CTA

Consolidated Tape Association

Key Operating Metrics of Tape A&B U.S. Equities Securities Information Processor (CTA SIP)

CQS: Quote Feed (Tape A&B)																
Quarter	System Availability (1)	Peak Messages Per Second (thousands)	Capacity Messages Per Second (millions)	Capacity vs Peak Ratio	Peak Messages Per 100 Milliseconds (thousands) (2)	Capacity Messages Per 100 Milliseconds (thousands)	Capacity vs Peak Ratio	Peak Messages Per 10 Milliseconds (thousands)	Peak Messages Per 1 Millisecond (thousands)	Peak Transactions Per Day (millions)	Capacity Transactions Per Day (billions)	Average Latency (us) (3)	Median Latency (us) (3)	10th Percentile Latency (us)	90th Percentile Latency (us)	99th Percentile Latency (us)
1Q16	100.00%	615	n/a	n/a	163.3	392	2.4:1	n/a	n/a	1338	16	490.0	220.0	150.0	1080.0	3890.0
2Q16	100.00%	618	n/a	n/a	168.4	400	2.4:1	n/a	n/a	1093	16	490.0	220.0	150.0	1090.0	4000.0
3Q16	100.00%	541	n/a	n/a	185.5	450	2.4:1	n/a	n/a	1027	16	470.0	210.0	150.0	970.0	3860.0
4Q16	99.99%	785	n/a	n/a	210.8	450	2.1:1	n/a	n/a	1150	16	260.0	80.0	60.0	280.0	1570.0
1Q17	100.00%	530	n/a	n/a	175.7	450	2.6:1	n/a	n/a	720	16	145.0	81.0	63.0	257.0	1096.5
2Q17	100.00%	543	n/a	n/a	189.2	450	2.4:1	n/a	n/a	676	16	150.0	82.0	63.0	281.0	1114.0
3Q17	100.00%	519	n/a	n/a	165.4	450	2.7:1	n/a	n/a	546	16	141.0	83.0	64.0	251.0	1020.0
4Q17	100.00%	527	n/a	n/a	187.2	450	2.4:1	n/a	n/a	782	16	121.0	87.0	70.0	164.0	722.0
1Q18	100.00%	691	n/a	n/a	182.6	450	2.5:1	n/a	n/a	1571	16	129.7	84.3	67.7	179.7	861.0
2Q18	100.00%	660	n/a	n/a	195.5	450	2.3:1	n/a	n/a	985	16	134.0	84.0	66.0	174.0	860.0
3Q18	100.00%	790	n/a	n/a	232.6	450	1.9:1	n/a	n/a	684	16	131.0	85.0	66.0	179.0	810.0
4Q18	100.00%	942	n/a	n/a	249.6	600	2.4:1	n/a	n/a	1755	16	97.0	60.0	49.0	100.0	371.0
1Q19	100.00%	853	n/a	n/a	265.1	600	2.3:1	486.7	571.4	1140	16	75.0	61.0	49.0	89.0	339.0
Jan '19	100.00%	853	n/a	n/a	265.1	600	2.3:1	449.6	527.5	1140	16	75.0	60.0	49.0	89.0	328.0
Feb '19	100.00%	749	n/a	n/a	241.6	600	2.5:1	471.1	561.4	860	16	75.0	61.0	49.0	88.0	362.0
Mar '19	100.00%	841	n/a	n/a	247.3	600	2.4:1	486.7	571.4	1017	16	75.0	61.0	49.0	88.0	362.0
2Q19	100.00%	903	n/a	n/a	227.2	650	2.9:1	515.4	571.6	1043	16	68.5	60.7	49.2	83.4	239.5
Apr '19	100.00%	524	n/a	n/a	199.5	600	3.0:1	515.4	571.6	657	16	68.0	60.0	49.0	84.0	242.0
May '19	100.00%	903	n/a	n/a	227.2	650	2.9:1	473.0	568.4	1043	16	70.0	60.0	49.0	85.0	244.0
Jun '19	100.00%	762	n/a	n/a	178.4	650	3.6:1	457.1	552.9	1003	16	68.0	60.0	49.0	82.0	221.0
3Q19	99.97%	958	n/a	n/a	246.8	750	3.0:1	503.2	592.1	1090	16	165.0	61.0	49.0	82.0	233.0
Jul '19	100.00%	578	n/a	n/a	222.2	650	2.9:1	503.2	588.6	814	16	67.5	60.7	49.2	80.2	210.4
Aug '19	99.90%	653	n/a	n/a	210.6	650	3.1:1	467.3	592.1	1090	16	352.8	60.7	49.2	83.4	244.3
Sep '19	100.00%	958	n/a	n/a	246.8	750	3.0:1	496.0	591.7	807	16	75.0	61.0	50.0	83.0	246.0
4Q19	100.00%	1156	n/a	n/a	322.5	850	2.6:1	533.8	646.4	803	16	69.0	61.0	49.0	80.5	222.5
Oct '19	100.00%	1043	n/a	n/a	291.1	750	2.6:1	501.7	634.3	803	16	69.6	60.1	48.7	80.2	239.6
Nov '19	100.00%	988	n/a	n/a	248.1	850	3.4:1	496.8	644.4	565	16	67.3	60.7	48.7	78.6	214.7
Dec '19	100.00%	1156	n/a	n/a	322.5	850	2.6:1	533.8	646.4	744	16	69.0	60.7	48.7	81.0	226.0
1Q20	100.00%	1119	n/a	n/a	232.6	900	3.9:1	539.1	651.8	2139	16	69.8	60.0	49.0	82.0	243.0
Jan'20	100.00%	981	n/a	n/a	232.6	850	3.7:1	539.1	642.9	1042	16	69.1	61.0	48.7	82.0	243.0
Feb'20	100.00%	1119	n/a	n/a	228.0	900	3.9:1	532.4	649.3	2139	16	71.0	60.0	49.0	82.0	252.0
Mar'20	100.00%	724	n/a	n/a	213.9	900	4.2:1	519.3	651.8	2139	16	69.5	60.0	48.7	83.0	213.0
2Q20	100.00%	1018	n/a	n/a	259.0	900	3.5:1	581.5	628.8	1947	16	71.0	60.0	49.0	85.0	234.0
Apr'20	100.00%	808	n/a	n/a	219.9	900	4.1:1	496.3	628.8	1354	16	67.9	60.0	49.0	83.0	219.0
May'20	100.00%	1015	n/a	n/a	259.0	900	3.5:1	470.5	625.0	1382	16	70.6	60.5	49.5	86.5	237.0
Jun'20	100.00%	1018	n/a	n/a	254.2	900	3.5:1	581.5	605.2	1947	16	74.4	65.0	54.0	91.0	253.0
3Q20	100.00%	1005	n/a	n/a	274.6	950	3.5:1	526.6	703.2	1853	12	20.3	16.5	14.1	19.3	27.6
Jul'20	100.00%	1005	n/a	n/a	274.6	950	3.5:1	526.6	688.0	1396	12	26.2	16.3	13.9	19.1	27.1
Aug'20	100.00%	699	n/a	n/a	230.6	950	4.1:1	490.6	703.2	1027	12	17.0	16.1	13.9	18.9	24.3
Sep'20	100.00%	784	n/a	n/a	232.7	950	4.1:1	501.2	643.5	1853	12	19.5	16.8	14.5	19.9	37.3

(1) Service level guidelines: (A) 99.98% system availability; (B) 10 minute recovery time for full system failures; (C) Operations production support 24x5 in primary and backup data center and test support provided on Tuesdays, Thursdays, and Saturdays.

(2) Beginning 1Q14, capacity planning interval changed from 1-second to 100-mcroseconds.

(3) Message latency is measured beginning with the time-stamp taken as an inbound Participant message arrives at the network entrance to the CTS/CQS environment, through processing by the system into a consolidated message for Data Recipients, to the time-stamp taken as the outbound message arrives at the network exit from the environment. Latency is represented in milliseconds.

CTA

Consolidated Tape Association

CTS: Trade Feed (Tape A&B)																
Quarter	System Availability (1)	Peak Messages Per Second (thousands)	Capacity Messages Per Second (thousands)	Capacity vs Peak Ratio	Peak Messages Per 100 Milliseconds (thousands) (2)	Capacity Messages Per 100 Milliseconds (thousands)	Capacity vs Peak Ratio	Peak Messages Per 10 Milliseconds (thousands)	Peak Messages Per 1 Millisecond (thousands)	Peak Transactions Per Day (millions)	Capacity Transactions Per Day (millions)	Average Latency (3)	Median Latency (3)	10th Percentile Latency	90th Percentile Latency	99th Percentile Latency
1Q16	100.00%	123.0	n/a	n/a	42.4	86	2.0:1	n/a	n/a	49.8	1000	330.0	250.0	160.0	430.0	1730.0
2Q16	100.00%	91.9	n/a	n/a	37.4	96	2.6:1	n/a	n/a	45.6	1000	340.0	240.0	190.0	450.0	1730.0
3Q16	100.00%	98.2	n/a	n/a	41.5	105	2.5:1	n/a	n/a	33.8	1000	320.0	240.0	200.0	440.0	1650.0
4Q16	100.00%	94.3	n/a	n/a	38.7	105	2.7:1	n/a	n/a	49.3	1000	250.0	160.0	130.0	310.0	1410.0
1Q17	100.00%	121.8	n/a	n/a	45.4	105	2.3:1	n/a	n/a	32.9	1000	167.0	115.0	83.0	218.0	1023.0
2Q17	100.00%	98.2	n/a	n/a	51.0	105	2.1:1	n/a	n/a	32.4	1000	154.0	113.0	83.0	210.0	848.0
3Q17	100.00%	88.3	n/a	n/a	46.9	105	2.2:1	n/a	n/a	29.2	1000	144.0	113.0	83.0	199.0	708.0
4Q17	100.00%	67.6	n/a	n/a	39.6	105	2.7:1	n/a	n/a	38.5	1000	151.2	120.0	87.0	205.0	708.0
1Q18	100.00%	68.0	n/a	n/a	35.8	105	2.9:1	n/a	n/a	57.3	1000	146.7	119.0	87.3	198.3	661.7
2Q18	100.00%	77.3	n/a	n/a	35.8	105	2.9:1	n/a	n/a	40.2	1000	150.0	121.0	87.0	202.0	716.0
3Q18	100.00%	77.4	n/a	n/a	31.0	105	3.4:1	n/a	n/a	40.1	1000	150.0	122.0	85.0	206.0	648.0
4Q18	100.00%	91.9	n/a	n/a	39.8	105	2.6:1	n/a	n/a	55.3	1000	164.0	112.0	85.0	193.0	783.0
1Q19	100.00%	77.2	n/a	n/a	38.3	105	2.7:1	84.1	117.6	41.7	1000	147.0	102.0	77.0	198.0	823.0
Jan '19	100.00%	76.5	n/a	n/a	38.3	105	2.7:1	80.1	115.1	41.7	1000	147.0	103.0	80.0	194.0	882.0
Feb '19	100.00%	76.5	n/a	n/a	37.0	105	2.8:1	81.0	117.6	39.2	1000	144.0	102.0	78.0	198.0	823.0
Mar '19	100.00%	77.2	n/a	n/a	36.8	105	2.9:1	84.1	113.4	41.5	1000	149.0	100.0	72.0	199.0	810.0
2Q19	100.00%	98.4	n/a	n/a	43.8	250	5.7:1	144.9	230.7	49.8	1000	138.9	94.0	69.7	179.5	647.8
Apr '19	100.00%	76.3	n/a	n/a	37.2	105	2.8:1	81.9	113.5	41.7	1000	142.0	100.0	77.0	196.0	709.0
May '19	100.00%	98.3	n/a	n/a	43.8	105	2.4:1	117.3	168.7	49.6	1000	156.4	94.9	76.3	190.5	708.5
Jun '19	100.00%	98.4	n/a	n/a	40.1	250	6.2:1	144.9	230.7	49.8	1000	110.4	70.0	54.9	129.9	391.9
3Q19	99.82%	134.3	n/a	n/a	54.1	250	4.6:1	174.8	245.2	55.6	1000	115.0	64.0	50.0	117.0	377.0
Jul '19	100.00%	59.2	n/a	n/a	32.8	250	7.6:1	162.5	245.2	50.2	1000	83.8	64.1	50.1	117.6	369.2
Aug '19	99.46%	75.8	n/a	n/a	39.8	250	6.3:1	162.5	240.2	55.6	1000	174.1	64.4	50.8	114.7	374.8
Sep '19	100.00%	134.3	n/a	n/a	54.1	250	4.6:1	174.8	232.0	50.7	1000	86.0	65.0	49.0	118.0	388.0
4Q19	100.00%	207.4	n/a	n/a	80.9	300	3.7:1	174.7	233.1	48.0	1000	87.0	66.0	50.0	119.0	435.0
Oct '19	100.00%	207.4	n/a	n/a	80.9	300	3.7:1	169.7	233.1	48.0	1000	88.3	66.4	50.1	121.7	437.3
Nov '19	100.00%	128.9	n/a	n/a	51.6	300	5.8:1	156.1	224.2	47.1	1000	87.0	65.4	49.2	118.2	437.3
Dec '19	100.00%	170.2	n/a	n/a	77.8	300	3.9:1	174.7	228.7	47.2	1000	87.0	66.0	50.0	119.0	427.0
1Q20	100.00%	130.2	n/a	n/a	67.5	300	4.4:1	165.5	261.2	89.2	1000	88.1	65.0	43.5	116.0	440.5
Jan '20	100.00%	125.9	n/a	n/a	50.9	300	5.9:1	153.8	240.7	50.5	1000	87.1	65.0	43.0	118.0	430.0
Feb '20	100.00%	130.2	n/a	n/a	47.1	300	6.4:1	165.5	261.2	89.2	1000	88.3	65.0	43.0	117.0	440.0
Mar '20	100.00%	123.6	n/a	n/a	67.5	300	4.4:1	156.0	229.1	87.4	1000	89.0	64.5	45.0	107.0	454.0
2Q20	100.00%	150.5	n/a	n/a	85.4	300	3.5:1	192.0	248.3	76.9	1000	94.5	66.0	47.0	115.0	482.0
Apr '20	100.00%	150.5	n/a	n/a	85.4	300	3.5:1	184.7	232.5	76.9	1000	91.2	65.0	44.0	112.0	484.0
May '20	100.00%	143.8	n/a	n/a	66.4	300	4.5:1	161.9	226.3	63.9	1000	92.4	65.5	45.5	114.5	464.5
Jun '20	100.00%	124.7	n/a	n/a	54.4	300	5.5:1	192.0	248.3	73.6	1000	99.1	71.0	50.0	122.0	484.0
3Q20	100.00%	125.6	n/a	n/a	84.4	350	4.1:1	200.3	326.3	60.4	500	19.2	17.8	15.1	21.3	29.0
Jul'20	100.00%	125.6	n/a	n/a	60.2	350	5.8:1	198.0	305.7	56.4	500	19.2	17.7	15.1	21.1	29.1
Aug'20	100.00%	69.6	n/a	n/a	39.4	350	8.9:1	185.2	326.3	57.3	500	18.4	17.7	14.9	20.9	27.9
Sep'20	100.00%	86.7	n/a	n/a	84.4	350	4.1:1	200.3	299.9	60.4	500	20.0	18.2	15.5	21.8	31.1

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(2) Beginning 1Q14, capacity planning interval changed from 1-second to 100-milliseconds.

(3) Message latency is measured beginning with the time-stamp taken as an inbound Participant message arrives at the network entrance to the CTS/CQS environment, through processing by the system into a consolidated message for Data Recipients, to the time-stamp taken as the outbound message arrives at the network exit from the environment. Latency is represented in microseconds.