



Consolidated Tape Association

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

Quote Feed (Tape A&B)														
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 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)	
1Q10	100.00%	215	0.25	1.2:1	n/a	n/a	n/a	619	8	4,040	n/a	n/a	n/a	n/a
2Q10	99.99%	233	0.25	1.1:1	n/a	n/a	n/a	1112	8	6,430	n/a	n/a	n/a	n/a
3Q10	99.99%	299	0.30	1.0:1	n/a	n/a	n/a	849	8	11,450	n/a	n/a	n/a	n/a
4Q10	99.99%	309	0.35	1.1:1	n/a	n/a	n/a	574	8	3,270	n/a	n/a	n/a	n/a
1Q11	100.00%	390	0.50	1.3:1	n/a	n/a	n/a	971	8	1,170	n/a	n/a	n/a	n/a
2Q11	100.00%	453	0.75	1.7:1	n/a	n/a	n/a	839	8	520	n/a	n/a	n/a	n/a
3Q11	100.00%	567	1.00	1.8:1	n/a	n/a	n/a	1919	8	470	n/a	n/a	n/a	n/a
4Q11	100.00%	581	1.25	2.2:1	n/a	n/a	n/a	1418	8	430	n/a	n/a	n/a	n/a
1Q12	100.00%	561	1.50	2.7:1	n/a	n/a	n/a	743	16	350	n/a	n/a	n/a	n/a
2Q12	100.00%	553	1.75	3.2:1	n/a	n/a	n/a	809	16	300	n/a	n/a	n/a	n/a
3Q12	99.99%	567	2.00	3.5:1	n/a	n/a	n/a	559	16	280	n/a	n/a	n/a	n/a
4Q12	100.00%	474	2.25	4.7:1	n/a	n/a	n/a	617	16	260	n/a	n/a	n/a	n/a
1Q13	99.99%	508	2.50	4.9:1	n/a	n/a	n/a	607	16	690	n/a	n/a	n/a	n/a
2Q13	100.00%	575	2.50	4.3:1	n/a	n/a	n/a	744	16	590	n/a	n/a	1.02	n/a
3Q13	100.00%	458	2.75	6.0:1	116.2	275	2.4:1	547	16	400	n/a	n/a	0.65	n/a
4Q13	100.00%	516	3.00	5.8:1	120.7	300	2.5:1	634	16	400	n/a	n/a	0.65	n/a
1Q14	100.00%	565	n/a	n/a	121.1	300	2.5:1	710	16	450	n/a	n/a	0.90	n/a
2Q14	99.99%	559	n/a	n/a	131.7	300	2.3:1	833	16	440	n/a	n/a	0.76	n/a
3Q14	100.00%	476	n/a	n/a	121.1	325	2.7:1	596	16	450	n/a	n/a	0.88	n/a
4Q14	99.99%	517	n/a	n/a	141.8	325	2.3:1	1397	16	410	n/a	n/a	0.75	n/a
1Q15	100.00%	510	n/a	n/a	146.4	350	2.4:1	849	16	390	n/a	n/a	0.68	n/a
2Q15	100.00%	526	n/a	n/a	142.6	350	2.5:1	625	16	460	n/a	n/a	1.02	n/a
3Q15	100.00%	583	n/a	n/a	158.4	375	2.4:1	952	16	510	230	n/a	1.13	n/a
4Q15	99.99%	652	n/a	n/a	162.3	375	2.3:1	910	16	440	210	n/a	0.93	n/a
1Q16	100.00%	615	n/a	n/a	163.3	392	2.4:1	1338	16	490	220	150	1,080	3,890
2Q16	100.00%	618	n/a	n/a	168.4	400	2.4:1	1093	16	490	220	150	1,090	4,000
3Q16	100.00%	541	n/a	n/a	185.5	450	2.4:1	1027	16	470	210	150	970	3860
4Q16	99.99%	785	n/a	n/a	210.8	450	2.1:1	1150	16	260	80	60	280	1570
1Q17	100.00%	530	n/a	n/a	175.7	450	2.6:1	720	16	145	81	63	257	1097
2Q17	100.00%	543	n/a	n/a	189.2	450	2.4:1	676	16	150	82	63	281	1114
3Q17	100.00%	519	n/a	n/a	165.4	450	2.7:1	546	16	141	83	64	251	1020
4Q17	100.00%	527	n/a	n/a	187.2	450	2.4:1	782	16	121	87	70	164	722
1Q18	100.00%	691	n/a	n/a	182.6	450	2.5:1	1571	16	130	84	68	180	861
2Q18	100.00%	660	n/a	n/a	195.5	450	2.3:1	985	16	134	84	66	174	860
3Q18	100.00%	790	n/a	n/a	232.6	450	1.9:1	684	16	131	85	66	179	810
4Q18	100.00%	942	n/a	n/a	249.6	800	3.2:1	1755	16	97	60	49	100	371
1Q19	100.00%	853	n/a	n/a	265.1	800	3.0:1	1140	16	75	61	49	89	339
2Q19	100.00%	903	n/a	n/a	227.2	800	3.5:1	1043	16	69	61	49	83	240

Trade Feed (Tape A&B)														
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 Transactions Per Day (millions)	Capacity Transactions Per Day (millions)	Average Latency (3)	Median Latency (3)	10th Percentile Latency	90th Percentile Latency	99th Percentile Latency	
1Q10	100.00%	49.6	50	1.0:1	n/a	n/a	n/a	36.8	200	6,460	n/a	n/a	n/a	n/a
2Q10	99.99%	42.9	50	1.2:1	n/a	n/a	n/a	55.5	200	6,170	n/a	n/a	n/a	n/a
3Q10	99.99%	42.1	60	1.4:1	n/a	n/a	n/a	38.3	200	5,730	n/a	n/a	n/a	n/a
4Q10	99.99%	48.4	75	1.5:1	n/a	n/a	n/a	30.2	200	3,240	n/a	n/a	n/a	n/a
1Q11	100.00%	57.2	100	1.7:1	n/a	n/a	n/a	36.9	200	1,960	n/a	n/a	n/a	n/a
2Q11	99.99%	78.2	150	1.9:1	n/a	n/a	n/a	31.6	200	1,250	n/a	n/a	n/a	n/a
3Q11	100.00%	77.8	200	2.6:1	n/a	n/a	n/a	61.6	200	800	n/a	n/a	n/a	n/a
4Q11	100.00%	67.5	250	3.7:1	n/a	n/a	n/a	44.8	200	730	n/a	n/a	n/a	n/a
1Q12	100.00%	57.2	300	5.2:1	n/a	n/a	n/a	26.9	1000	580	n/a	n/a	n/a	n/a
2Q12	100.00%	80.7	350	4.3:1	n/a	n/a	n/a	25.9	1000	370	n/a	n/a	n/a	n/a
3Q12	99.99%	72.4	400	5.5:1	n/a	n/a	n/a	25.5	1000	360	n/a	n/a	n/a	n/a
4Q12	100.00%	59.5	450	7.6:1	n/a	n/a	n/a	22.8	1000	320	n/a	n/a	n/a	n/a
1Q13	100.00%	67.7	500	7.4:1	n/a	n/a	n/a	22.2	1000	480	n/a	n/a	n/a	n/a
2Q13	100.00%	68.7	500	7.3:1	n/a	n/a	n/a	27.9	1000	380	n/a	n/a	500	n/a
3Q13	100.00%	70.8	550	7.8:1	21.4	55	2.6:1	25.0	1000	380	n/a	n/a	540	n/a
4Q13	100.00%	91.1	600	6.6:1	20.6	60	2.9:1	30.4	1000	420	n/a	n/a	530	n/a
1Q14	100.00%	111.8	n/a	n/a	21.8	60	2.8:1	36.5	1000	510	n/a	n/a	710	n/a
2Q14	99.99%	98.7	n/a	n/a	23.5	60	2.6:1	30.0	1000	510	n/a	n/a	660	n/a
3Q14	100.00%	81.7	n/a	n/a	22.7	65	2.9:1	29.2	1000	510	n/a	n/a	660	n/a
4Q14	99.99%	109.7	n/a	n/a	24.2	65	2.7:1	49.6	1000	450	n/a	n/a	600	n/a
1Q15	100.00%	85.5	n/a	n/a	22.1	70	3.2:1	34.6	1000	450	n/a	n/a	590	n/a
2Q15	100.00%	111.6	n/a	n/a	31.8	70	2.2:1	31.6	1000	340	n/a	n/a	430	n/a
3Q15	100.00%	79.6	n/a	n/a	27.1	75	2.8:1	56.0	1000	320	240	n/a	410	n/a
4Q15	100.00%	128.1	n/a	n/a	43.7	75	1.7:1	38.0	1000	310	240	240	410	n/a
1Q16	100.00%	123.0	n/a	n/a	42.4	86	2.0:1	49.8	1000	330	250	160	430	1,730
2Q16	100.00%	91.9	n/a	n/a	37.4	96	2.6:1	45.6	1000	340	240	190	450	1,730
3Q16	100.00%	98.2	n/a	n/a	41.5	105	2.5:1	33.8	1000	320	240	200	440	1,650
4Q16	100.00%	94.3	n/a	n/a	38.7	105	2.7:1	49.3	1000	250	160	130	310	1,410
1Q17	100.00%	121.8	n/a	n/a	45.4	105	2.3:1	32.9	1000	167	115	83	218	1,023
2Q17	100.00%	98.2	n/a	n/a	51.0	105	2.1:1	32.4	1000	154	113	83	210	848
3Q17	100.00%	88.3	n/a	n/a	46.9	105	2.2:1	29.2	1000	144	113	83	199	708
4Q17	100.00%	67.6	n/a	n/a	39.6	105	2.7:1	38.5	1000	151	120	87	205	708
1Q18	100.00%	68.0	n/a	n/a	35.8	105	2.9:1	57.3	1000	147	119	87	198	662
2Q18	100.00%	77.3	n/a	n/a	35.8	105	2.9:1	40.2	1000	150	121	87	202	716
3Q18	100.00%	77.4	n/a	n/a	31.0	105	3.4:1	40.1	1000	150	122	85	206	648
4Q18	100.00%	91.9	n/a	n/a	39.8	105	2.6:1	55.3	1000	164	112	85	193	783
1Q19	100.00%	77.2	n/a	n/a	38.3	105	2.7:1	41.7	1000	147	102	77	198	823
2Q19	100.00%	98.4	n/a	n/a	43.8	105	2.4:1	49.8	1000	139	94	70	179	648

(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-milliseconds.

(3) Prior to 1Q13, latency was measured from the time a message received from a Participant was time-stamped by CTS/CQS, to the time that processing the message was completed.

Beginning 1Q13, 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.

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Quarter	Tape A							Tape B						
	Capped Nonprofessional Subscribers (Quarter-End)	Quote Usage (Total; Excludes Capped Subscribers)	Professional Subscribers (Quarter-End)	Households (Quarter-End)	Real-Time Internal Only Vendors (Quarter-End)	Real-Time External Vendors (Quarter-End)	Non-Display Vendors (Quarter-End)	Capped Nonprofessional Subscribers (Quarter-End)	Quote Usage (Total; Excludes Capped Subscribers)	Professional Subscribers (Quarter-End)	Households (Quarter-End)	Real-Time Internal Only Vendors (Quarter-End)	Real-Time External Vendors (Quarter-End)	Non-Display Vendors (Quarter-End)
1Q14	2,739,647	756,230,895	289,620	143,163,057	610	229	NA	1,421,106	220,142,165	215,145	53,256,000	482	200	NA
2Q14	2,566,637	695,548,296	282,755	145,377,725	614	224	NA	1,328,856	207,952,904	201,484	53,256,000	485	194	NA
3Q14	2,633,128	651,198,510	280,930	146,407,373	579	228	NA	1,355,551	212,561,368	199,681	53,256,000	451	195	NA
4Q14	2,669,941	672,153,175	280,218	145,776,063	563	231	NA	1,404,440	222,534,074	200,863	53,256,000	441	198	NA
1Q15	2,805,328	692,353,682	276,423	146,348,088	540	235	322	1,430,084	221,928,854	198,983	53,256,000	424	203	287
2Q15	2,695,514	639,698,333	268,472	150,706,873	519	232	328	1,399,034	193,106,875	193,877	53,256,000	405	199	285
3Q15	2,857,731	633,815,292	268,353	149,670,412	485	236	319	1,529,488	195,882,562	194,337	53,256,000	386	203	279
4Q15	2,593,460	641,075,577	270,380	149,157,480	477	236	317	1,389,834	214,879,531	207,350	53,256,000	371	205	277
1Q16	2,679,609	594,340,199	269,531	148,992,420	475	231	334	1,491,437	202,405,541	212,296	53,256,000	370	202	295
2Q16	2,731,832	620,868,669	283,033	150,359,705	476	231	338	1,528,320	210,715,719	227,579	53,256,000	374	203	299
3Q16	2,743,666	570,054,780	279,944	151,550,218	461	231	336	1,563,712	208,675,439	225,768	53,256,000	359	202	299
4Q16	2,691,960	515,179,425	277,443	149,042,548	457	235	329	1,567,124	183,453,430	224,582	53,256,000	349	204	294
1Q17	2,854,682	555,582,000	275,731	148,861,020	451	236	340	1,626,279	194,242,580	224,113	53,256,000	344	207	312
2Q17	2,725,430	551,150,194	277,423	150,074,827	449	232	337	1,544,540	187,310,259	225,773	53,256,000	345	203	309
3Q17	2,835,253	531,842,562	274,815	149,179,250	438	229	329	1,538,015	171,266,036	225,438	53,256,000	344	201	306
4Q17	3,042,936	554,593,781	275,319	144,061,866	427	230	322	1,718,697	157,995,482	227,378	53,256,000	339	201	301
1Q18	3,437,857	603,274,895	279,077	144,208,928	417	226	321	2,185,231	187,006,736	232,829	53,256,000	326	198	296
2Q18	3,273,808	541,346,119	278,911	145,401,019	414	227	325	2,019,033	180,043,162	230,661	53,256,000	325	199	301
3Q18	3,426,928	538,195,852	290,445	145,699,598	421	241	324	2,095,223	173,926,250	237,162	53,256,000	374	215	301
4Q18	3,282,898	564,981,867	292,357	144,984,473	415	242	322	1,916,189	187,130,393	238,779	53,256,000	372	217	301
1Q19	3,415,127	578,808,380	292,428	144,425,174	406	239	325	1,972,961	189,438,285	238,954	53,256,000	358	218	300
2Q19	3,420,512	655,249,679	291,584	142,418,225	398	238	319	1,934,856	194,295,888	239,031	75,638,000	358	216	298

Definitions

- (1) **Capped Nonprofessional Subscribers** includes data usage by those defined pursuant to the Nonprofessional Subscriber Policy paying the flat per subscriber rate. Includes Nonprofessionals paying on a per-quote basis that are capped at \$1.00/month.
- (2) **Quote Usage** includes data usage for those professionals that choose to report on a per-quote-packet basis as well as Nonprofessionals that are not capped at \$1.00/month.
- (3) **Professional Subscribers** are deemed to be those that do not meet the criteria defined pursuant to the Nonprofessional Subscriber Policy paying on a per device basis.
- (4) **Households** provides an estimate of households reached based on vendor reporting of television broadcast data.
- (5) **Real-Time Internal Only Vendors** are datafeed recipients that only use the data internally.
- (6) **Real-Time External Vendors** are datafeed recipients that redistribute data outside their firms, as well as any applicable internal use.
- (7) **Non-Display Vendors** are datafeed recipients that use the data for non-display, as well as any other applicable use.
- (8) **NA** means 'Not Applicable' as the metrics were not available for this time period.
- (9) Effective September 1, 2013, Tape B Pro Devices include Bid Ask and Last Sale Services.