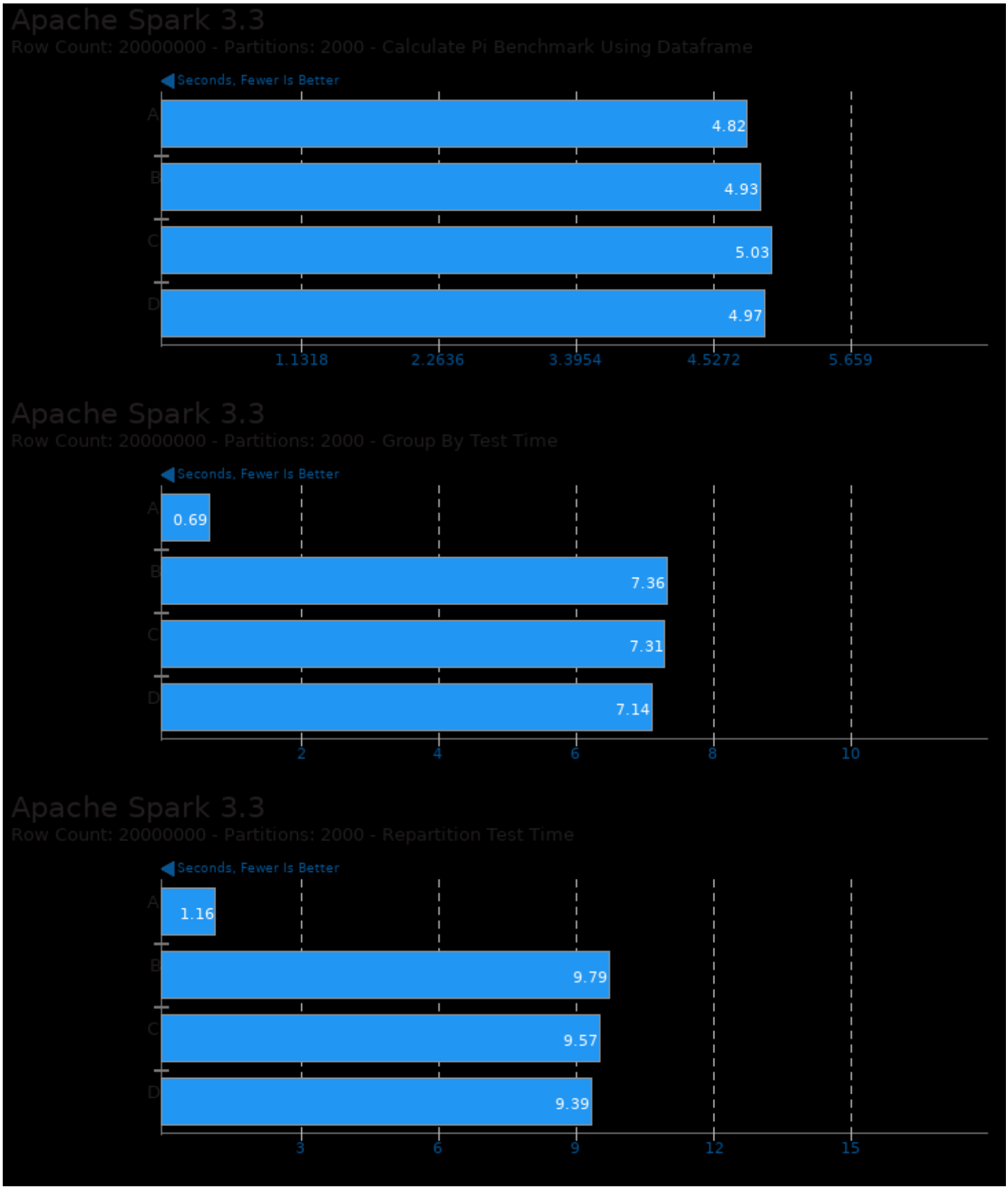

Apache Spark 3.3
Row Count: 10000000 - Partitions: 2000 - Repartition Test Time
Seconds, Fewer Is Better
A
5.19
B
5.17
C
5.39
D
5.21
1.2128
2.4256
3.6384
4.8512
6.064
Apache Spark 3.3
Row Count: 10000000 - Partitions: 2000 - Inner Join Test Time
Seconds, Fewer Is Better
A
6.08
B
6.12
C
6.32
D
6.17
2
4
6
8
10
Apache Spark 3.3
Row Count: 10000000 - Partitions: 2000 - Broadcast Inner Join Test Time
Seconds, Fewer Is Better
A
6.07
B
5.95
C
6.05
D
6.02
2
4
6
8
10

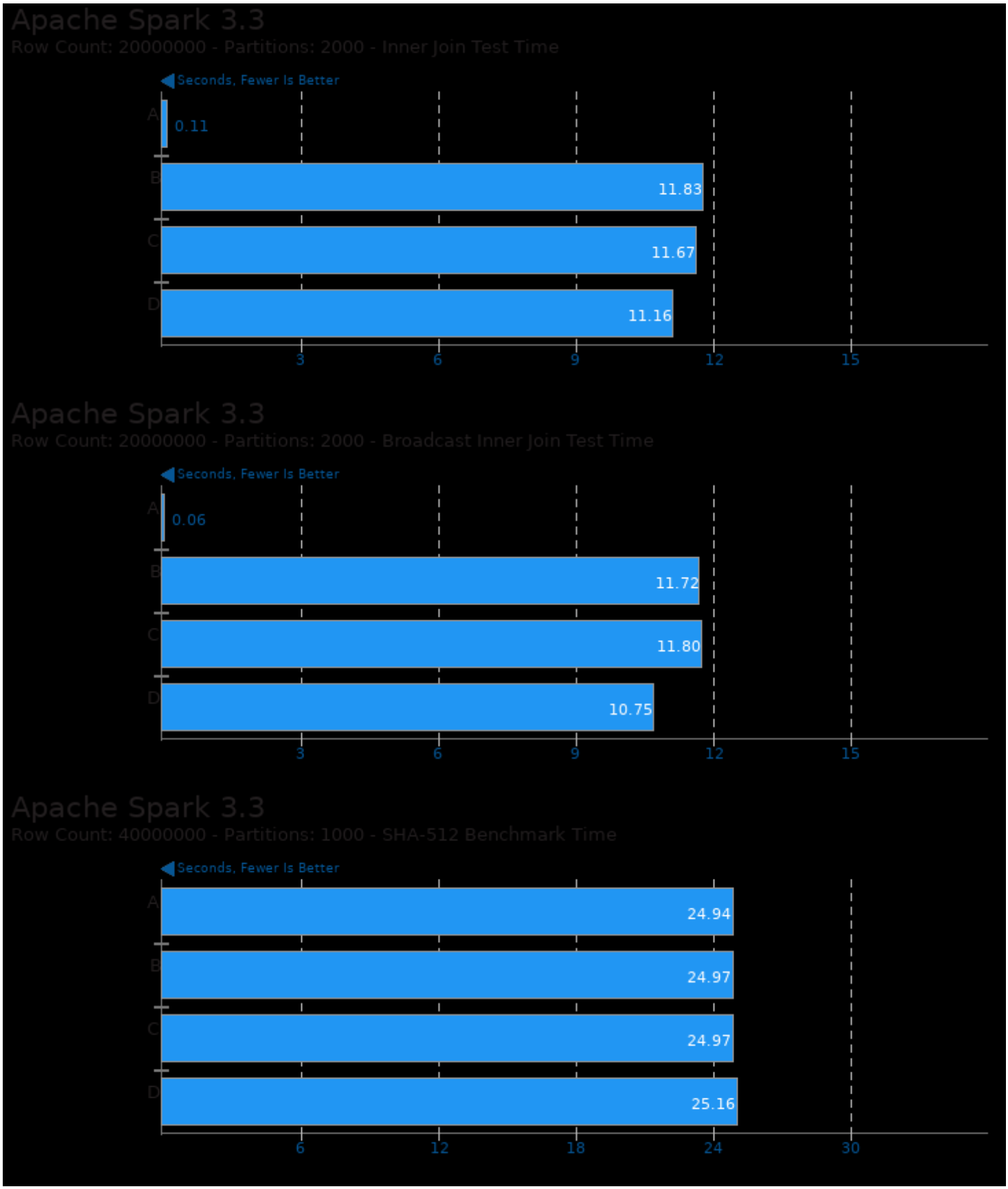

Apache Spark 3.3
Row Count: 20000000 - Partitions: 1000 - SHA-512 Benchmark Time
Seconds, Fewer Is Better
A
13.43
B
13.24
C
13.12
D
13.28
3
6
9
12
15
Apache Spark 3.3
Row Count: 20000000 - Partitions: 1000 - Calculate Pi Benchmark
Seconds, Fewer Is Better
A
84.83
B
85.35
C
84.81
D
85.07
20
40
60
80
100
Apache Spark 3.3
Row Count: 20000000 - Partitions: 1000 - Calculate Pi Benchmark Using Dataframe
Seconds, Fewer Is Better
A
5.00
B
5.07
C
4.99
D
4.99
1.1408
2.2816
3.4224
4.5632
5.704

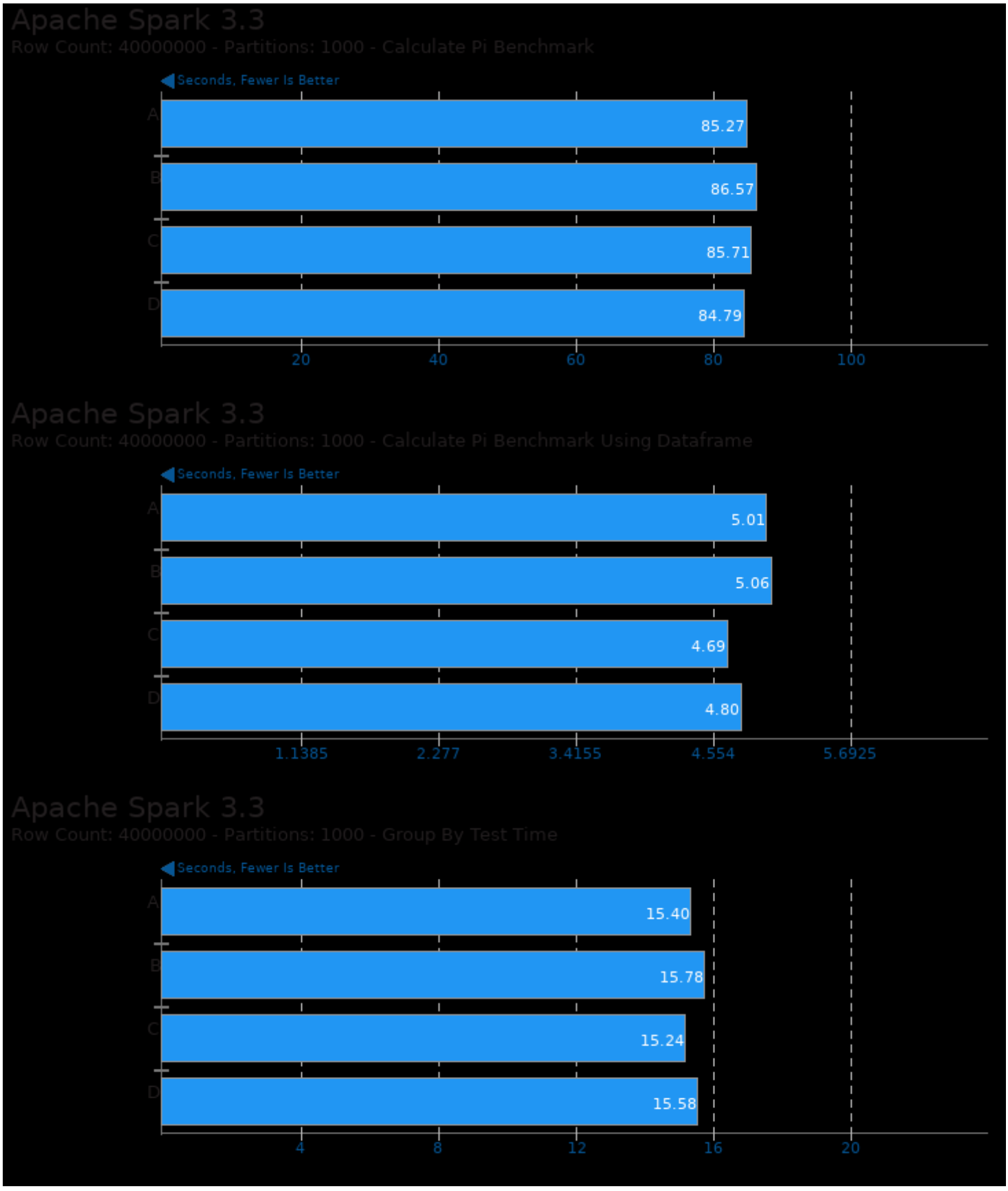
spark 12900K Intel

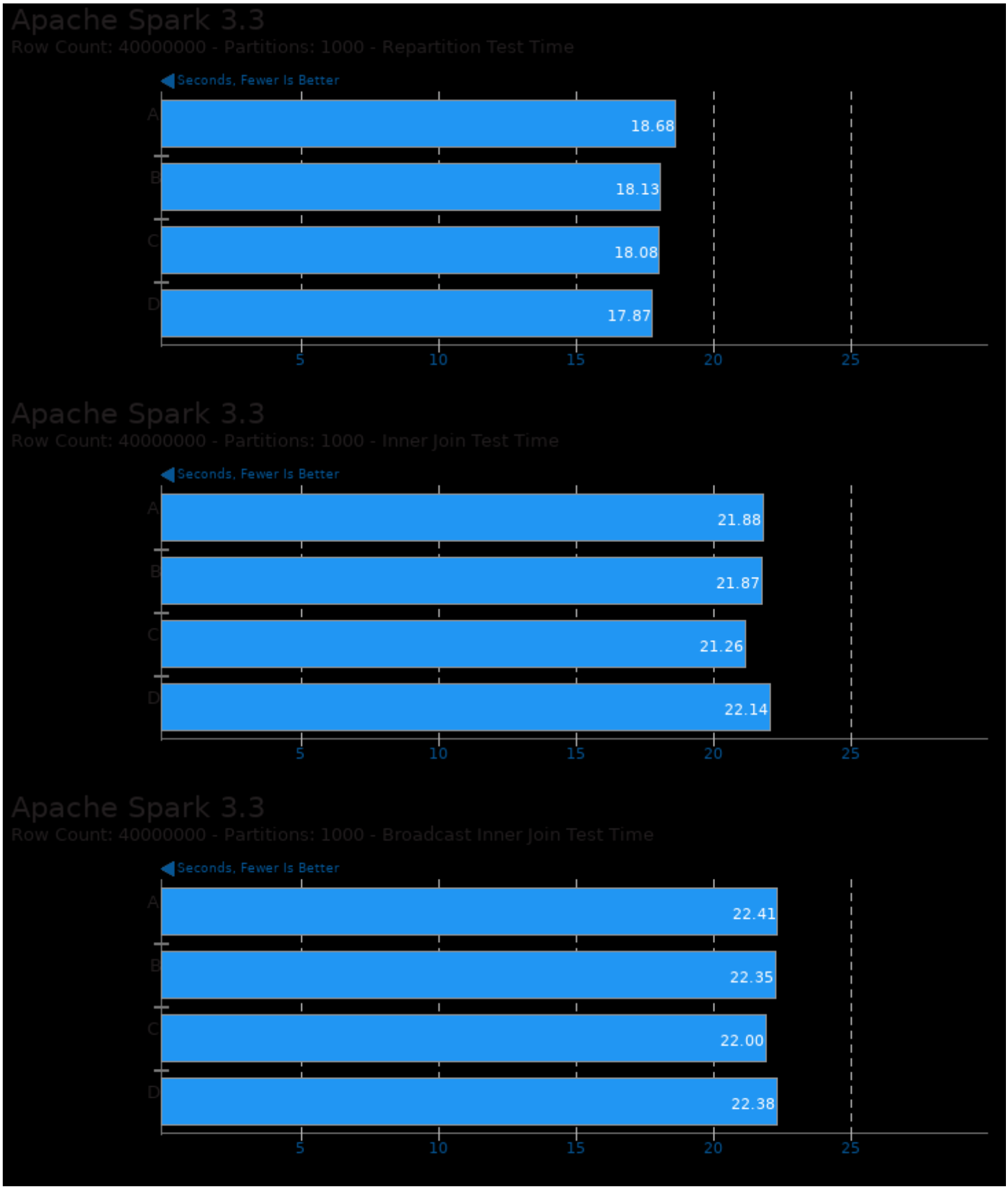


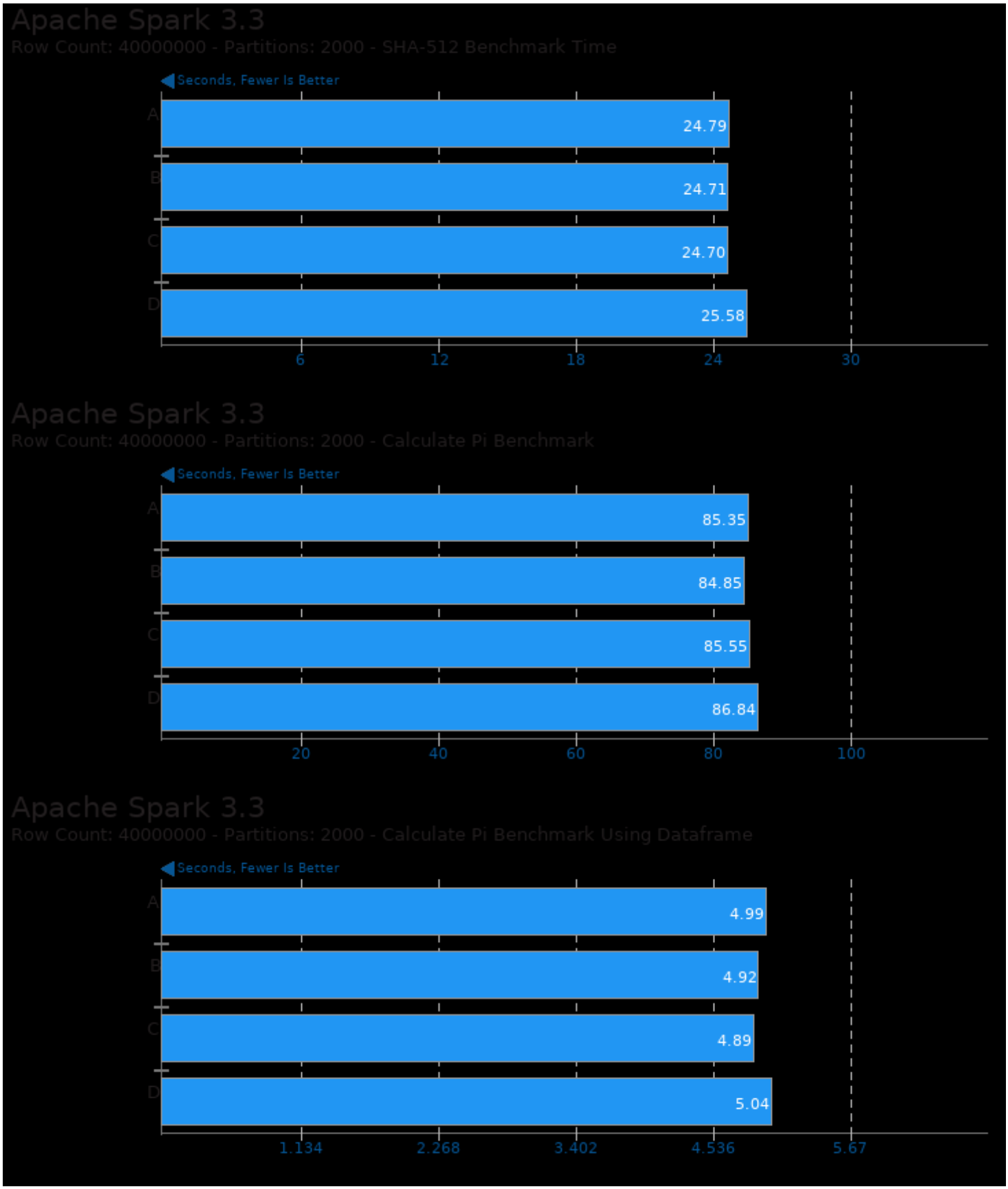

Apache Spark 3.3
Row Count: 20000000 - Partitions: 1000 - Broadcast Inner Join Test Time
Seconds, Fewer Is Better
A
10.55
B
11.72
C
10.74
D
10.60
3
6
9
12
15
Apache Spark 3.3
Row Count: 20000000 - Partitions: 2000 - SHA-512 Benchmark Time
Seconds, Fewer Is Better
A
0.54000000
B
13.68000000
C
13.70550217
D
13.68000000
4
8
12
16
20
Apache Spark 3.3
Row Count: 20000000 - Partitions: 2000 - Calculate Pi Benchmark
Seconds, Fewer Is Better
A
85.12
B
84.89
C
85.13
D
85.35
20
40
60
80
100

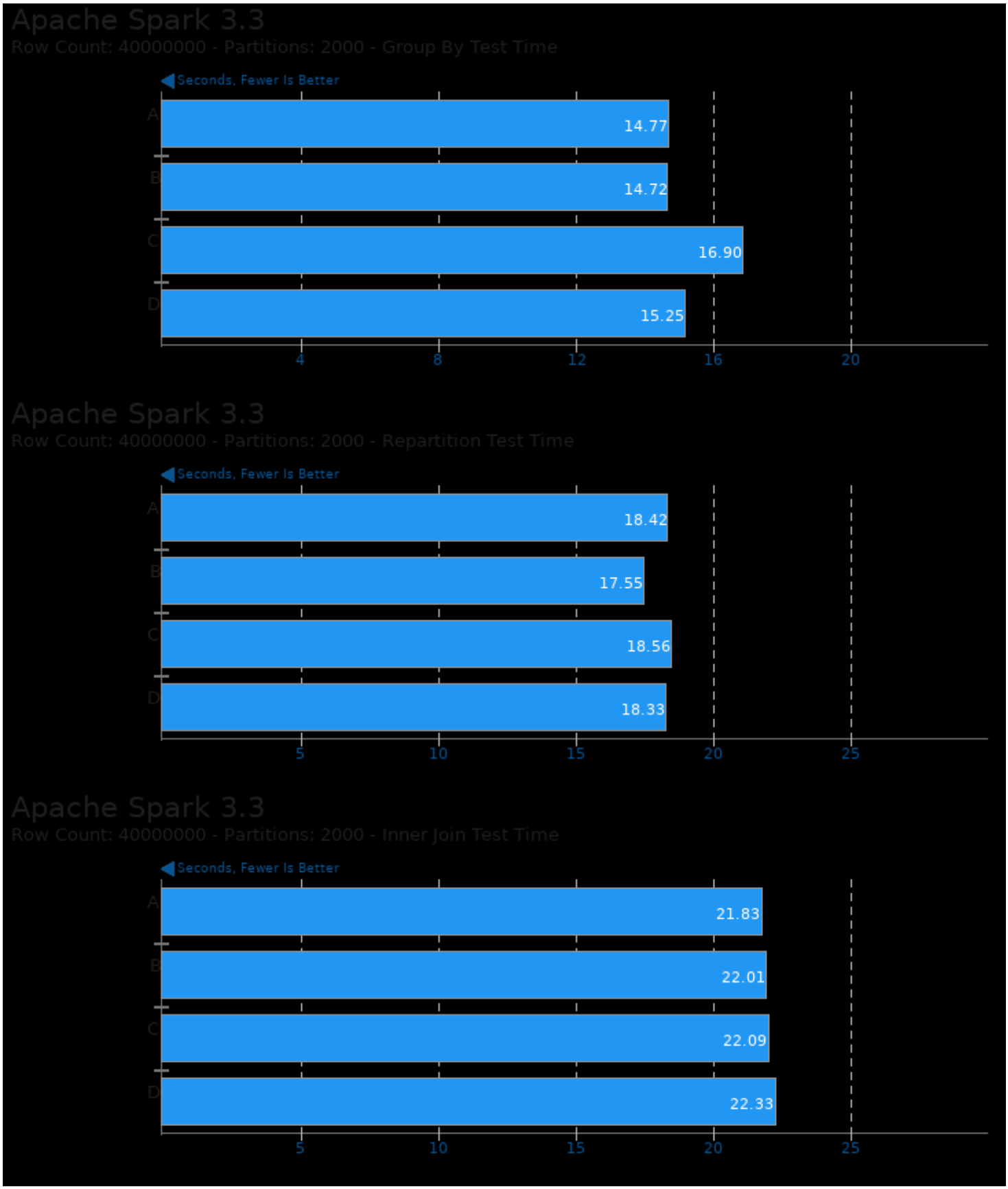

Apache Spark 3.3
Row Count: 20000000 - Partitions: 2000 - Calculate Pi Benchmark Using Dataframe
Seconds, Fewer Is Better
A
4.82
B
4.93
C
5.03
D
4.97
1.1318
2.2636
3.3954
4.5272
5.659
Apache Spark 3.3
Row Count: 20000000 - Partitions: 2000 - Group By Test Time
Seconds, Fewer Is Better
A
0.69
B
7.36
C
7.31
D
7.14
2
4
6
8
10
Apache Spark 3.3
Row Count: 20000000 - Partitions: 2000 - Repartition Test Time
Seconds, Fewer Is Better
A
1.16
B
9.79
C
9.57
D
9.39
3
6
9
12
15


Apache Spark 3.3
Row Count: 20000000 - Partitions: 2000 - Inner Join Test Time
Seconds, Fewer Is Better
A
0.11
B
11.83
C
11.67
D
11.16
3
6
9
12
15
Apache Spark 3.3
Row Count: 20000000 - Partitions: 2000 - Broadcast Inner Join Test Time
Seconds, Fewer Is Better
A
0.06
B
11.72
C
11.80
D
10.75
3
6
9
12
15
Apache Spark 3.3
Row Count: 40000000 - Partitions: 1000 - SHA-512 Benchmark Time
Seconds, Fewer Is Better
A
24.94
B
24.97
C
24.97
D
25.16
6
12
18
24
30

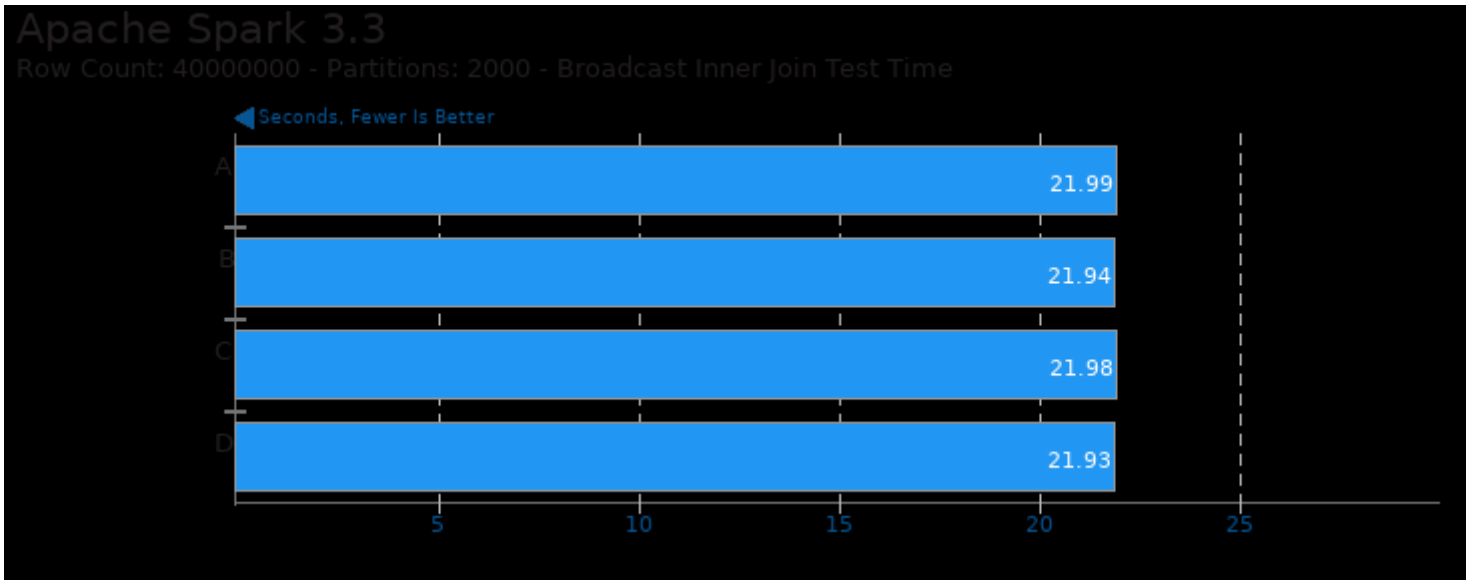

Apache Spark 3.3
Row Count: 40000000 - Partitions: 1000 - Calculate Pi Benchmark
Seconds, Fewer Is Better
A
B
C
D
85.27
86.57
85.71
84.79
20
40
60
80
100
Apache Spark 3.3
Row Count: 40000000 - Partitions: 1000 - Calculate Pi Benchmark Using Dataframe
Seconds, Fewer Is Better
A
B
C
D
5.01
5.06
4.69
4.80
1.1385
2.277
3.4155
4.554
5.6925
Apache Spark 3.3
Row Count: 40000000 - Partitions: 1000 - Group By Test Time
Seconds, Fewer Is Better
A
B
C
D
15.40
15.78
15.24
15.58
4
8
12
16
20


Apache Spark 3.3
Row Count: 40000000 - Partitions: 1000 - Repartition Test Time
Seconds, Fewer Is Better
A
18.68
B
18.13
C
18.08
D
17.87
5
10
15
20
25
Apache Spark 3.3
Row Count: 40000000 - Partitions: 1000 - Inner Join Test Time
Seconds, Fewer Is Better
A
21.88
B
21.87
C
21.26
D
22.14
5
10
15
20
25
Apache Spark 3.3
Row Count: 40000000 - Partitions: 1000 - Broadcast Inner Join Test Time
Seconds, Fewer Is Better
A
22.41
B
22.35
C
22.00
D
22.38
5
10
15
20
25


Apache Spark 3.3
Row Count: 40000000 - Partitions: 2000 - SHA-512 Benchmark Time
Seconds, Fewer Is Better
A
24.79
B
24.71
C
24.70
D
25.58
6
12
18
24
30
Apache Spark 3.3
Row Count: 40000000 - Partitions: 2000 - Calculate Pi Benchmark
Seconds, Fewer Is Better
A
85.35
B
84.85
C
85.55
D
86.84
20
40
60
80
100
Apache Spark 3.3
Row Count: 40000000 - Partitions: 2000 - Calculate Pi Benchmark Using Dataframe
Seconds, Fewer Is Better
A
4.99
B
4.92
C
4.89
D
5.04
1.134
2.268
3.402
4.536
5.67


Apache Spark 3.3
Row Count: 40000000 - Partitions: 2000 - Group By Test Time
Seconds, Fewer Is Better
A
14.77
B
14.72
C
16.90
D
15.25
4
8
12
16
20
Apache Spark 3.3
Row Count: 40000000 - Partitions: 2000 - Repartition Test Time
Seconds, Fewer Is Better
A
18.42
B
17.55
C
18.56
D
18.33
5
10
15
20
25
Apache Spark 3.3
Row Count: 40000000 - Partitions: 2000 - Inner Join Test Time
Seconds, Fewer Is Better
A
21.83
B
22.01
C
22.09
D
22.33
5
10
15
20
25

spark 12900K Intel



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