

Key Operating Metrics of U.S. Options Securities Information Processor (OPRA SIP)

	System Availability (1)	Peak Messages Per Second (millions)	Capacity Messages Per Second (millions)	Capacity vs Peak Ratio	Peak Messages Per 100 Milliseconds (millions) (2)	Capacity Messages Per 100 Milliseconds (millions)	Capacity vs Peak Ratio	Peak Transactions Per Day (billions)	Capacity Transactions Per Day (billions)	Average Latency (us) (3)	Median Latency (us)	10th Percentile Latency (us)	90th Percentile Latency (us)	99th Percentile Latency (us)
1Q10	100.00%	1.4	3.2	2.3:1	n/a	n/a	n/a	3.9	24	2,190	n/a	n/a	n/a	n/a
2Q10	100.00%	1.7	3.2	1.9:1	n/a	n/a	n/a	6.3	24	2,080	n/a	n/a	n/a	n/a
3Q10	100.00%	2.0	4.2	2.1:1	n/a	n/a	n/a	5.1	24	1,250	n/a	n/a	n/a	n/a
4Q10	100.00%	2.2	4.2	2.0:1	n/a	n/a	n/a	4.5	24	1,320	n/a	n/a	n/a	n/a
1Q11	99.99%	2.6	6.0	2.3:1	n/a	n/a	n/a	8.0	24	960	n/a	n/a	n/a	n/a
2Q11	100.00%	3.7	6.0	1.6:1	n/a	n/a	n/a	7.1	48	760	n/a	n/a	n/a	n/a
3Q11	100.00%	3.9	6.0	1.5:1	n/a	n/a	n/a	14.6	48	720	n/a	n/a	n/a	n/a
4Q11	100.00%	3.9	7.0	1.8:1	n/a	n/a	n/a	11.2	48	610	n/a	n/a	n/a	n/a
1Q12	99.99%	4.6	10.5	2.3:1	n/a	n/a	n/a	5.2	48	470	n/a	n/a	n/a	n/a
2Q12	100.00%	4.6	10.5	2.3:1	n/a	n/a	n/a	6.2	48	400	n/a	n/a	n/a	n/a
3Q12	100.00%	4.6	12.0	2.6:1	n/a	n/a	n/a	5.6	48	370	n/a	n/a	n/a	n/a
4Q12	100.00%	5.0	12.0	2.4:1	n/a	n/a	n/a	7.6	48	340	n/a	n/a	n/a	n/a
1Q13	100.00%	6.8	15.0	2.2:1	n/a	n/a	n/a	7.1	48	820	n/a	n/a	n/a	n/a
2Q13	100.00%	6.8	15.0	2.2:1	n/a	n/a	n/a	11.1	48	830	n/a	n/a	1,800	n/a
3Q13	99.96%	6.8	15.0	2.2:1	0.9	1.5	1.6:1	8.5	48	850	n/a	n/a	1,800	n/a
4Q13	100.00%	6.8	21.0	3.1:1	1.0	3.2	3.1:1	11.2	48	850	n/a	n/a	1,800	n/a
1Q14	100.00%	7.5	n/a	n/a	1.2	3.2	2.7:1	12.0	75	780	n/a	n/a	1,700	n/a
2Q14	100.00%	7.9	n/a	n/a	1.3	3.2	2.5:1	13.9	100	550	n/a	n/a	1,200	n/a
3Q14	100.00%	7.9	n/a	n/a	1.4	5.0	3.6:1	9.9	100	510	n/a	n/a	1,200	n/a
4Q14	99.98%	9.6	n/a	n/a	1.6	5.5	3.4:1	15.2	100	400	n/a	n/a	750	n/a
1Q15	100.00%	10.2	n/a	n/a	1.6	5.5	3.4:1	11.0	100	350	n/a	n/a	600	n/a
2Q15	100.00%	8.7	n/a	n/a	1.6	5.5	3.4:1	10.1	100	370	n/a	n/a	620	n/a
3Q15	100.00%	9.8	n/a	n/a	1.7	5.5	3.2:1	18.0	100	410	210	n/a	700	n/a
4Q15	99.99%	9.9	n/a	n/a	1.9	5.5	2.9:1	15.3	100	390	200	n/a	640	n/a
1Q16	99.99%	11.1	n/a	n/a	2.3	6.0	2.6:1	23.1	100	400	150	110	590	4,440
2Q16	99.99%	11.3	n/a	n/a	2.2	6.5	3.0:1	14.7	150	110	60	50	130	870
3Q16	100.00%	10.4	n/a	n/a	3.1	7.3	2.4:1	15.0	200	110	60	50	120	700
4Q16	100.00%	14.5	n/a	n/a	2.8	7.3	2.6:1	17.7	200	100	50	40	120	670
1Q17	100.00%	10.5	n/a	n/a	2.9	7.3	2.5:1	11.4	200	84	53	41	113	659
2Q17	100.00%	11.0	n/a	n/a	2.2	8.5	3.9:1	16.4	200	72	42	32	94	610
3Q17	100.00%	12.9	n/a	n/a	2.3	8.5	3.7:1	15.4	200	80	40	30	100	890
4Q17	100.00%	10.9	n/a	n/a	2.3	8.5	3.6:1	13.9	200	78	40	30	104	729
1Q18	100.00%	13.5	n/a	n/a	2.8	8.5	3.0:1	30.6	200	91	44	31	120	918
2Q18	100.00%	13.0	n/a	n/a	2.7	8.5	3.2:1	27.5	200	93	42	31	115	953
3Q18	100.00%	18.0	n/a	n/a	3.3	8.5	2.6:1	24.4	200	145	42	30	115	2,556
4Q18	100.00%	19.8	n/a	n/a	4.2	8.5	2.0:1	45.9	200	110	41	29	103	1,653
1Q19	99.97%	18.0	n/a	n/a	3.4	8.5	2.5:1	41.7	200	136	41	29	113	2,311
2Q19	99.99%	21.8	n/a	n/a	4.2	8.5	2.0:1	45.9	200	153	42	29	121	2,773

(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 OPRA, 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 OPRA environment, OPRA 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.