

Overall Times

	label	TPCH wall time	TPC-DS wall time	TPCH CPU time	TPC-DS CPU time	TPCH Network GB	TPC-DS Network GB	TPCH peak mem	TPC-DS peak mem	TPCH wall time % change	TPC-DS wall time % change	TPCH CPU time % change	TPC-DS CPU time % change	TPCH Network GB % change	TPC-DS Network GB % change	TPCH peak mem % change	TPC-DS peak mem % change
0	baseline	602	1,041	68,409	118,662	2,289	1,917	1,802,289,529	1,093,653,809	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	paa union over poo rle	556	1,017	63,580	115,880	1,992	1,854	1,797,136,037	1,091,261,801	-7.68	-2.35	-7.06	-2.34	-12.95	-3.29	-0.29	-0.22
2	paa union	566	1,037	66,114	119,342	2,009	1,855	1,812,087,935	1,095,027,110	-6.08	-0.43	-3.35	0.57	-12.21	-3.22	0.54	0.13

FAILED QUERIES

baseline

benchmark	query	mean_duration	std_dev
-----------	-------	---------------	---------

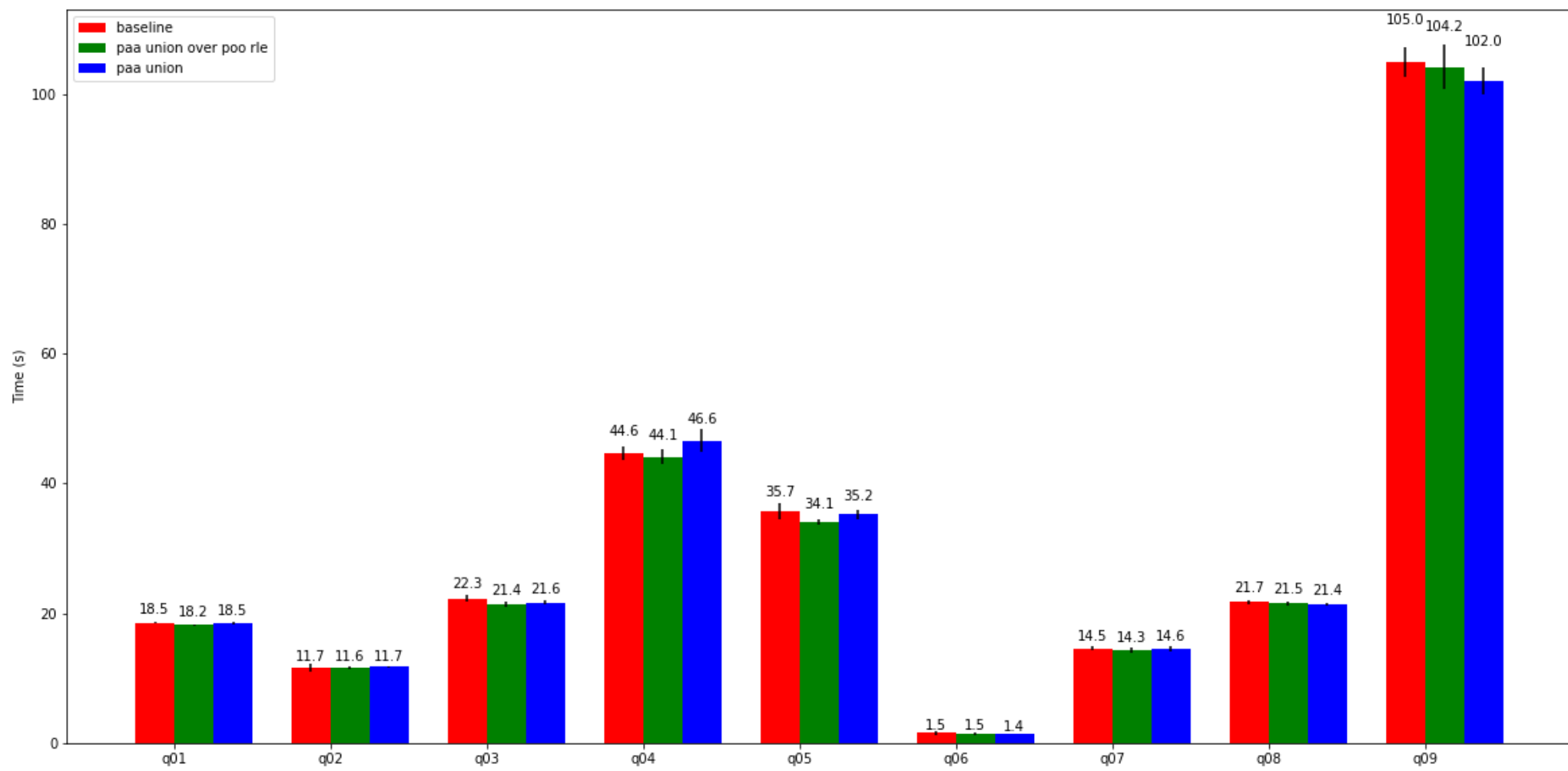
paa union over poo rle

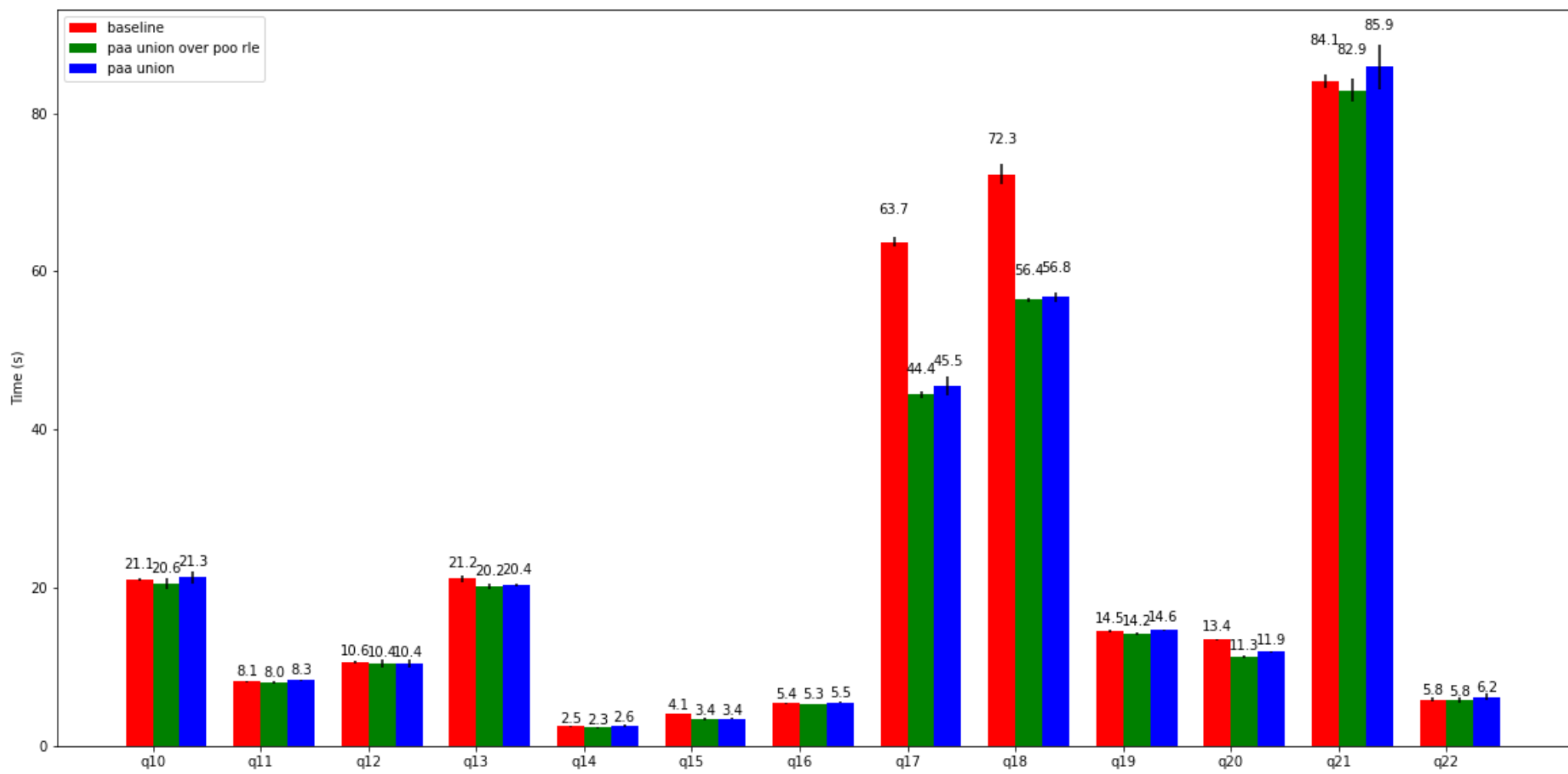
benchmark	query	mean_duration	std_dev
-----------	-------	---------------	---------

paa union

benchmark	query	mean_duration	std_dev
-----------	-------	---------------	---------

TPC-H Comparison (DURATION)





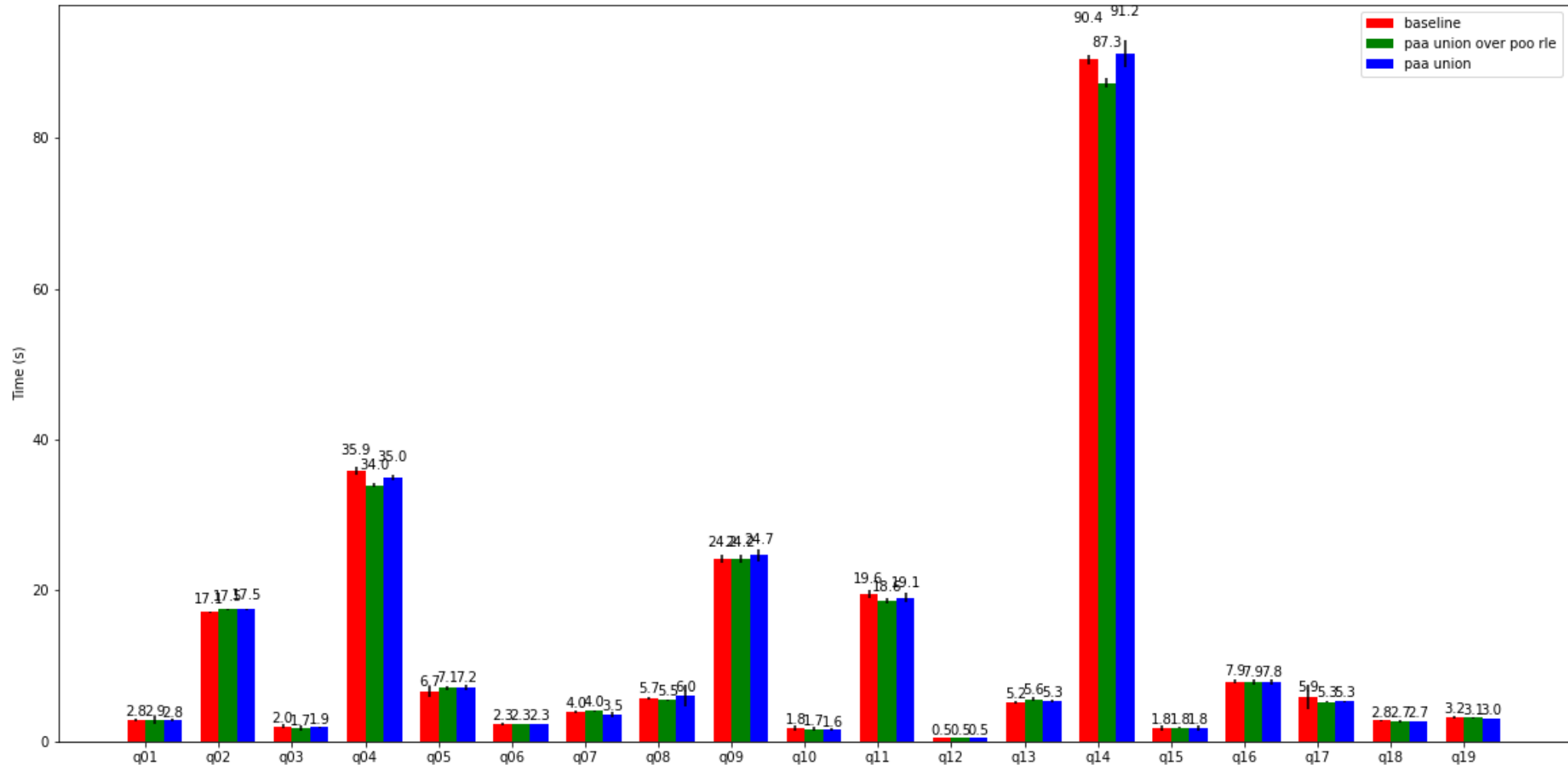
	query	baseline mean	baseline std.dev	paa union over poo rle mean	paa union over poo rle std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
16	presto/tpch: q17	63.71	0.57	44.41	0.38	45.50	1.13	-30.30	-28.58	0.90	0.85	2.49	0.00000
17	presto/tpch: q18	72.26	1.29	56.43	0.25	56.76	0.64	-21.91	-21.44	1.78	0.45	1.12	0.00000
14	presto/tpch: q15	4.05	0.06	3.38	0.12	3.41	0.09	-16.58	-15.72	1.45	3.44	2.61	0.00000
19	presto/tpch: q20	13.44	0.11	11.28	0.19	11.87	0.16	-16.11	-11.72	0.81	1.72	1.36	0.00000
13	presto/tpch: q14	2.48	0.12	2.33	0.09	2.55	0.12	-6.26	2.86	4.92	3.76	4.79	0.02968

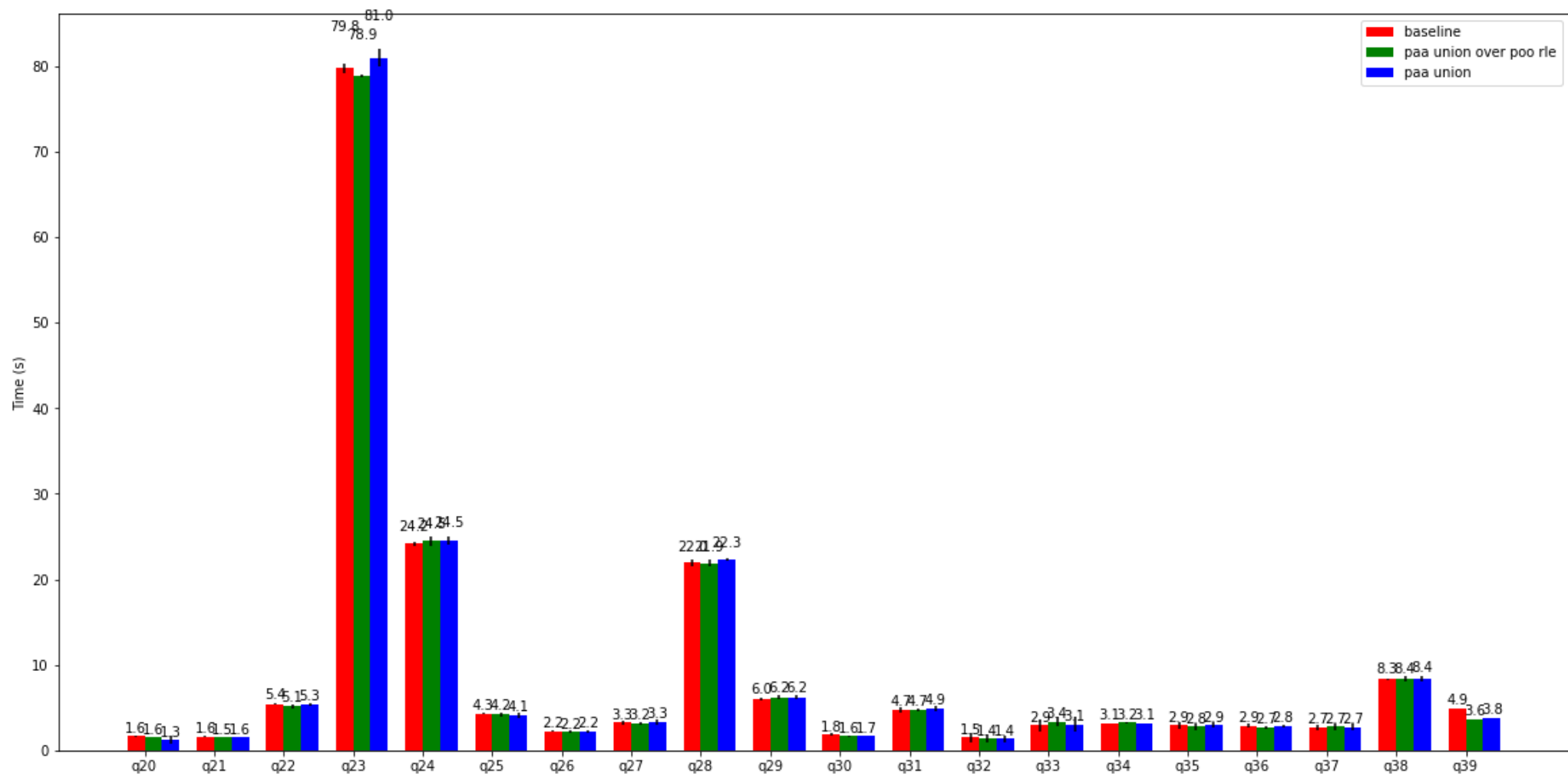

```

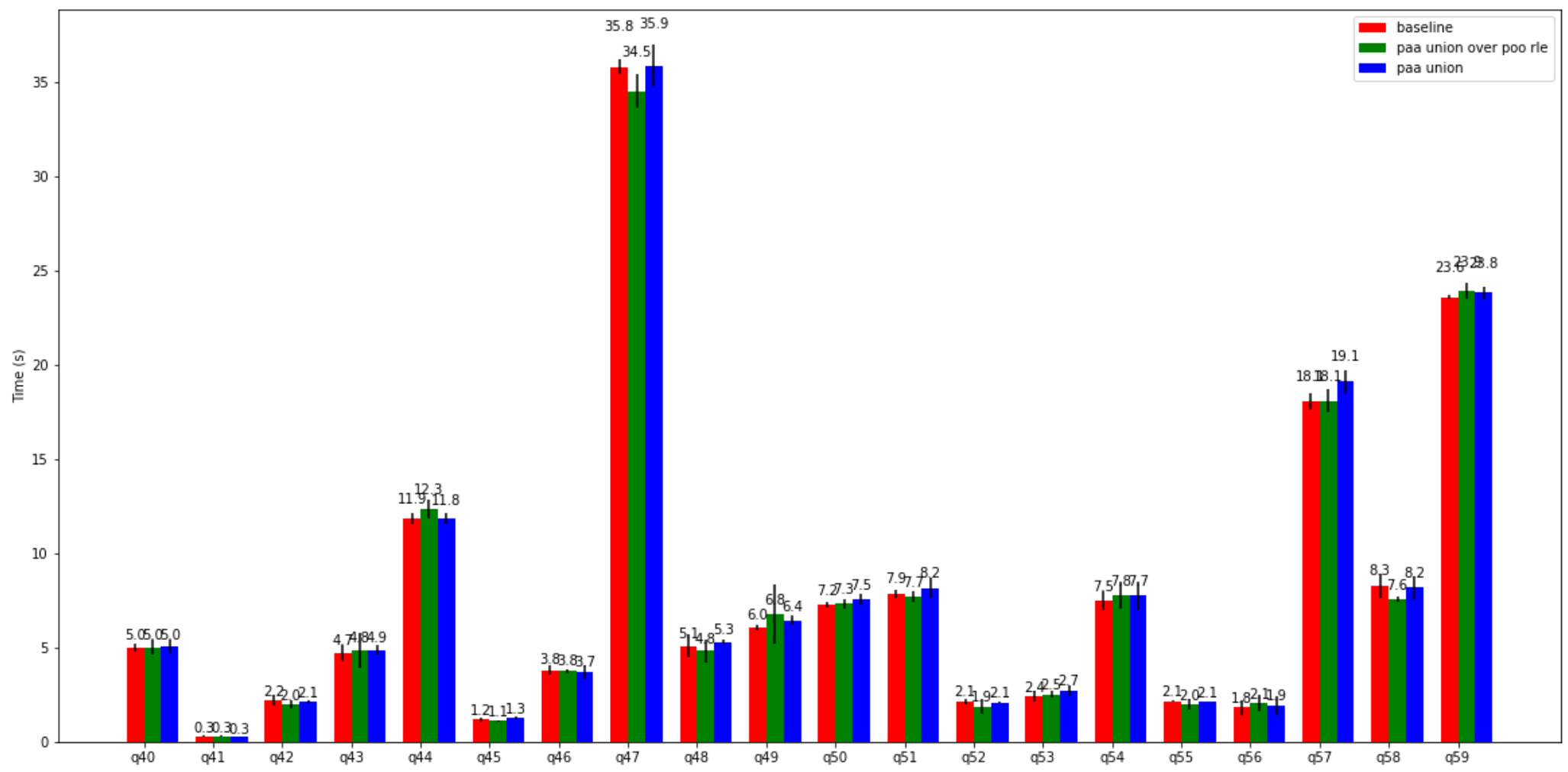
75%      -1
max       -1
Name: % change, dtype: float64
count     22
mean      -3
std        9
min       -29
25%       -4
50%       -1
75%        2
max        6
Name: % change base -> paa union, dtype: float64

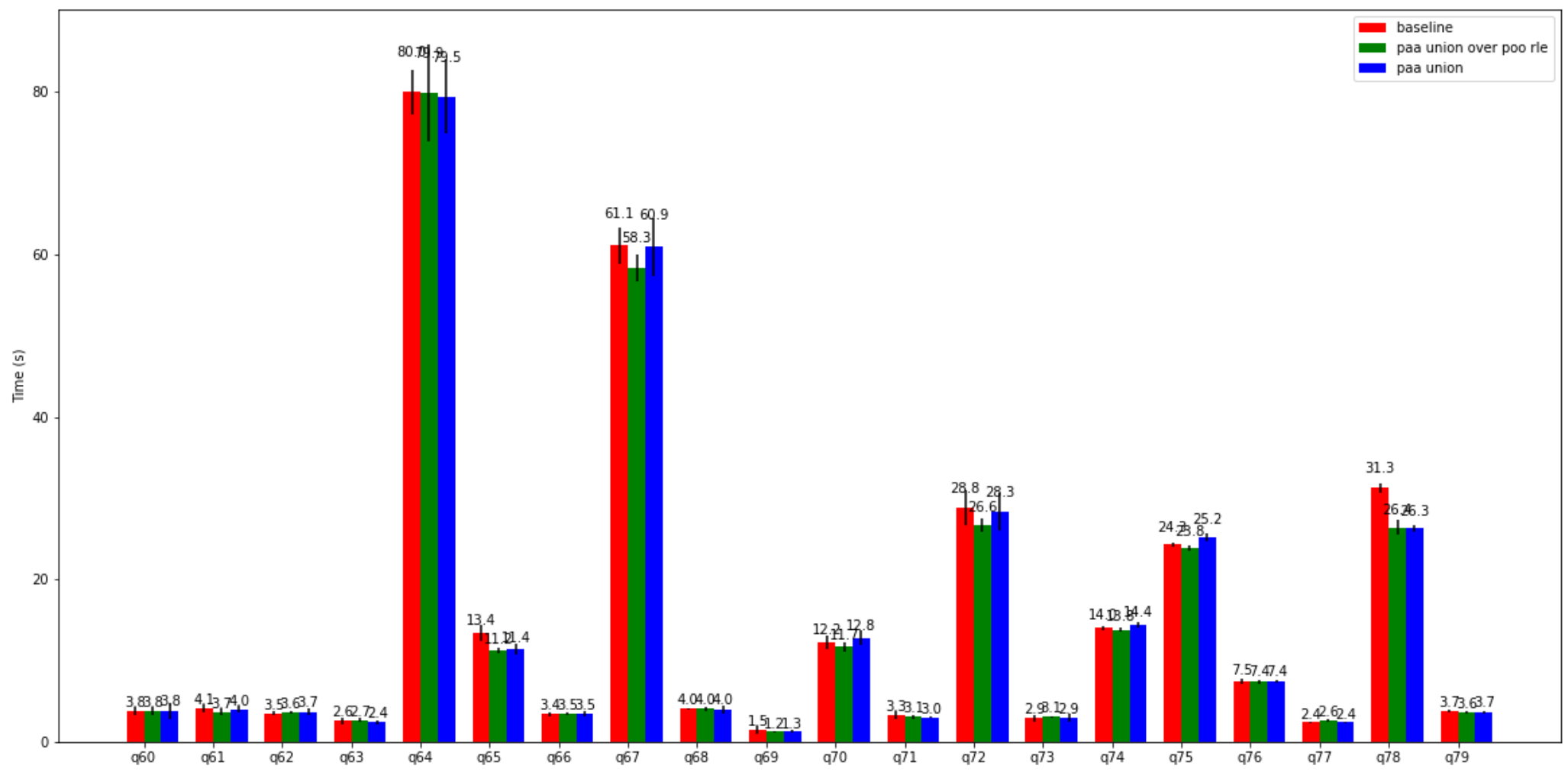
```

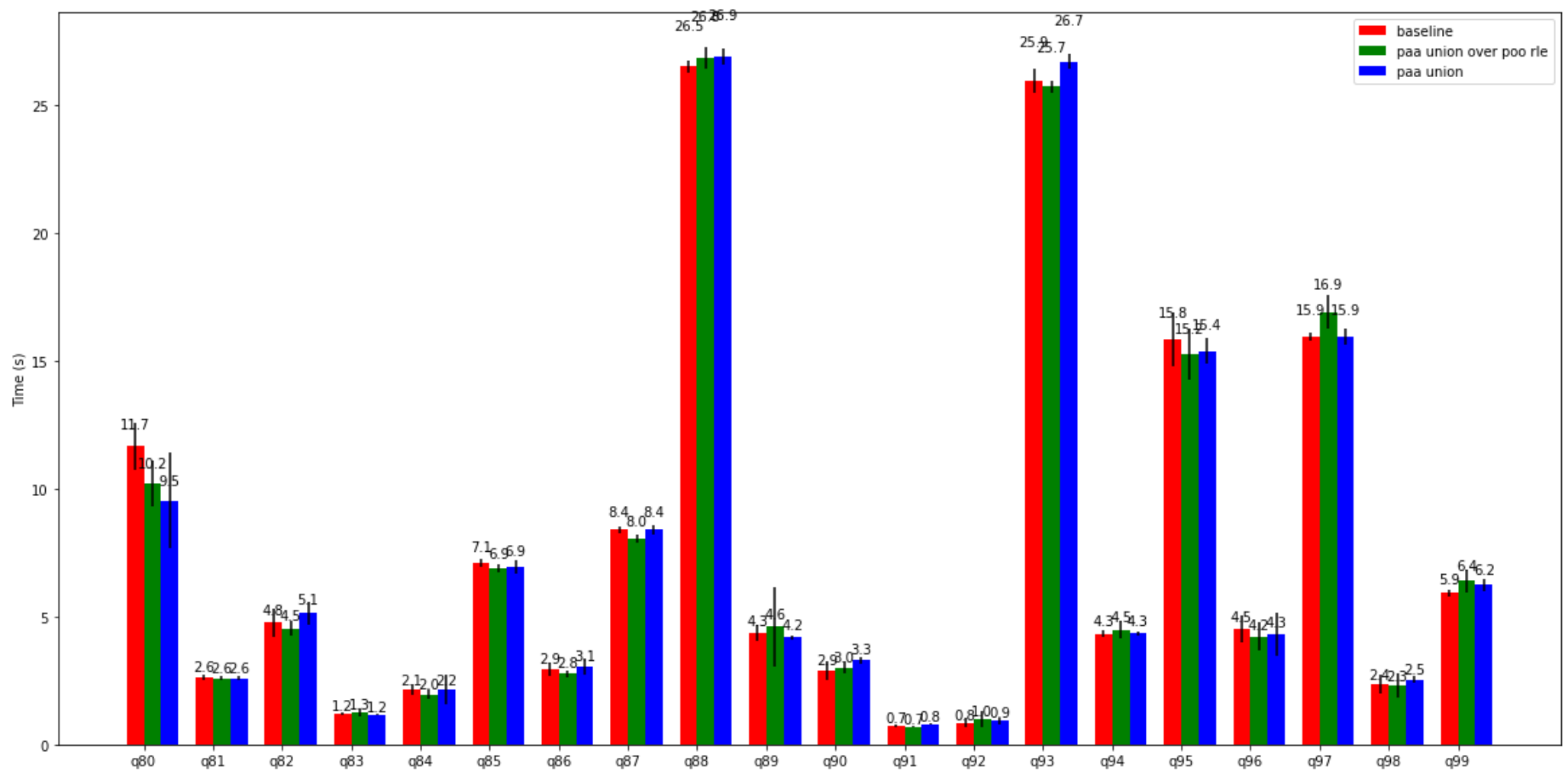
TPC-DS Comparison (DURATION)

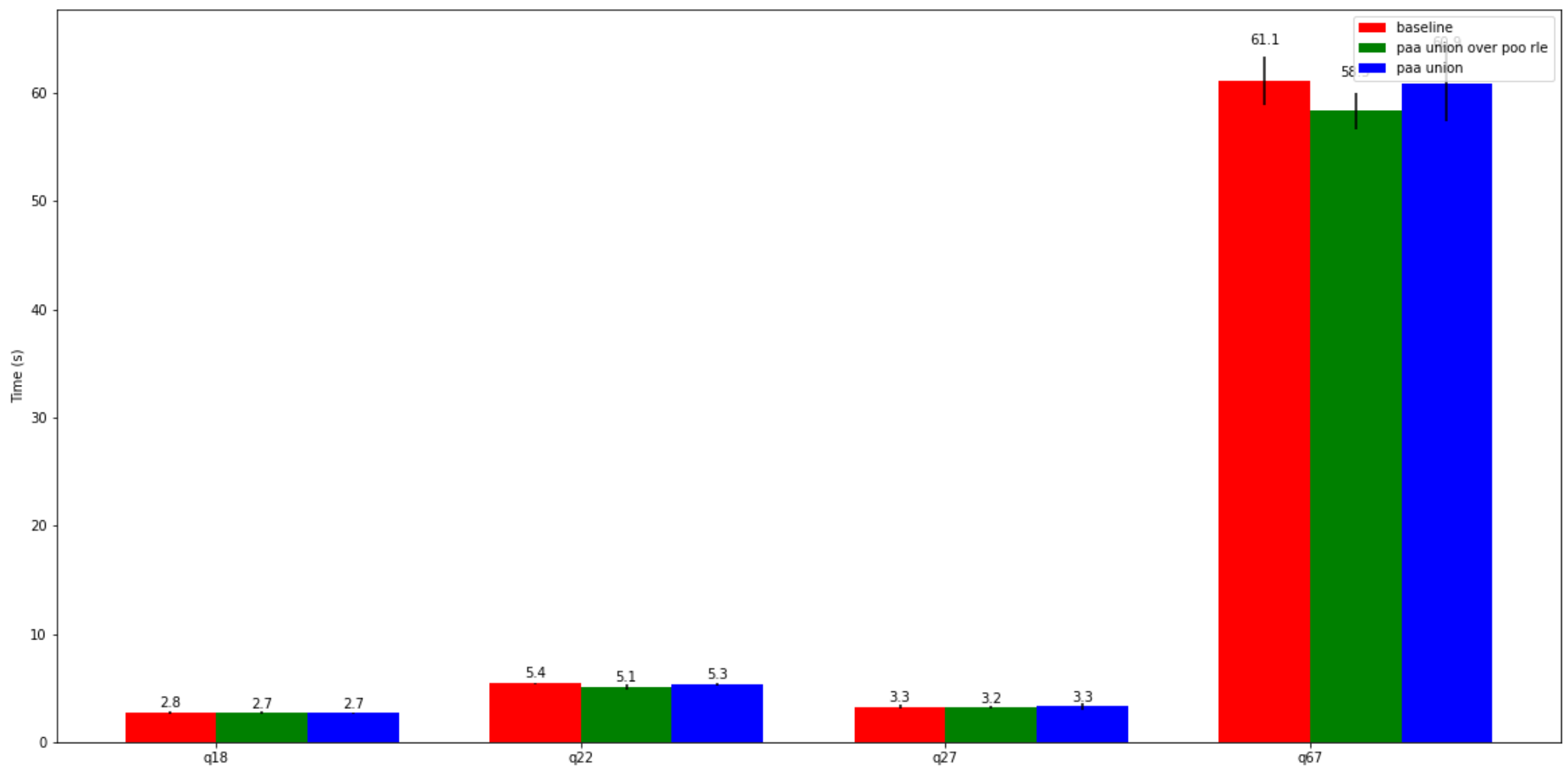












	query	baseline mean	baseline std.dev	paa union over poo rle mean	paa union over poo rle std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
38	presto/tpcds: q39	4.91	0.04	3.59	0.04	3.78	0.03	-26.88	-22.97	0.75	1.10	0.85	0.00000
68	presto/tpcds: q69	1.47	0.55	1.23	0.06	1.29	0.14	-16.19	-12.07	37.57	5.08	10.86	0.31877
64	presto/tpcds: q65	13.37	0.99	11.23	0.39	11.40	0.69	-16.00	-14.74	7.41	3.50	6.01	0.00061
77	presto/tpcds: q78	31.28	0.55	26.38	0.93	26.26	0.46	-15.66	-16.03	1.76	3.52	1.76	0.00000
51	presto/tpcds: q52	2.15	0.14	1.87	0.40	2.08	0.04	-12.67	-2.87	6.51	21.15	1.81	0.14403

	query	baseline mean	baseline std.dev	paa union over poo rle mean	paa union over poo rle std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
79	presto/tpcds:q80	11.65	0.90	10.19	0.91	9.54	1.87	-12.54	-18.16	7.74	8.91	19.57	0.01888
2	presto/tpcds:q03	1.99	0.27	1.74	0.29	1.88	0.03	-12.33	-5.56	13.52	16.57	1.66	0.15905
41	presto/tpcds:q42	2.19	0.31	1.96	0.22	2.11	0.07	-10.55	-3.84	14.12	10.98	3.10	0.16383
16	presto/tpcds:q17	5.87	1.62	5.26	0.15	5.29	0.10	-10.43	-9.86	27.60	2.88	1.97	0.37862
29	presto/tpcds:q30	1.82	0.18	1.64	0.05	1.70	0.05	-10.00	-6.61	9.66	2.83	2.98	0.03410
60	presto/tpcds:q61	4.08	0.52	3.68	0.47	3.96	0.42	-9.86	-2.97	12.63	12.79	10.61	0.18803
31	presto/tpcds:q32	1.53	0.55	1.39	0.46	1.38	0.41	-9.22	-9.85	35.74	32.86	29.84	0.63788
57	presto/tpcds:q58	8.29	0.65	7.56	0.15	8.18	0.62	-8.84	-1.37	7.79	1.95	7.63	0.02195
90	presto/tpcds:q91	0.74	0.05	0.68	0.02	0.80	0.04	-8.19	7.96	6.13	3.34	5.39	0.01517
9	presto/tpcds:q10	1.82	0.37	1.67	0.33	1.58	0.19	-8.18	-12.97	20.62	20.05	12.30	0.48513
83	presto/tpcds:q84	2.13	0.21	1.96	0.17	2.15	0.56	-7.89	1.14	9.90	8.89	26.08	0.16360
71	presto/tpcds:q72	28.83	2.12	26.64	0.88	28.32	2.31	-7.58	-1.75	7.36	3.31	8.16	0.04202
11	presto/tpcds:q12	0.53	0.03	0.49	0.03	0.50	0.02	-7.54	-5.74	5.39	6.25	4.61	0.04141
54	presto/tpcds:q55	2.14	0.04	1.99	0.26	2.11	0.02	-7.41	-1.52	1.79	13.09	0.88	0.16899
95	presto/tpcds:q96	4.51	0.50	4.21	0.54	4.31	0.83	-6.67	-4.43	11.12	12.83	19.33	0.34089
85	presto/tpcds:q86	2.95	0.27	2.76	0.12	3.05	0.32	-6.26	3.57	9.24	4.48	10.46	0.16174
70	presto/tpcds:q71	3.31	0.48	3.11	0.26	3.01	0.03	-6.17	-9.01	14.51	8.23	0.86	0.37952
35	presto/tpcds:q36	2.86	0.26	2.68	0.11	2.80	0.10	-6.12	-1.89	9.02	3.96	3.60	0.15548
44	presto/tpcds:q45	1.19	0.11	1.12	0.04	1.25	0.07	-5.70	5.45	9.36	3.14	5.30	0.18541

	query	baseline mean	baseline std.dev	paa union over pooler mean	paa union over pooler std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline std.dev %	paa union over pooler std.dev %	paa union std.dev %	p-value
3	presto/tpcds:q04	35.93	0.52	33.98	0.26	34.96	0.42	-5.42	-2.71	1.44	0.76	1.21	0.00001
47	presto/tpcds:q48	5.08	0.59	4.81	0.59	5.30	0.11	-5.28	4.32	11.66	12.30	2.13	0.45082
21	presto/tpcds:q22	5.40	0.09	5.12	0.25	5.31	0.16	-5.19	-1.61	1.73	4.81	2.99	0.02620
20	presto/tpcds:q21	1.61	0.02	1.53	0.01	1.59	0.03	-5.15	-1.35	1.22	0.82	1.83	0.00001
10	presto/tpcds:q11	19.57	0.51	18.58	0.35	19.06	0.60	-5.05	-2.58	2.60	1.91	3.14	0.00295
34	presto/tpcds:q35	2.90	0.39	2.76	0.41	2.94	0.33	-4.96	1.18	13.31	14.71	11.30	0.54337
81	presto/tpcds:q82	4.76	0.56	4.53	0.30	5.14	0.45	-4.93	7.93	11.74	6.68	8.66	0.38744
66	presto/tpcds:q67	61.12	2.26	58.33	1.71	60.93	3.55	-4.58	-0.32	3.69	2.93	5.82	0.03594
86	presto/tpcds:q87	8.39	0.12	8.03	0.16	8.38	0.17	-4.37	-0.12	1.47	1.95	2.03	0.00112
69	presto/tpcds:q70	12.23	0.83	11.72	0.57	12.79	0.92	-4.18	4.51	6.75	4.90	7.18	0.24201
7	presto/tpcds:q08	5.73	0.22	5.49	0.11	6.03	1.43	-4.15	5.35	3.88	2.04	23.71	0.04149
19	presto/tpcds:q20	1.65	0.03	1.59	0.03	1.27	0.46	-3.70	-23.21	2.08	1.97	36.43	0.00918
94	presto/tpcds:q95	15.82	1.06	15.24	1.00	15.37	0.49	-3.66	-2.86	6.70	6.56	3.22	0.35306
18	presto/tpcds:q19	3.23	0.20	3.11	0.12	3.04	0.02	-3.57	-5.83	6.08	3.70	0.75	0.24287
46	presto/tpcds:q47	35.76	0.39	34.49	0.88	35.86	1.11	-3.57	0.27	1.10	2.55	3.09	0.00888
13	presto/tpcds:q14	90.40	0.69	87.28	0.65	91.22	1.75	-3.45	0.91	0.76	0.75	1.91	0.00001
84	presto/tpcds:q85	7.09	0.15	6.87	0.16	6.94	0.26	-3.01	-1.99	2.06	2.28	3.81	0.03482
97	presto/tpcds:q98	2.35	0.39	2.29	0.47	2.53	0.14	-2.70	7.69	16.40	20.51	5.58	0.80323
17	presto/tpcds:q18	2.76	0.13	2.70	0.13	2.68	0.06	-2.34	-3.04	4.82	4.95	2.41	0.41982

	query	baseline mean	baseline std.dev	paa union over poo rle mean	paa union over poo rle std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
78	presto/tpcds:q79	3.72	0.14	3.64	0.16	3.68	0.16	-2.14	-1.06	3.89	4.45	4.37	0.39089
25	presto/tpcds:q26	2.21	0.08	2.17	0.20	2.20	0.20	-2.06	-0.47	3.46	9.41	9.31	0.61868
50	presto/tpcds:q51	7.86	0.20	7.70	0.28	8.16	0.52	-2.00	3.78	2.54	3.65	6.37	0.29098
74	presto/tpcds:q75	24.29	0.20	23.81	0.37	25.17	0.43	-1.98	3.62	0.82	1.55	1.72	0.01855
26	presto/tpcds:q27	3.25	0.21	3.19	0.14	3.28	0.30	-1.88	0.71	6.36	4.49	9.04	0.56583
73	presto/tpcds:q74	14.01	0.27	13.79	0.27	14.36	0.29	-1.56	2.52	1.89	1.94	2.04	0.18481
24	presto/tpcds:q25	4.25	0.08	4.20	0.21	4.11	0.35	-1.23	-3.36	1.96	5.08	8.53	0.58821
75	presto/tpcds:q76	7.49	0.31	7.40	0.23	7.39	0.21	-1.17	-1.23	4.10	3.04	2.85	0.58568
22	presto/tpcds:q23	79.75	0.51	78.86	0.21	81.00	1.02	-1.12	1.56	0.64	0.27	1.26	0.00268
45	presto/tpcds:q46	3.79	0.25	3.75	0.12	3.69	0.34	-1.08	-2.69	6.65	3.24	9.10	0.72739
40	presto/tpcds:q41	0.30	0.01	0.30	0.02	0.28	0.01	-1.05	-7.49	2.42	6.55	2.96	0.71845
80	presto/tpcds:q81	2.61	0.12	2.59	0.08	2.59	0.09	-0.83	-0.73	4.70	2.95	3.52	0.72160
92	presto/tpcds:q93	25.92	0.47	25.71	0.23	26.68	0.29	-0.81	2.97	1.82	0.90	1.07	0.35060
15	presto/tpcds:q16	7.93	0.31	7.89	0.30	7.81	0.37	-0.45	-1.43	3.96	3.81	4.72	0.84399
67	presto/tpcds:q68	4.05	0.07	4.03	0.18	4.01	0.49	-0.30	-0.89	1.64	4.44	12.14	0.88074
27	presto/tpcds:q28	21.96	0.41	21.90	0.36	22.28	0.15	-0.26	1.48	1.87	1.63	0.66	0.79889
5	presto/tpcds:q06	2.29	0.13	2.28	0.06	2.31	0.03	-0.24	1.06	5.67	2.66	1.51	0.92684
8	presto/tpcds:q09	24.24	0.59	24.20	0.49	24.68	0.83	-0.15	1.80	2.42	2.01	3.37	0.90767
63	presto/tpcds:q64	80.02	2.78	79.91	5.95	79.45	4.60	-0.14	-0.71	3.47	7.45	5.79	0.96803

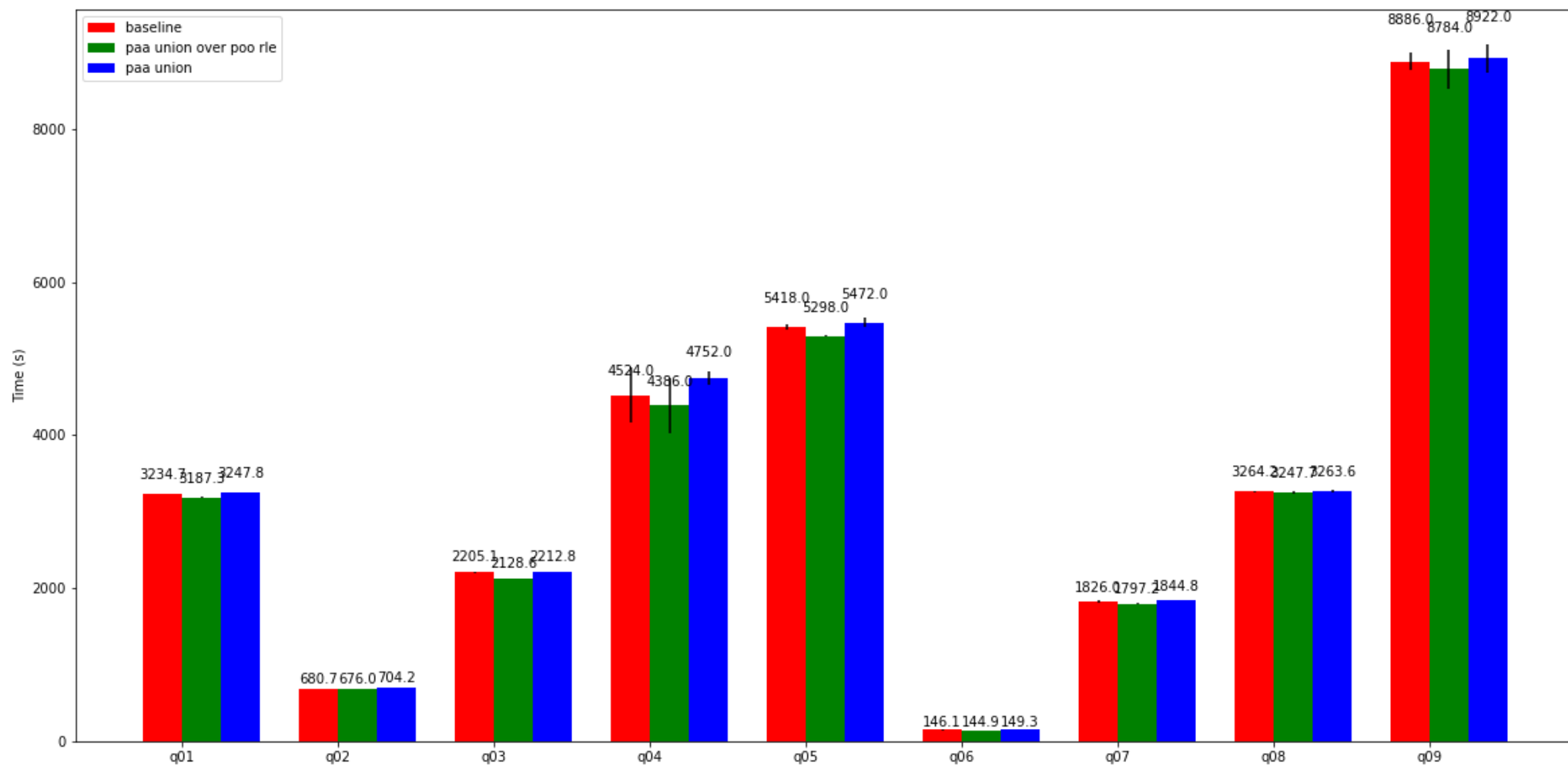
	query	baseline mean	baseline std.dev	paa union over poo rle mean	paa union over poo rle std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
30	presto/tpcds:q31	4.72	0.30	4.71	0.21	4.89	0.32	-0.12	3.62	6.25	4.42	6.44	0.96924
56	presto/tpcds:q57	18.05	0.44	18.08	0.58	19.10	0.60	0.16	5.82	2.43	3.22	3.13	0.92689
39	presto/tpcds:q40	4.99	0.20	5.01	0.40	5.03	0.35	0.39	0.70	3.93	8.00	6.99	0.91754
37	presto/tpcds:q38	8.30	0.12	8.36	0.37	8.42	0.30	0.66	1.42	1.40	4.41	3.61	0.73631
49	presto/tpcds:q50	7.25	0.15	7.31	0.26	7.54	0.27	0.89	4.09	2.11	3.61	3.57	0.61736
87	presto/tpcds:q88	26.50	0.23	26.83	0.41	26.89	0.30	1.25	1.44	0.88	1.53	1.12	0.11654
59	presto/tpcds:q60	3.75	0.52	3.80	0.44	3.84	0.98	1.25	2.43	13.81	11.69	25.43	0.86933
58	presto/tpcds:q59	23.57	0.12	23.87	0.42	23.80	0.32	1.29	0.99	0.50	1.77	1.33	0.12009
23	presto/tpcds:q24	24.16	0.27	24.48	0.54	24.54	0.52	1.31	1.56	1.11	2.22	2.12	0.22859
14	presto/tpcds:q15	1.82	0.34	1.84	0.05	1.77	0.30	1.61	-2.36	18.95	2.80	17.20	0.84143
65	presto/tpcds:q66	3.42	0.22	3.48	0.21	3.48	0.30	1.82	1.96	6.57	5.91	8.56	0.62689
6	presto/tpcds:q07	3.95	0.23	4.03	0.13	3.53	0.36	1.93	-10.64	5.83	3.32	10.30	0.49930
1	presto/tpcds:q02	17.13	0.05	17.49	0.03	17.51	0.11	2.07	2.24	0.30	0.19	0.61	0.00000
28	presto/tpcds:q29	6.03	0.14	6.18	0.24	6.20	0.23	2.49	2.90	2.33	3.87	3.72	0.21442
42	presto/tpcds:q43	4.72	0.41	4.85	0.94	4.87	0.26	2.79	3.25	8.73	19.41	5.43	0.75997
36	presto/tpcds:q37	2.67	0.25	2.74	0.35	2.69	0.38	2.79	0.76	9.43	12.84	14.06	0.68223
33	presto/tpcds:q34	3.14	0.05	3.23	0.14	3.13	0.06	2.88	-0.41	1.65	4.31	1.85	0.16691
0	presto/tpcds:q01	2.79	0.15	2.88	0.52	2.79	0.17	2.98	-0.21	5.31	18.22	6.09	0.71558
93	presto/tpcds:q94	4.32	0.14	4.47	0.34	4.34	0.06	3.39	0.33	3.27	7.69	1.49	0.35742

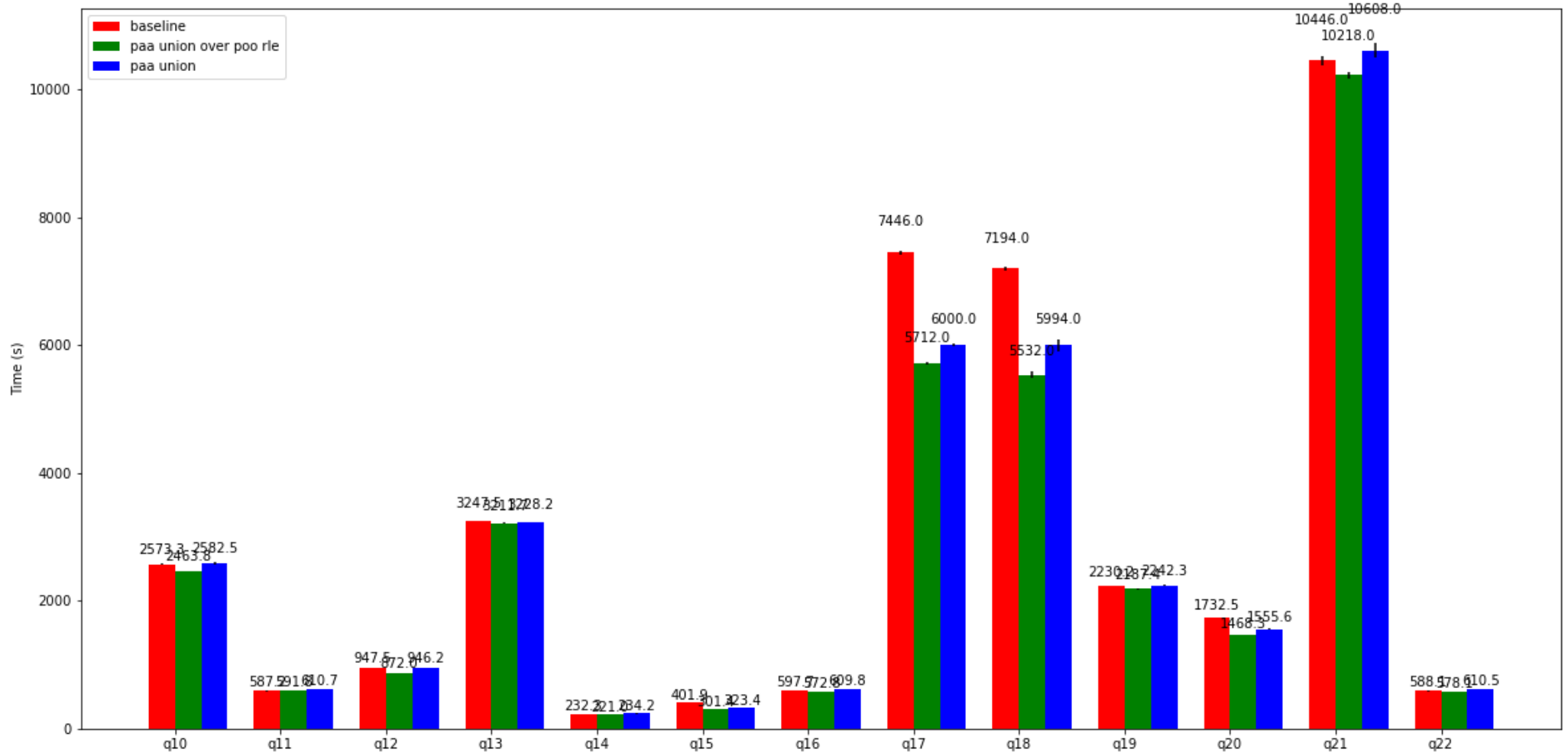

```

min      -27
25%     -5
50%     -1
75%      2
max      18
Name: % change, dtype: float64
count    99
mean     -1
std       6
min     -23
25%     -3
50%     -0
75%      3
max      13
Name: % change base -> paa union, dtype: float64

```

TPC-H Comparison (CPU)





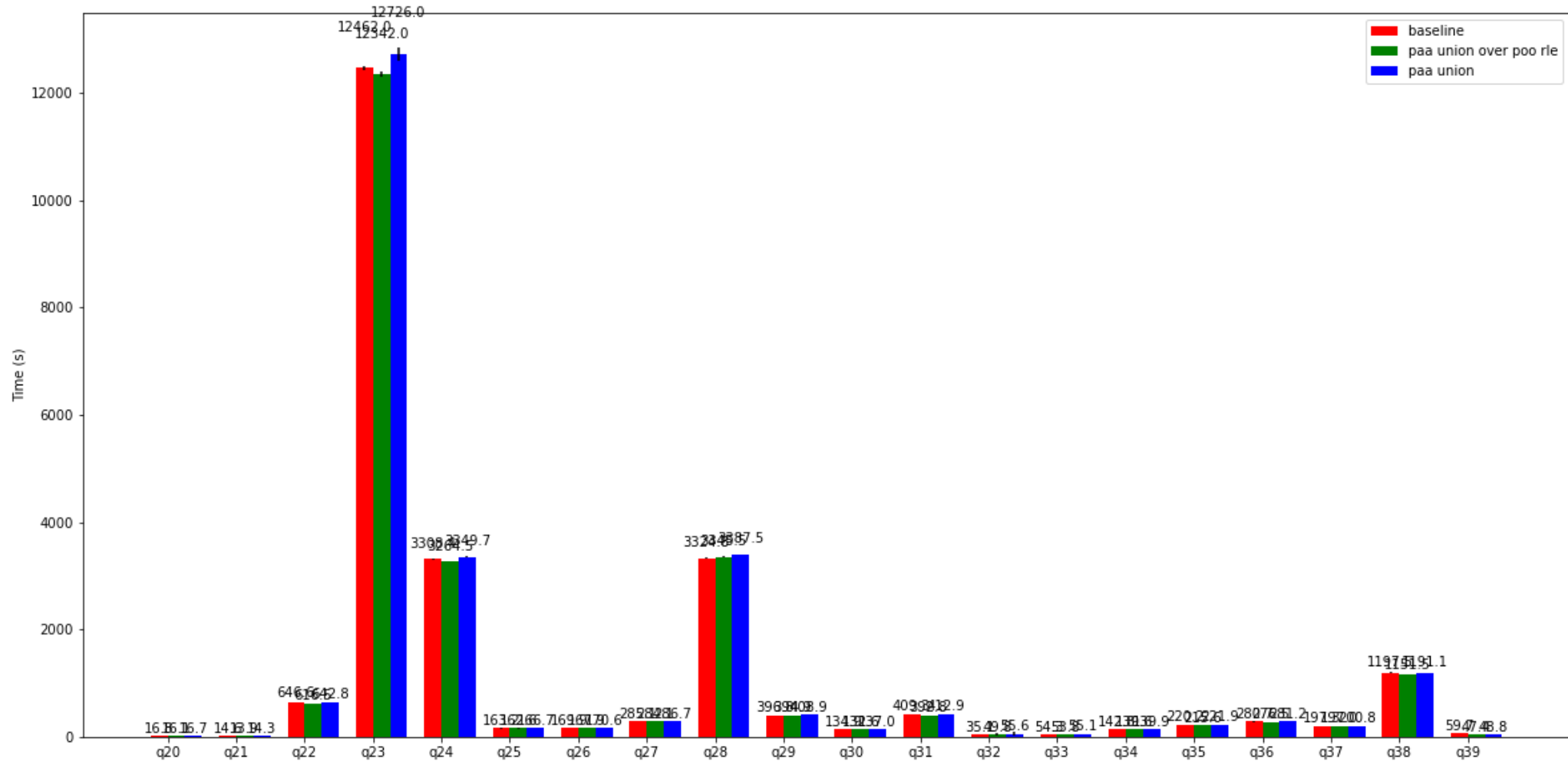
query	baseline mean	baseline std.dev	paa union over poo rle mean	paa union over poo rle std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
14 presto/tpch: q15	401.90	1.10	301.40	0.31	323.40	0.76	-25.01	-19.53	0.27	0.10	0.23	0.00000
16 presto/tpch: q17	7446.00	35.39	5712.00	29.39	6000.00	18.59	-23.29	-19.42	0.48	0.51	0.31	0.00000
17 presto/tpch: q18	7194.00	27.10	5532.00	49.19	5994.00	98.59	-23.10	-16.68	0.38	0.89	1.64	0.00000
19 presto/tpch: q20	1732.50	3.57	1468.30	1.88	1555.60	12.11	-15.25	-10.21	0.21	0.13	0.78	0.00000
11 presto/tpch: q12	947.50	1.22	872.00	0.98	946.20	2.68	-7.97	-0.14	0.13	0.11	0.28	0.00000

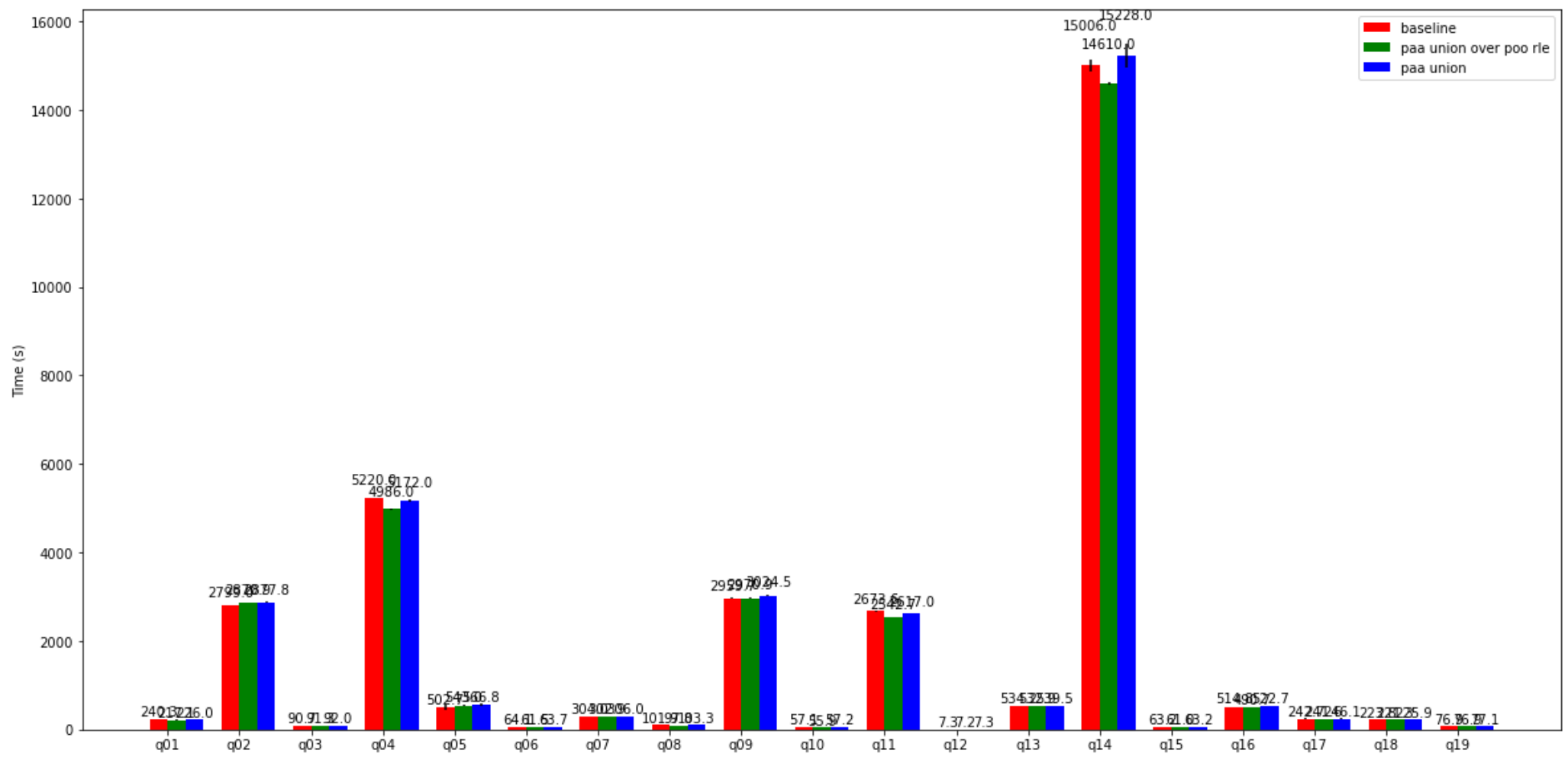

```

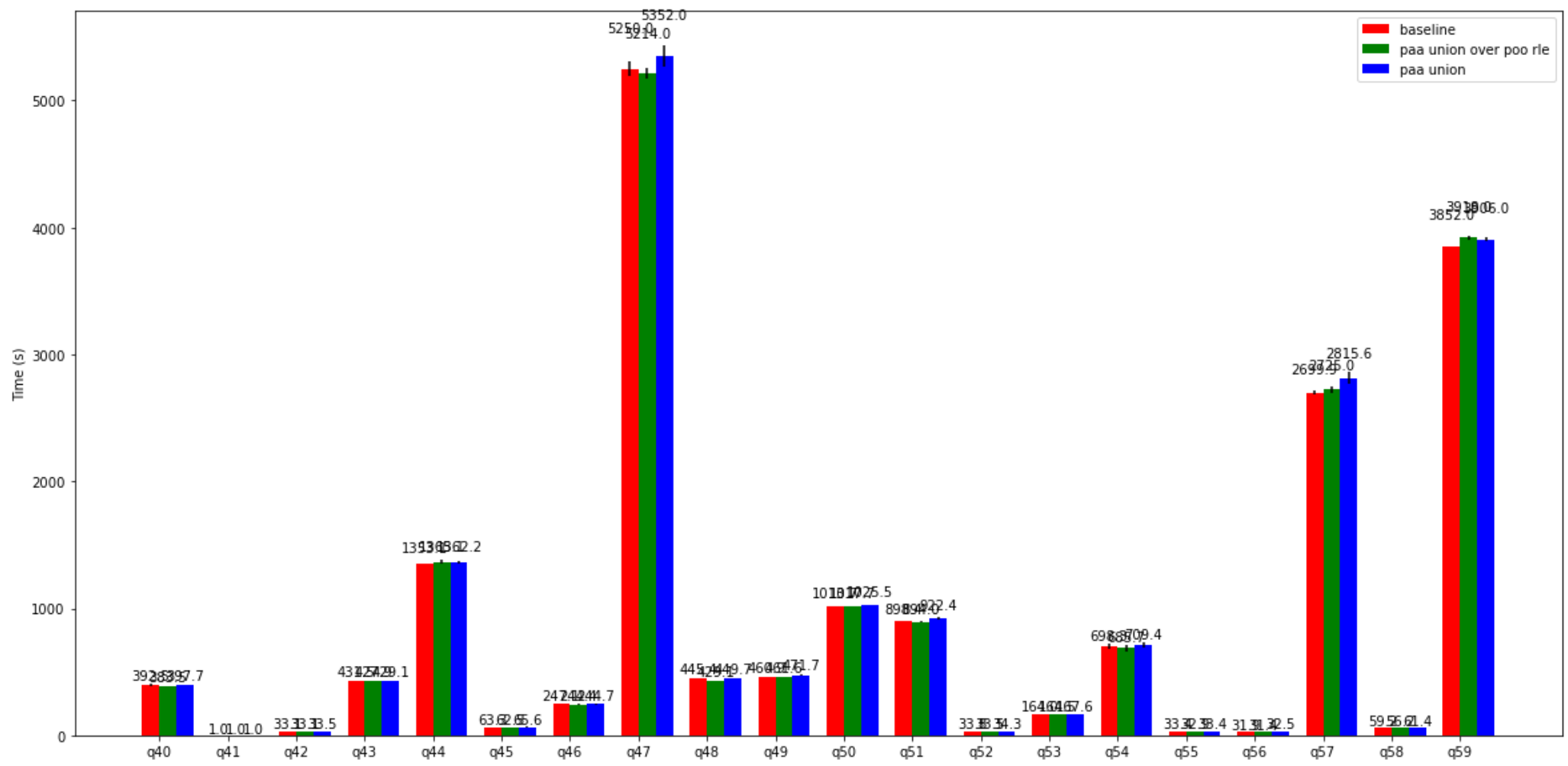
75%      -1
max       1
Name: % change, dtype: float64
count    22
mean     -2
std       7
min     -20
25%      -0
50%       0
75%       2
max       5
Name: % change base -> paa union, dtype: float64

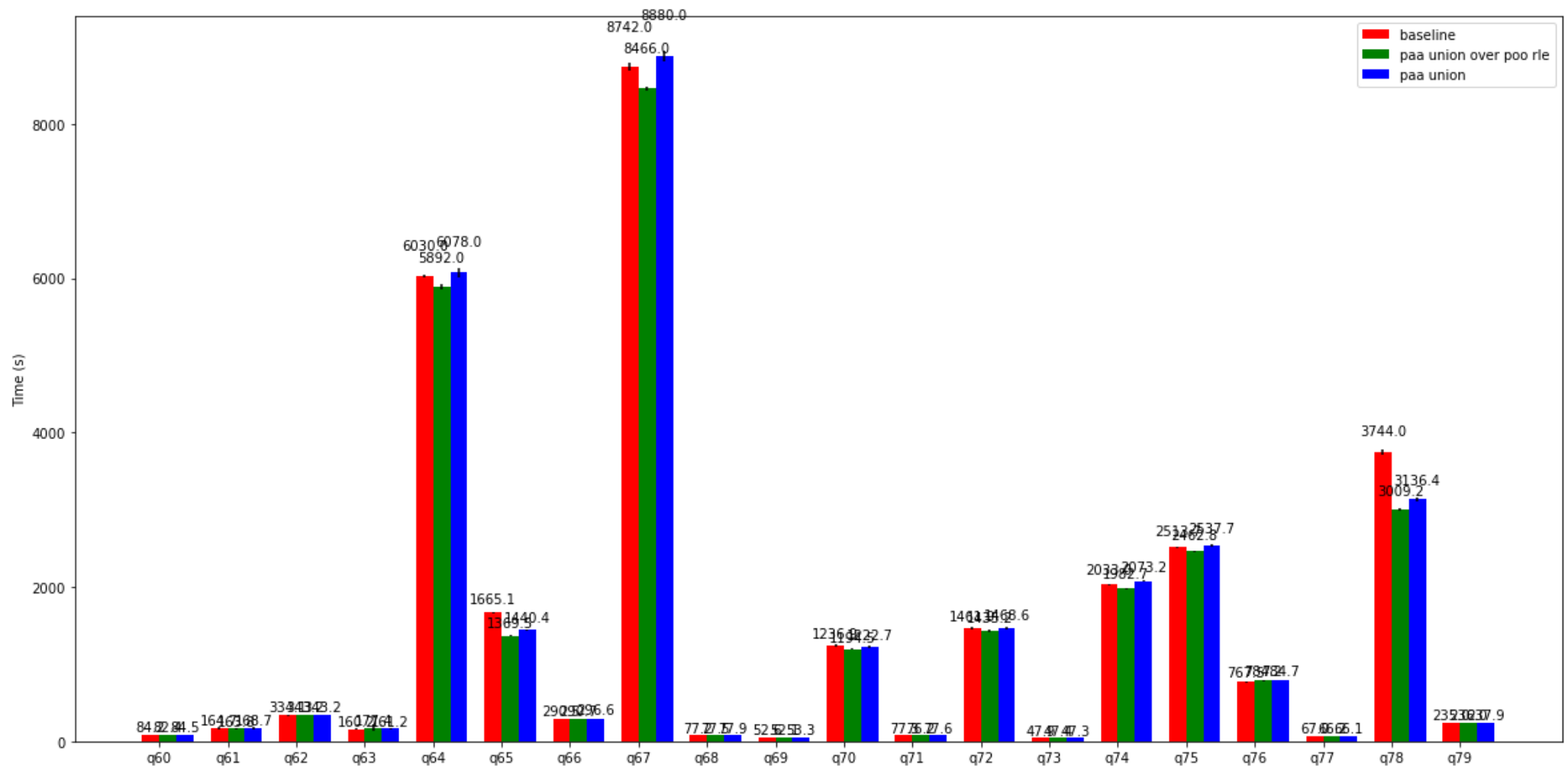
```

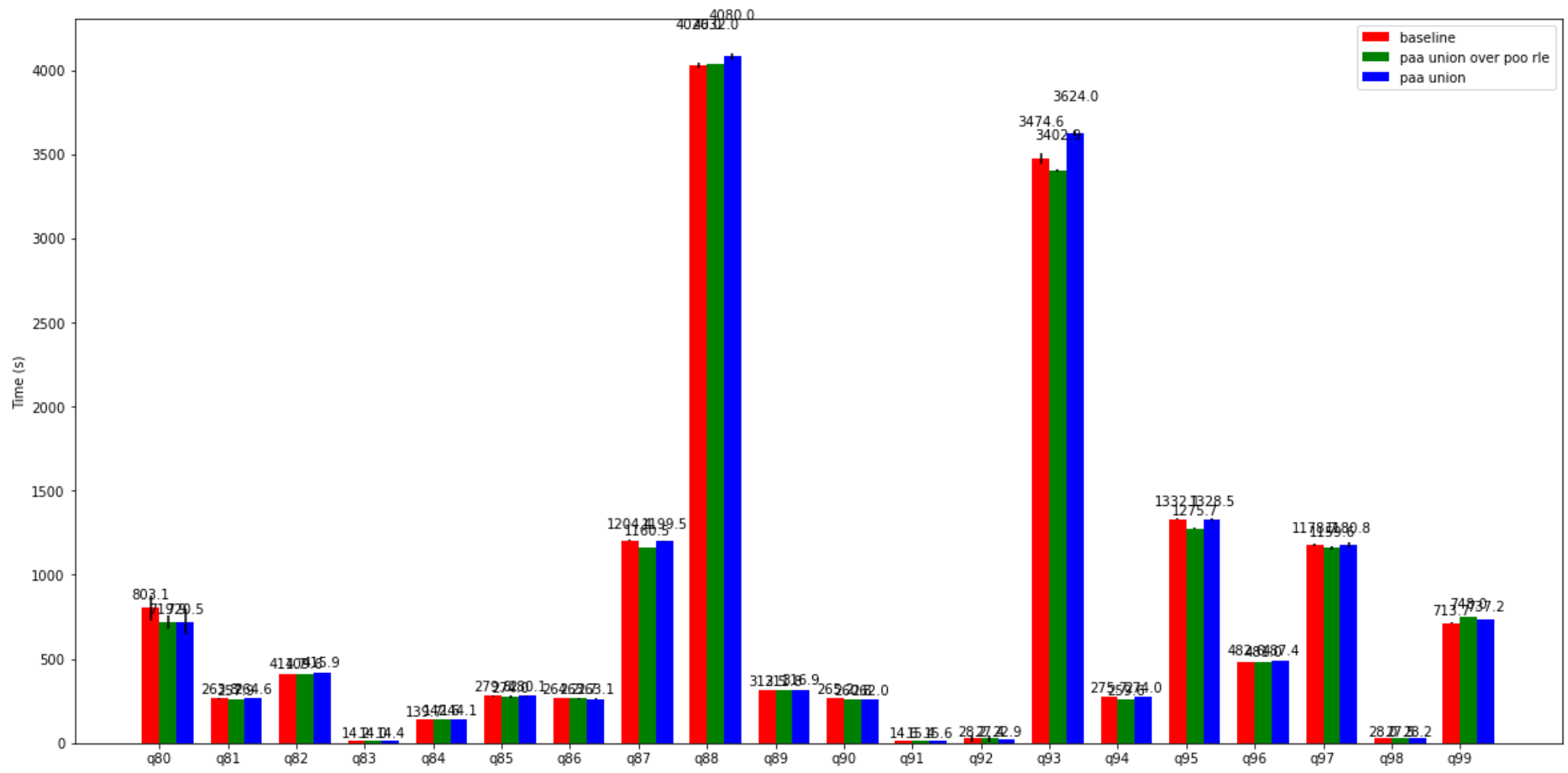
TPC-DS Comparison (CPU)

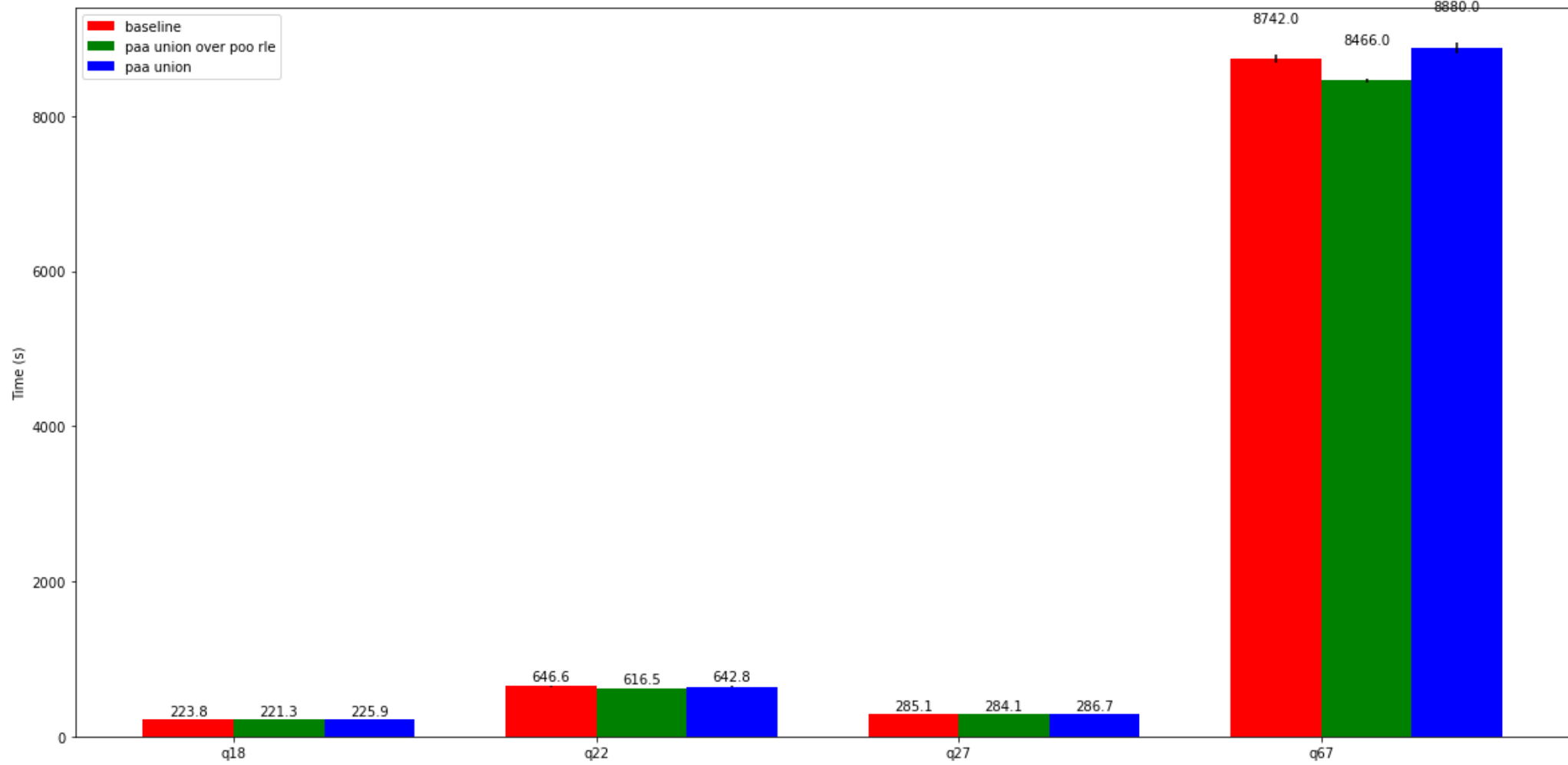












	query	baseline mean	baseline std.dev	paa union over poo rle mean	paa union over poo rle std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
38	presto/tpcds: q39	59.71	0.32	47.38	0.30	48.76	0.37	-20.64	-18.33	0.53	0.63	0.76	0.00000
77	presto/tpcds: q78	3744.00	32.20	3009.20	20.00	3136.40	28.99	-19.63	-16.23	0.86	0.66	0.92	0.00000
64	presto/tpcds: q65	1665.10	9.64	1369.50	4.34	1440.40	13.79	-17.75	-13.49	0.58	0.32	0.96	0.00000
79	presto/tpcds: q80	803.10	76.99	719.90	39.79	720.50	76.33	-10.36	-10.29	9.59	5.53	10.59	0.04053
0	presto/tpcds: q01	240.30	1.81	217.10	1.91	226.00	2.48	-9.65	-5.95	0.75	0.88	1.10	0.00000

	query	baseline mean	baseline std.dev	paa union over poo rle mean	paa union over poo rle std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
93	presto/tpcds:q94	275.70	0.83	259.60	1.05	274.00	0.73	-5.84	-0.62	0.30	0.40	0.27	0.00000
57	presto/tpcds:q58	59.21	0.72	56.20	0.57	61.35	1.41	-5.09	3.61	1.22	1.02	2.30	0.00001
10	presto/tpcds:q11	2673.60	7.21	2542.70	4.51	2617.00	2.36	-4.90	-2.12	0.27	0.18	0.09	0.00000
15	presto/tpcds:q16	514.80	1.37	490.70	1.03	522.70	1.84	-4.68	1.53	0.27	0.21	0.35	0.00000
21	presto/tpcds:q22	646.60	2.10	616.50	1.41	642.80	2.48	-4.66	-0.59	0.32	0.23	0.39	0.00000
20	presto/tpcds:q21	14.56	0.19	13.89	0.10	14.32	0.15	-4.59	-1.66	1.33	0.73	1.04	0.00002
3	presto/tpcds:q04	5220.00	0.00	4986.00	19.72	5172.00	18.59	-4.48	-0.92	0.00	0.40	0.36	0.00000
94	presto/tpcds:q95	1332.10	4.18	1275.70	4.40	1328.50	5.08	-4.23	-0.27	0.31	0.34	0.38	0.00000
5	presto/tpcds:q06	64.10	0.45	61.50	0.50	63.70	0.59	-4.06	-0.62	0.70	0.82	0.93	0.00000
30	presto/tpcds:q31	409.30	4.48	392.80	5.53	412.90	2.19	-4.03	0.88	1.09	1.41	0.53	0.00020
7	presto/tpcds:q08	101.90	0.45	97.80	0.38	103.30	0.24	-4.02	1.37	0.44	0.39	0.24	0.00000
37	presto/tpcds:q38	1197.50	2.93	1151.50	2.75	1191.10	4.85	-3.84	-0.53	0.24	0.24	0.41	0.00000
19	presto/tpcds:q20	16.77	0.17	16.14	0.12	16.70	0.13	-3.73	-0.40	0.99	0.76	0.80	0.00002
47	presto/tpcds:q48	445.40	1.35	429.10	0.96	449.70	1.89	-3.66	0.97	0.30	0.22	0.42	0.00000
86	presto/tpcds:q87	1204.40	2.07	1160.50	1.76	1199.50	2.44	-3.64	-0.41	0.17	0.15	0.20	0.00000
14	presto/tpcds:q15	63.20	0.49	61.00	0.31	63.20	0.49	-3.48	0.00	0.78	0.51	0.78	0.00000
69	presto/tpcds:q70	1236.90	14.26	1194.50	12.06	1222.70	11.68	-3.43	-1.15	1.15	1.01	0.96	0.00024
66	presto/tpcds:q67	8742.00	47.85	8466.00	27.10	8880.00	70.79	-3.16	1.58	0.55	0.32	0.80	0.00000
13	presto/tpcds:q14	15006.00	125.57	14610.00	27.10	15228.00	265.52	-2.64	1.48	0.84	0.19	1.74	0.00002

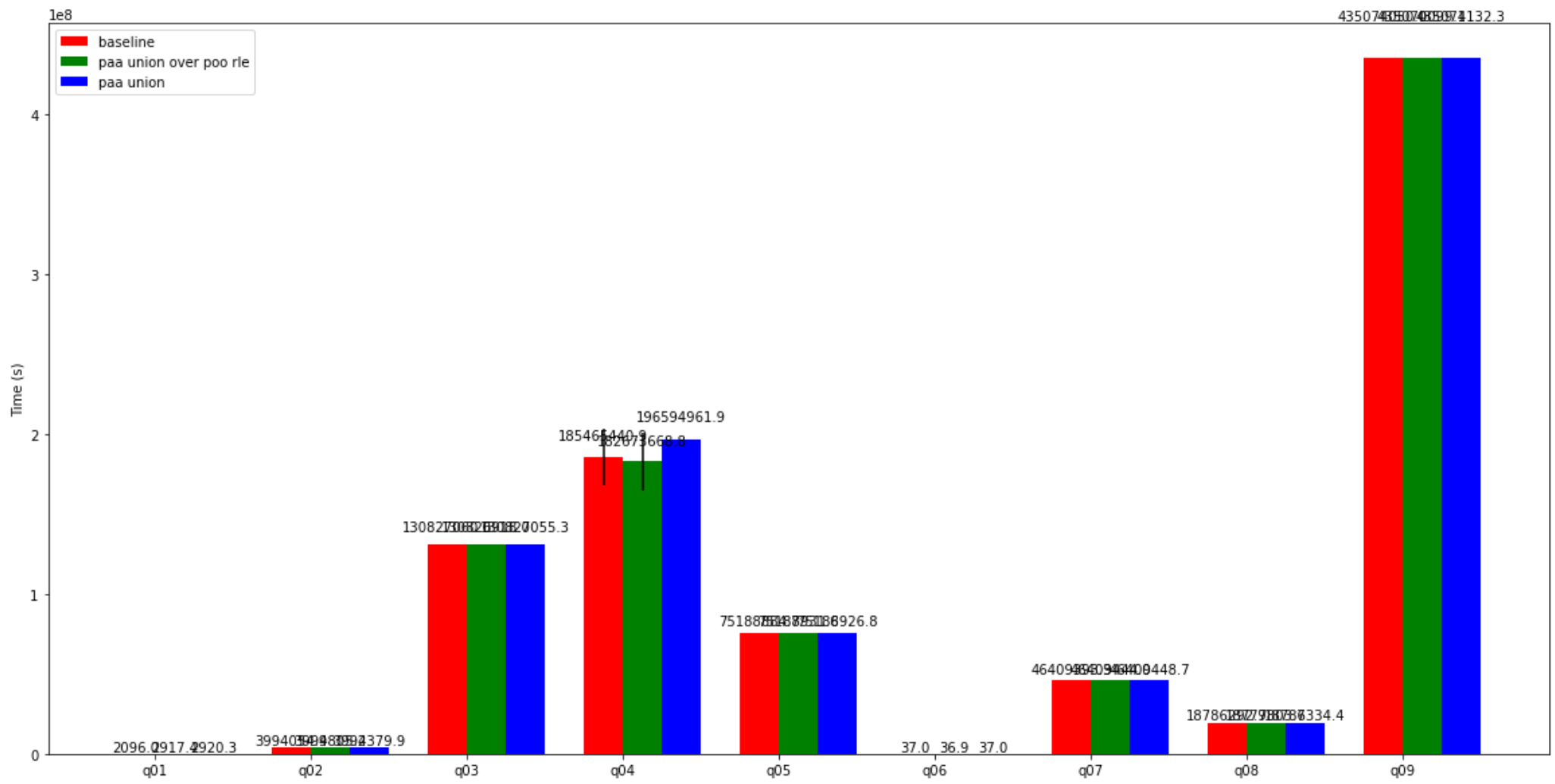
	query	baseline mean	baseline std.dev	paa union over poo rle mean	paa union over poo rle std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
91	presto/tpcds:q92	28.17	18.54	27.44	18.30	22.87	3.14	-2.60	-18.82	65.80	66.70	13.75	0.94651
73	presto/tpcds:q74	2033.00	7.48	1982.70	7.75	2073.20	6.92	-2.47	1.98	0.37	0.39	0.33	0.00000
39	presto/tpcds:q40	392.50	10.16	383.50	2.50	397.70	3.93	-2.29	1.32	2.59	0.65	0.99	0.06129
63	presto/tpcds:q64	6030.00	19.72	5892.00	29.39	6078.00	57.67	-2.29	0.80	0.33	0.50	0.95	0.00000
11	presto/tpcds:q12	7.32	0.08	7.15	0.05	7.32	0.03	-2.28	-0.05	1.06	0.73	0.40	0.00144
33	presto/tpcds:q34	142.80	0.38	139.60	0.49	139.90	0.45	-2.24	-2.03	0.27	0.35	0.32	0.00000
80	presto/tpcds:q81	263.80	0.49	257.90	1.39	264.60	0.54	-2.24	0.30	0.19	0.54	0.20	0.00000
59	presto/tpcds:q60	84.20	0.90	82.40	0.31	84.50	0.80	-2.14	0.36	1.07	0.38	0.94	0.00096
9	presto/tpcds:q10	57.11	0.59	55.90	0.53	57.19	0.75	-2.13	0.14	1.02	0.95	1.31	0.00370
34	presto/tpcds:q35	220.20	1.70	215.60	2.86	221.90	2.38	-2.09	0.77	0.77	1.32	1.07	0.00687
84	presto/tpcds:q85	279.80	6.57	274.00	6.45	280.10	5.60	-2.07	0.11	2.35	2.35	2.00	0.15374
92	presto/tpcds:q93	3474.60	29.10	3402.90	6.19	3624.00	18.59	-2.06	4.30	0.84	0.18	0.51	0.00015
74	presto/tpcds:q75	2513.70	5.74	2462.80	4.30	2537.70	16.77	-2.02	0.95	0.23	0.17	0.66	0.00000
71	presto/tpcds:q72	1461.90	20.83	1435.20	17.62	1468.60	16.76	-1.83	0.46	1.42	1.23	1.14	0.03751
53	presto/tpcds:q54	698.30	19.42	685.70	22.41	709.40	21.43	-1.80	1.59	2.78	3.27	3.02	0.32253
29	presto/tpcds:q30	134.90	1.22	132.60	0.66	137.00	0.62	-1.70	1.56	0.91	0.50	0.45	0.00231
89	presto/tpcds:q90	265.20	0.00	260.80	0.31	262.00	0.31	-1.66	-1.21	0.00	0.12	0.12	0.00000
97	presto/tpcds:q98	27.95	0.22	27.49	0.26	28.23	0.06	-1.66	1.00	0.78	0.93	0.22	0.00710
55	presto/tpcds:q56	31.89	0.28	31.36	0.22	32.55	0.21	-1.64	2.08	0.89	0.70	0.65	0.00509

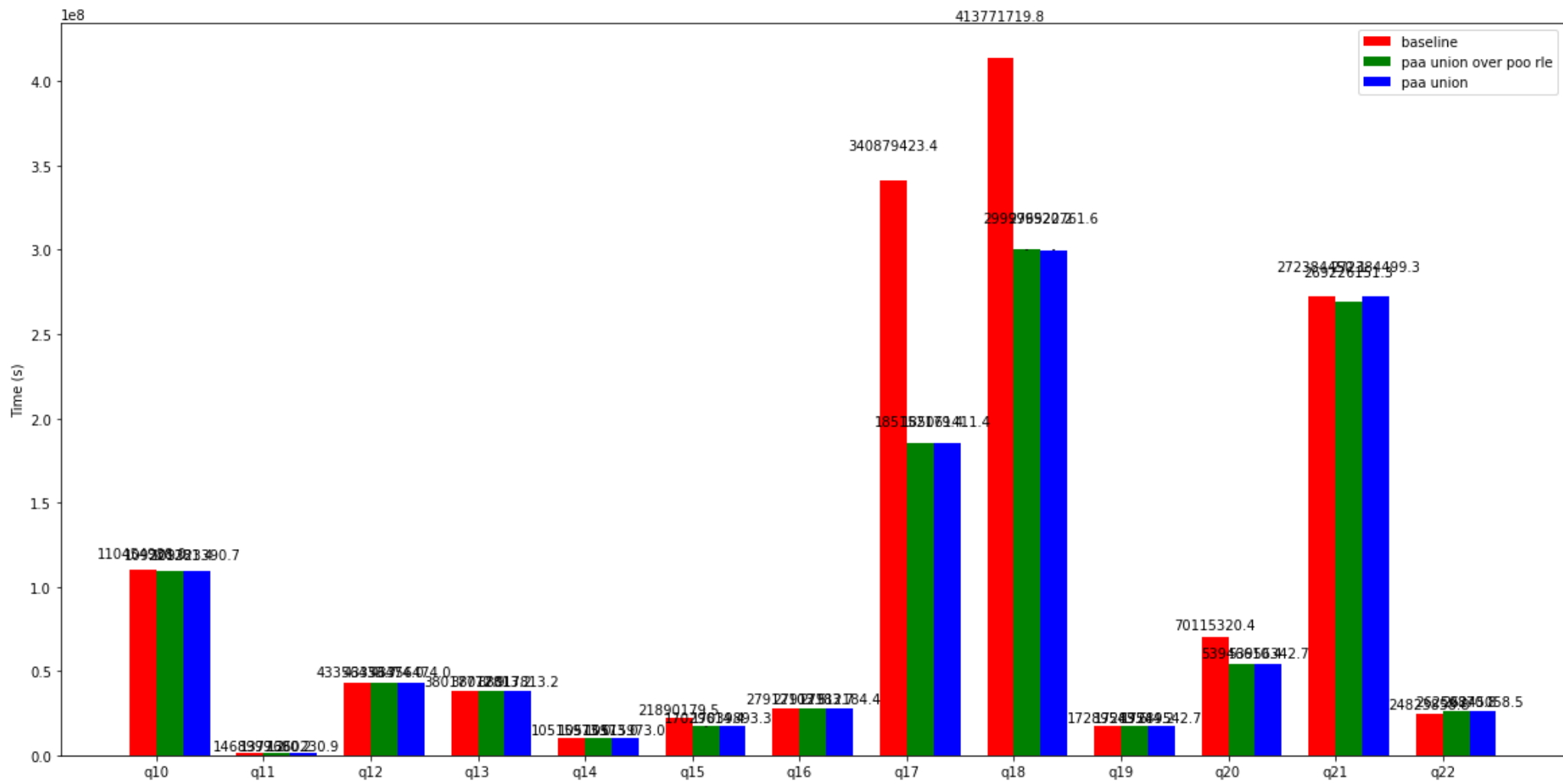
	query	baseline mean	baseline std.dev	paa union over poo rle mean	paa union over poo rle std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
96	presto/tpcds:q97	1178.70	7.56	1159.60	13.82	1180.80	16.56	-1.62	0.18	0.64	1.19	1.40	0.01403
35	presto/tpcds:q36	280.70	0.45	276.50	0.24	281.20	0.49	-1.50	0.18	0.16	0.09	0.17	0.00000
54	presto/tpcds:q55	33.42	0.09	32.94	0.46	33.44	0.09	-1.47	0.05	0.28	1.39	0.28	0.02808
70	presto/tpcds:q71	77.30	1.54	76.20	1.00	77.60	1.05	-1.42	0.39	1.99	1.32	1.35	0.17302
23	presto/tpcds:q24	3308.40	17.23	3264.50	5.19	3349.70	15.98	-1.33	1.25	0.52	0.16	0.48	0.00014
44	presto/tpcds:q45	63.30	0.33	62.50	0.96	65.60	0.82	-1.26	3.63	0.52	1.54	1.25	0.08257
76	presto/tpcds:q77	67.00	0.62	66.20	1.05	66.10	0.59	-1.19	-1.34	0.92	1.59	0.89	0.13926
25	presto/tpcds:q26	169.90	0.70	167.90	1.03	170.60	0.90	-1.18	0.41	0.41	0.62	0.53	0.00286
72	presto/tpcds:q73	47.92	0.06	47.36	0.16	47.33	0.05	-1.17	-1.25	0.12	0.34	0.10	0.00001
17	presto/tpcds:q18	223.80	0.66	221.30	1.63	225.90	1.24	-1.12	0.94	0.29	0.74	0.55	0.00585
45	presto/tpcds:q46	247.10	2.02	244.40	2.36	244.70	1.16	-1.09	-0.97	0.82	0.97	0.48	0.05923
32	presto/tpcds:q33	54.33	0.22	53.76	0.21	55.15	0.29	-1.05	1.51	0.41	0.40	0.52	0.00115
22	presto/tpcds:q23	12462.00	42.09	12342.00	47.85	12726.00	117.76	-0.96	2.12	0.34	0.39	0.93	0.00096
68	presto/tpcds:q69	52.59	0.85	52.09	0.32	53.32	1.84	-0.96	1.38	1.61	0.62	3.45	0.20229
82	presto/tpcds:q83	14.15	0.39	14.03	0.59	14.38	0.44	-0.91	1.57	2.73	4.22	3.05	0.66569
42	presto/tpcds:q43	431.50	0.88	427.90	1.80	429.10	1.10	-0.83	-0.56	0.20	0.42	0.26	0.00133
46	presto/tpcds:q47	5250.00	62.01	5214.00	42.09	5352.00	81.03	-0.69	1.94	1.18	0.81	1.51	0.26657
51	presto/tpcds:q52	33.75	0.05	33.54	0.08	34.34	0.11	-0.62	1.74	0.15	0.23	0.33	0.00026
60	presto/tpcds:q61	164.70	14.00	163.80	12.46	168.70	11.25	-0.55	2.43	8.50	7.61	6.67	0.90870

	query	baseline mean	baseline std.dev	paa union over poo rle mean	paa union over poo rle std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
81	presto/tpcds:q82	411.70	0.45	409.60	0.90	415.90	0.70	-0.51	1.02	0.11	0.22	0.17	0.00047
50	presto/tpcds:q51	898.40	1.24	894.00	1.37	922.40	7.12	-0.49	2.67	0.14	0.15	0.77	0.00016
28	presto/tpcds:q29	396.80	0.82	394.90	0.45	408.90	1.55	-0.48	3.05	0.21	0.11	0.38	0.00056
16	presto/tpcds:q17	242.70	6.73	241.60	5.83	246.10	3.71	-0.45	1.40	2.77	2.41	1.51	0.76836
24	presto/tpcds:q25	163.20	10.32	162.60	8.85	166.70	10.37	-0.37	2.14	6.32	5.44	6.22	0.91603
6	presto/tpcds:q07	304.00	1.40	302.90	0.59	306.00	1.31	-0.36	0.66	0.46	0.19	0.43	0.10706
26	presto/tpcds:q27	285.10	0.45	284.10	0.50	286.70	1.39	-0.35	0.56	0.16	0.18	0.48	0.00463
95	presto/tpcds:q96	482.60	1.18	481.00	1.05	487.40	0.98	-0.33	0.99	0.24	0.22	0.20	0.03250
12	presto/tpcds:q13	534.20	0.90	532.90	1.95	539.50	1.34	-0.24	0.99	0.17	0.37	0.25	0.16929
88	presto/tpcds:q89	312.50	0.59	311.80	0.49	316.90	0.80	-0.22	1.41	0.19	0.16	0.25	0.04933
85	presto/tpcds:q86	264.20	0.49	263.70	0.63	263.10	1.35	-0.19	-0.42	0.19	0.24	0.52	0.15561
36	presto/tpcds:q37	197.30	0.80	197.00	0.31	200.80	0.49	-0.15	1.77	0.40	0.16	0.24	0.41051
41	presto/tpcds:q42	33.09	0.04	33.06	0.21	33.54	0.11	-0.09	1.37	0.11	0.64	0.31	0.75517
18	presto/tpcds:q19	76.90	2.13	76.90	1.84	77.10	1.69	0.00	0.26	2.77	2.39	2.19	1.00000
65	presto/tpcds:q66	290.50	0.45	290.70	0.50	296.60	1.12	0.07	2.10	0.16	0.17	0.38	0.48479
87	presto/tpcds:q88	4026.00	14.70	4032.00	0.00	4080.00	18.59	0.15	1.34	0.37	0.00	0.46	0.34089
48	presto/tpcds:q49	460.90	1.28	461.60	2.17	471.70	5.94	0.15	2.34	0.28	0.47	1.26	0.51161
52	presto/tpcds:q53	164.00	0.49	164.50	2.09	167.60	1.68	0.30	2.20	0.30	1.27	1.00	0.58139
40	presto/tpcds:q41	1.03	0.01	1.03	0.02	1.02	0.01	0.32	-1.13	0.95	1.70	0.88	0.69409


```
min      -21
25%     -3
50%     -1
75%     -0
max      42
Name: % change, dtype: float64
count    99
mean     1
std      7
min     -19
25%     -0
50%     1
75%     2
max     58
Name: % change base -> paa union, dtype: float64
```

TPC-H Comparison (Network)





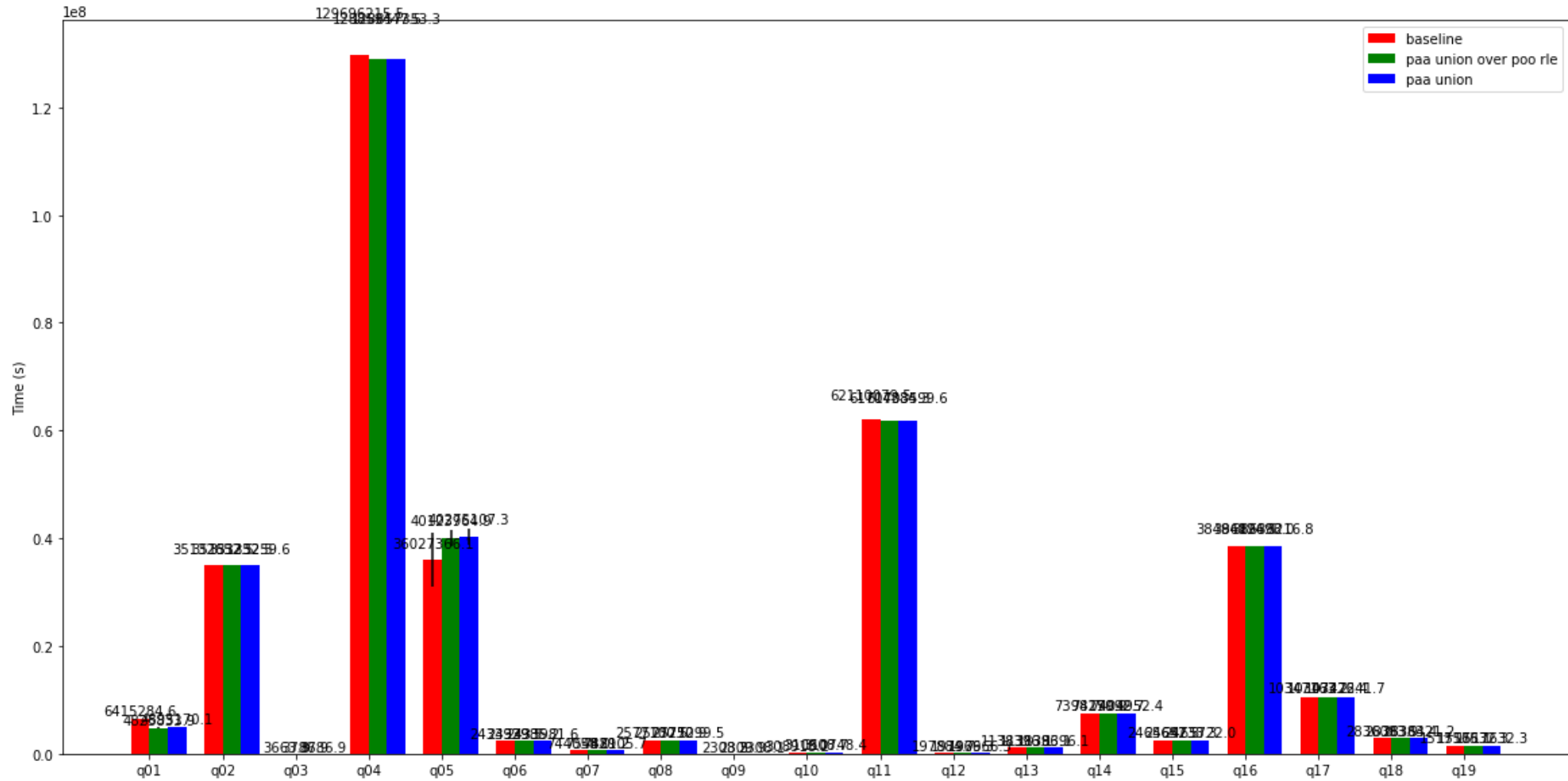
query	baseline mean	baseline std.dev	paa union over poo rle mean	paa union over poo rle std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
16 presto/tpch: q17	340879423.45	599.48	185152179.36	229649.25	185061411.37	116973.13	-45.68	-45.71	0.00	0.12	0.06	0.00000
17 presto/tpch: q18	413771719.78	5757.12	299976522.20	98960.79	299920761.57	81858.14	-27.50	-27.52	0.00	0.03	0.03	0.00000
19 presto/tpch: q20	70115320.42	21.11	53946610.40	32444.87	53956342.71	84255.44	-23.06	-23.05	0.00	0.06	0.16	0.00000
14 presto/tpch: q15	21890179.54	57.55	17029614.41	6212.16	17039893.33	6760.02	-22.20	-22.16	0.00	0.04	0.04	0.00000
10 presto/tpch: q11	1468999.19	8371.54	1377680.20	21647.23	1360230.87	34940.99	-6.22	-7.40	0.57	1.57	2.57	0.00000

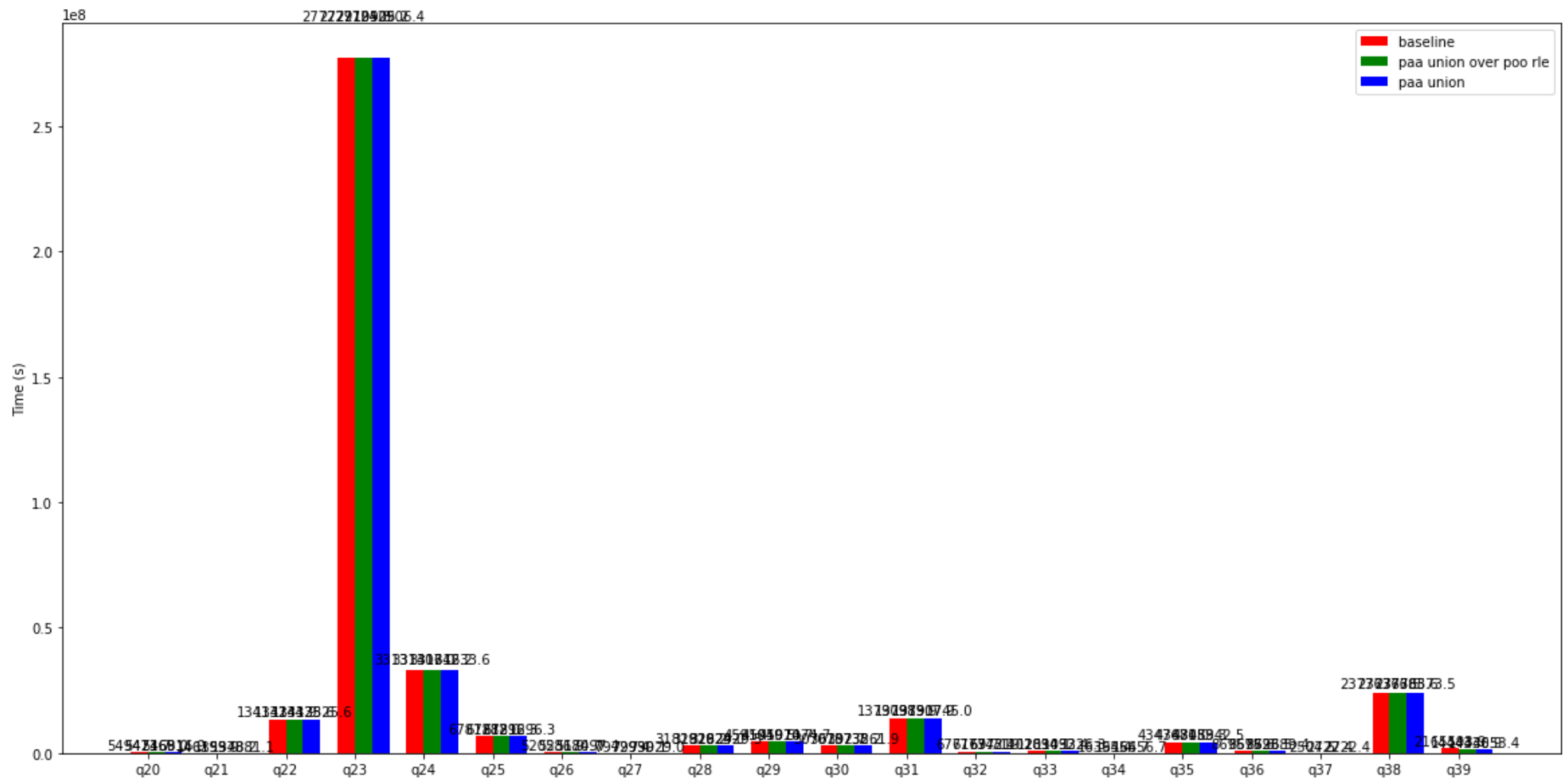

```

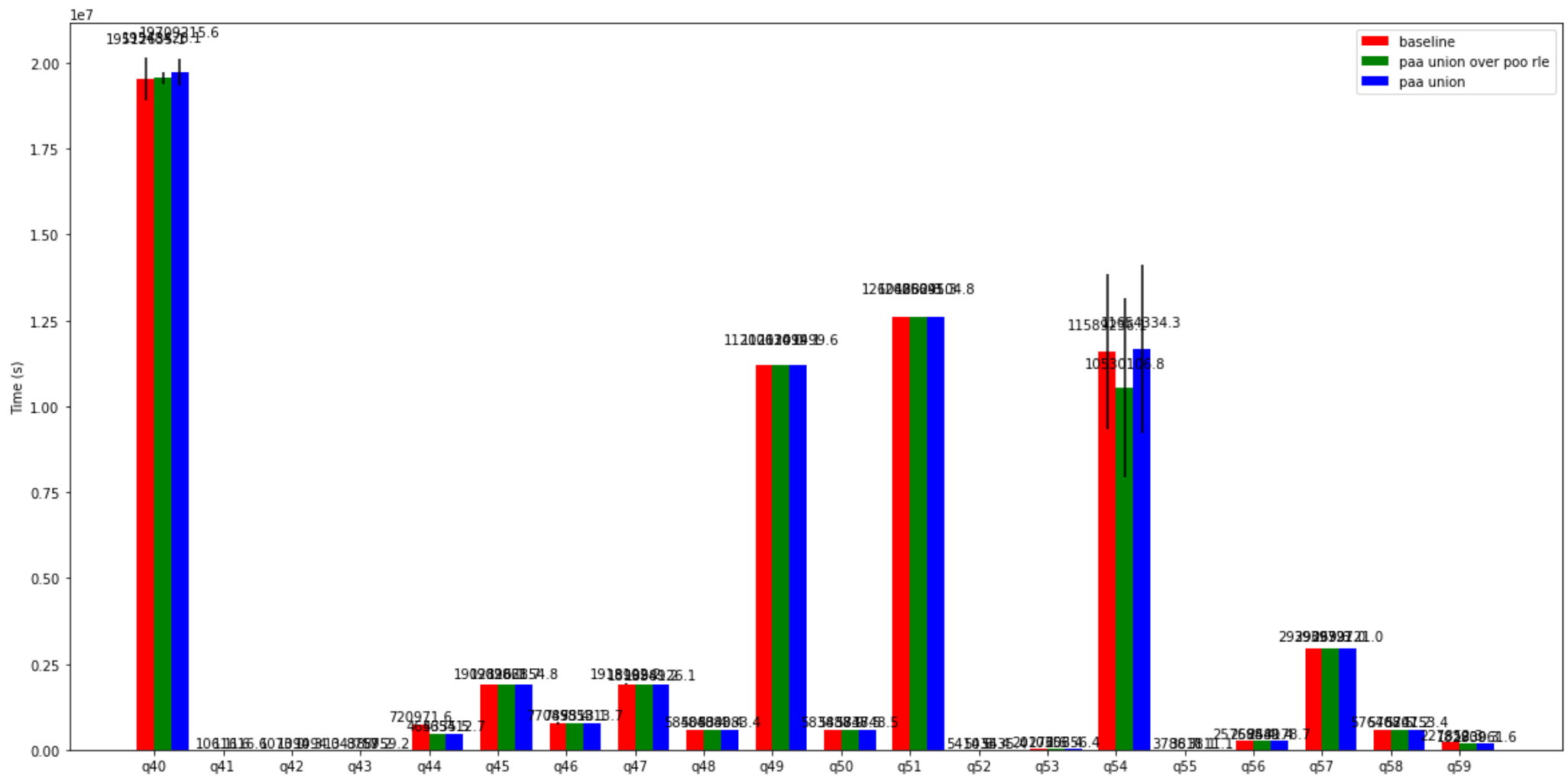
50%      -0
75%      0
max       39
Name: % change, dtype: float64
count    22
mean     -3
std      16
min     -46
25%     -1
50%      0
75%      0
max       39
Name: % change base -> paa union, dtype: float64

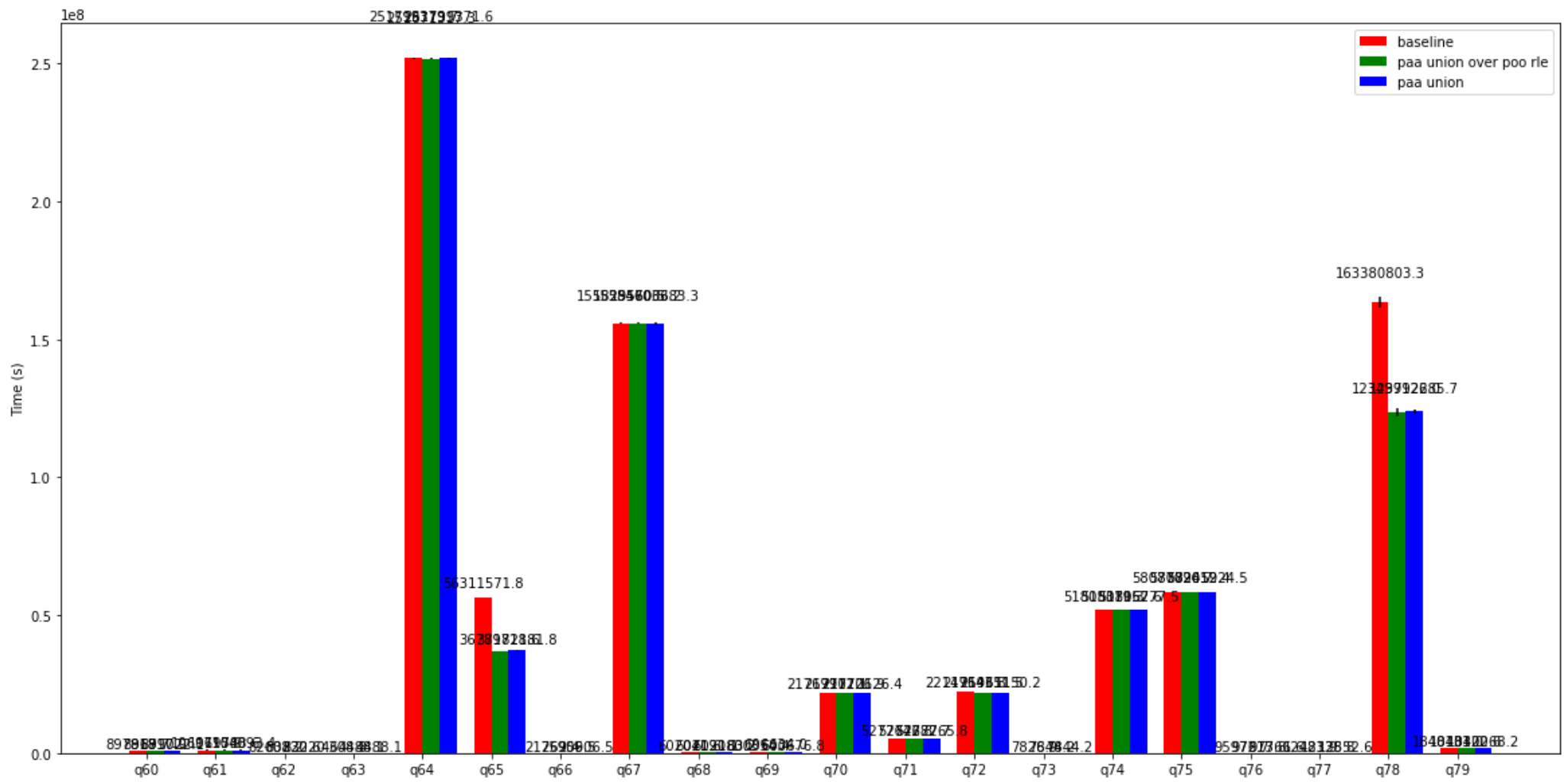
```

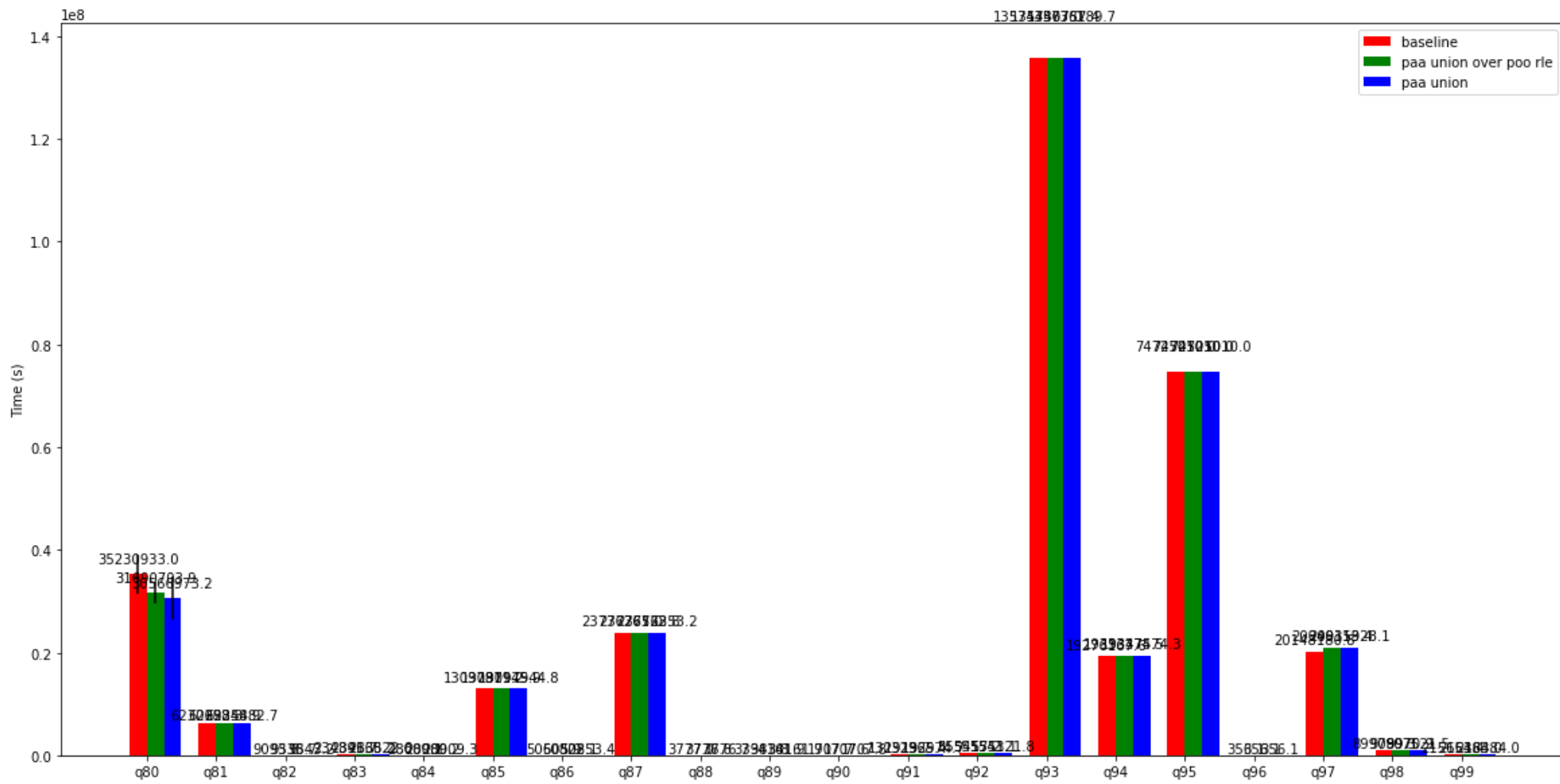
TPC-DS Comparison (Network)











query	baseline mean	baseline std.dev	paa union over poo rle mean	paa union over poo rle std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
43 presto/tpcds: q44	720971.62	17.21	465335.50	145.20	465412.70	223.99	-35.46	-35.45	0.00	0.03	0.05	0.00000
64 presto/tpcds: q65	56311571.78	1050.98	36789718.63	65984.09	37182181.84	308323.42	-34.67	-33.97	0.00	0.18	0.83	0.00000
38 presto/tpcds: q39	2165593.87	2.72	1444336.87	4.36	1444053.40	5.61	-33.31	-33.32	0.00	0.00	0.00	0.00000
0 presto/tpcds: q01	6415284.57	1733.18	4825833.92	51899.84	4895170.11	57410.01	-24.78	-23.70	0.03	1.08	1.17	0.00000
77 presto/tpcds: q78	163380803.32	1823074.11	123499126.02	1254897.99	123792285.75	891069.33	-24.41	-24.23	1.12	1.02	0.72	0.00000

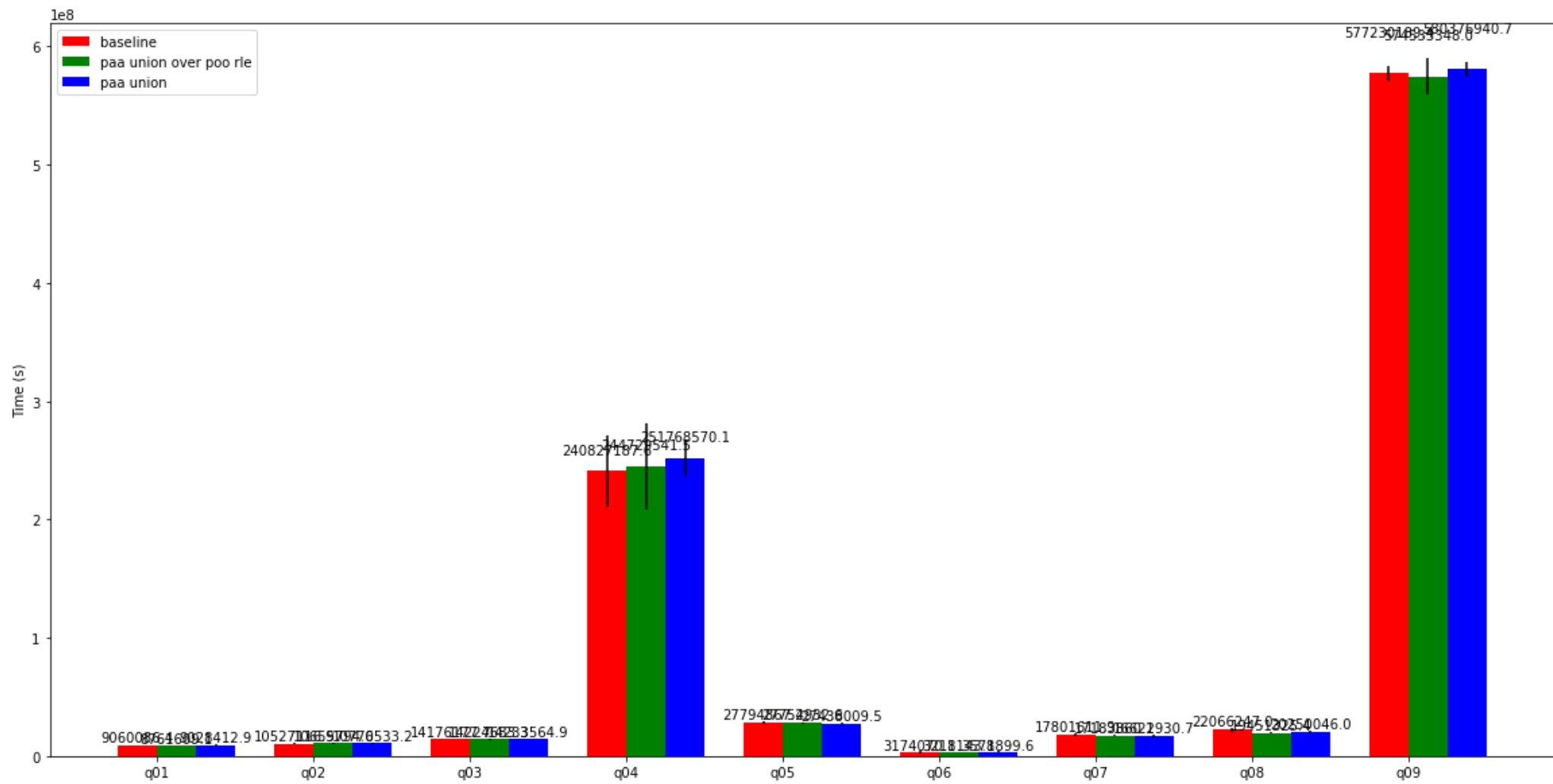
	query	baseline mean	baseline std.dev	paa union over pooler mean	paa union over pooler std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline std.dev %	paa union over pooler std.dev %	paa union std.dev %	p-value
58	presto/tpcds:q59	227852.31	527.67	182909.33	498.89	183061.57	437.42	-19.72	-19.66	0.23	0.27	0.24	0.00000
42	presto/tpcds:q43	10438.68	0.00	8759.23	0.00	8759.23	0.00	-16.09	-16.09	0.00	0.00	0.00	0.00000
79	presto/tpcds:q80	35230933.04	3818376.27	31690703.86	2004030.94	30566973.25	4251581.20	-10.05	-13.24	10.84	6.32	13.91	0.07206
53	presto/tpcds:q54	11589236.06	2265880.80	10530106.77	2595613.45	11654334.34	2449392.17	-9.14	0.56	19.55	24.65	21.02	0.46883
20	presto/tpcds:q21	146199.94	0.00	135578.19	0.00	134881.07	0.00	-7.27	-7.74	0.00	0.00	0.00	0.00000
76	presto/tpcds:q77	12483.90	586.76	12138.80	488.19	12552.60	631.86	-2.76	0.55	4.70	4.02	5.03	0.29401
19	presto/tpcds:q20	549473.70	6673.97	542168.96	7219.86	546816.93	6709.10	-1.33	-0.48	1.21	1.33	1.23	0.09880
46	presto/tpcds:q47	1918102.23	32055.07	1899549.22	3485.82	1898126.14	0.00	-0.97	-1.04	1.67	0.18	0.00	0.18904
71	presto/tpcds:q72	22147641.75	4.22	21954351.54	76.51	21961150.20	23.59	-0.87	-0.84	0.00	0.00	0.00	0.00000
10	presto/tpcds:q11	62110079.46	44.66	61704384.27	70.10	61703599.57	37.32	-0.65	-0.65	0.00	0.00	0.00	0.00000
3	presto/tpcds:q04	129696215.46	540.10	128859447.47	434.88	128857353.28	530.95	-0.65	-0.65	0.00	0.00	0.00	0.00000
59	presto/tpcds:q60	897818.67	1809.57	896717.90	5139.31	899022.14	2880.63	-0.12	0.13	0.20	0.57	0.32	0.63138
82	presto/tpcds:q83	234891.67	4514.05	234668.19	4719.74	233522.64	8610.69	-0.10	-0.58	1.92	2.01	3.69	0.93486
80	presto/tpcds:q81	6230698.30	91.16	6225348.90	4478.04	6225482.67	2793.19	-0.09	-0.08	0.00	0.07	0.04	0.01516
29	presto/tpcds:q30	3076192.73	42.52	3073738.16	409.20	3073261.95	674.93	-0.08	-0.10	0.00	0.01	0.02	0.00000
63	presto/tpcds:q64	251799379.73	116247.06	251671317.33	76665.25	251799371.56	92245.18	-0.05	-0.00	0.05	0.03	0.04	0.04796
89	presto/tpcds:q90	1707.71	0.41	1707.58	0.38	1707.82	0.24	-0.01	0.01	0.02	0.02	0.01	0.55540
87	presto/tpcds:q88	3776.97	1.17	3776.82	1.25	3776.66	1.01	-0.00	-0.01	0.03	0.03	0.03	0.83764
22	presto/tpcds:q23	277229105.83	38930.92	277219905.25	58273.31	277242906.36	46242.31	-0.00	0.00	0.01	0.02	0.02	0.75439

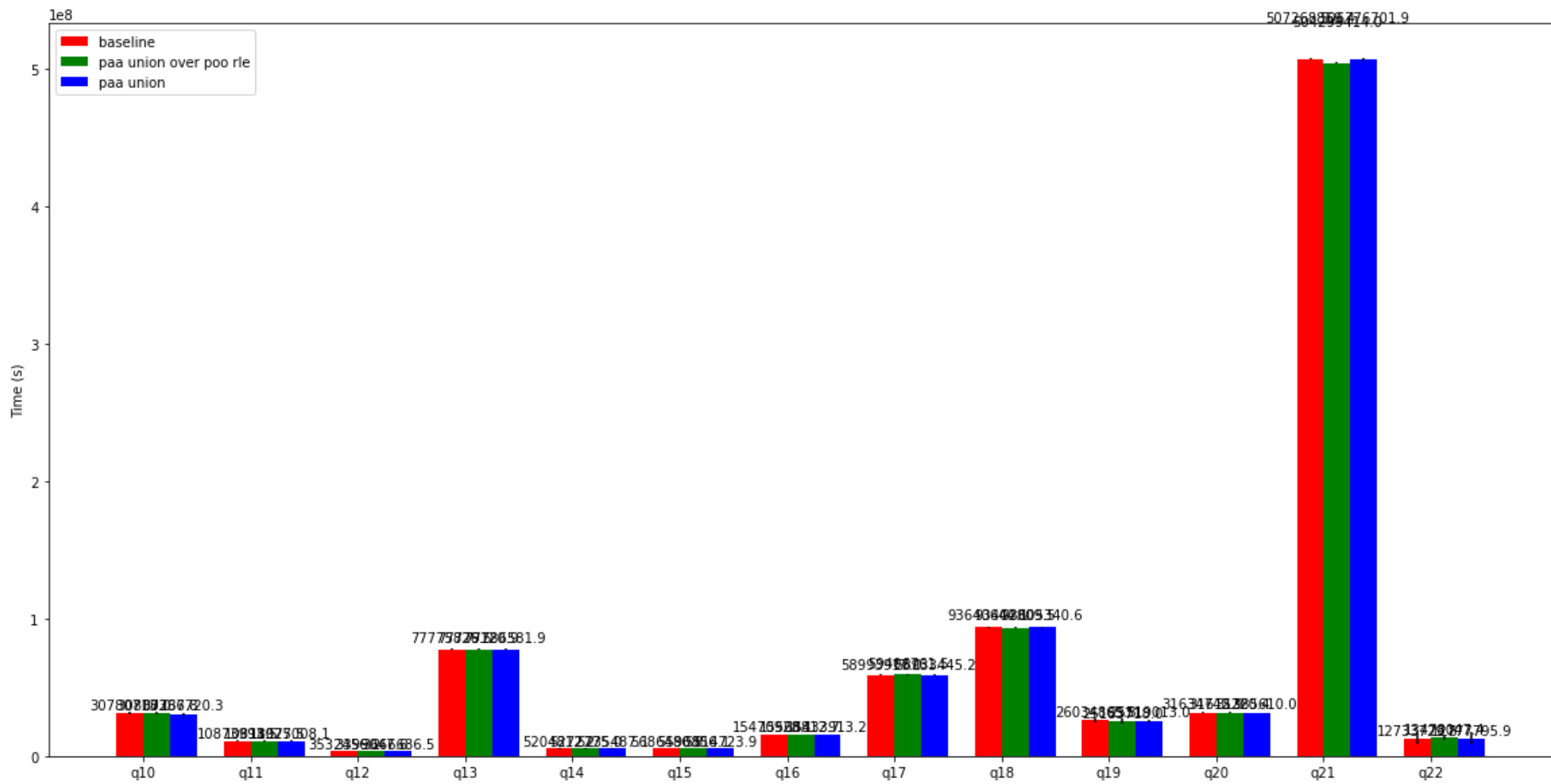
	query	baseline mean	baseline std.dev	paa union over pooler mean	paa union over pooler std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline std.dev %	paa union over pooler std.dev %	paa union std.dev %	p-value
74	presto/tpcds:q75	58077026.74	170.35	58079012.42	60.78	58245924.49	168.18	0.00	0.29	0.00	0.00	0.00	0.00000
73	presto/tpcds:q74	51805319.27	973.60	51807152.61	763.98	51806777.48	603.02	0.00	0.00	0.00	0.00	0.00	0.00462
14	presto/tpcds:q15	2465642.27	16.41	2465733.34	12.44	2465722.02	16.98	0.00	0.00	0.00	0.00	0.00	0.00000
18	presto/tpcds:q19	1517565.07	0.00	1517632.34	0.00	1517632.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00000
7	presto/tpcds:q08	2577100.51	42.96	2577250.94	132.60	2577299.47	46.21	0.01	0.01	0.00	0.01	0.00	0.02458
60	presto/tpcds:q61	1069715.90	164909.90	1069783.57	136809.72	1104093.36	126062.28	0.01	3.21	15.42	12.79	11.42	0.99940
50	presto/tpcds:q51	12604882.82	166.38	12605691.30	163.86	12604504.85	112.30	0.01	-0.00	0.00	0.00	0.00	0.00001
30	presto/tpcds:q31	13790983.93	1160.28	13791907.88	705.56	13791744.96	949.35	0.01	0.01	0.01	0.01	0.01	0.12656
48	presto/tpcds:q49	11200630.03	0.72	11201499.11	1.45	11201499.58	1.54	0.01	0.01	0.00	0.00	0.00	0.00000
34	presto/tpcds:q35	4347670.98	337.84	4348059.34	403.78	4348342.53	424.29	0.01	0.02	0.01	0.01	0.01	0.10091
95	presto/tpcds:q96	356.10	0.22	356.14	0.23	356.06	0.21	0.01	-0.01	0.06	0.06	0.06	0.77993
78	presto/tpcds:q79	1840131.03	0.21	1840320.62	0.20	1840268.21	0.30	0.01	0.01	0.00	0.00	0.00	0.00000
17	presto/tpcds:q18	2836083.94	26.07	2836383.36	21.03	2836421.21	15.86	0.01	0.01	0.00	0.00	0.00	0.00000
66	presto/tpcds:q67	155829560.52	315500.61	155846033.20	200718.48	155706683.29	408735.72	0.01	-0.08	0.20	0.13	0.26	0.91621
35	presto/tpcds:q36	869575.57	112.57	869728.46	59.21	869689.43	48.86	0.02	0.01	0.01	0.01	0.01	0.01467
56	presto/tpcds:q57	2939069.58	0.00	2939721.00	0.00	2939721.00	0.00	0.02	0.02	0.00	0.00	0.00	0.00000
91	presto/tpcds:q92	555417.19	0.00	555541.10	0.00	555321.85	0.00	0.02	-0.02	0.00	0.00	0.00	0.00000
67	presto/tpcds:q68	602041.56	31.99	602190.10	22.20	602183.24	29.32	0.02	0.02	0.01	0.00	0.00	0.00000
31	presto/tpcds:q32	677169.73	0.00	677343.42	0.00	677219.24	0.00	0.03	0.01	0.00	0.00	0.00	0.00000

	query	baseline mean	baseline std.dev	paa union over pooler mean	paa union over pooler std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline std.dev %	paa union over pooler std.dev %	paa union std.dev %	p-value
90	presto/tpcds:q91	132919.66	25.68	132965.38	11.41	132974.65	34.96	0.03	0.04	0.02	0.01	0.03	0.00258
11	presto/tpcds:q12	197884.75	2.78	197966.31	0.00	197966.31	0.00	0.04	0.04	0.00	0.00	0.00	0.00000
49	presto/tpcds:q50	583488.94	0.00	583748.50	0.00	583748.50	0.00	0.04	0.04	0.00	0.00	0.00	0.00000
32	presto/tpcds:q33	1102894.12	367.15	1103492.43	176.02	1103326.34	871.38	0.05	0.04	0.03	0.02	0.08	0.00485
8	presto/tpcds:q09	2308.49	2.37	2309.91	3.00	2308.06	3.37	0.06	-0.02	0.10	0.13	0.15	0.38328
39	presto/tpcds:q40	19512635.10	630356.99	19548428.11	181374.81	19709215.62	388943.75	0.18	1.01	3.23	0.93	1.97	0.89632
72	presto/tpcds:q73	7826.94	0.01	7844.16	0.01	7844.16	0.01	0.22	0.22	0.00	0.00	0.00	0.00000
13	presto/tpcds:q14	7398270.91	13242.35	7415992.74	12022.03	7404952.39	18759.74	0.24	0.09	0.18	0.16	0.25	0.03563
26	presto/tpcds:q27	79729.43	7.36	79930.07	4.99	79928.99	5.37	0.25	0.25	0.01	0.01	0.01	0.00000
55	presto/tpcds:q56	257698.41	897.97	258449.42	874.64	258178.66	526.86	0.29	0.19	0.35	0.34	0.20	0.17297
93	presto/tpcds:q94	19276167.58	3.19	19333374.52	120.89	19347574.32	72.86	0.30	0.37	0.00	0.00	0.00	0.00000
57	presto/tpcds:q58	576468.48	2005.98	578207.16	2905.47	574153.40	3322.80	0.30	-0.40	0.35	0.50	0.58	0.25548
15	presto/tpcds:q16	38494824.51	2.20	38619698.03	86.62	38638216.79	138.08	0.32	0.37	0.00	0.00	0.00	0.00000
98	presto/tpcds:q99	215654.43	0.00	216383.97	0.00	216383.97	0.00	0.34	0.34	0.00	0.00	0.00	0.00000
33	presto/tpcds:q34	16395.37	0.00	16456.69	0.00	16456.69	0.00	0.37	0.37	0.00	0.00	0.00	0.00000
85	presto/tpcds:q86	50605.86	8.92	50822.11	63.49	50853.43	82.52	0.43	0.49	0.02	0.12	0.16	0.00001
51	presto/tpcds:q52	5410.64	0.00	5435.42	0.00	5435.42	0.00	0.46	0.46	0.00	0.00	0.00	0.00000
25	presto/tpcds:q26	520586.86	5862.10	523180.70	10295.36	517497.35	4115.68	0.50	-0.59	1.13	1.97	0.80	0.60348
9	presto/tpcds:q10	308918.19	2371.54	310508.68	589.46	310748.36	15.16	0.51	0.59	0.77	0.19	0.00	0.14196


```
std      8
min     -35
25%     -0
50%      0
75%      0
max      19
Name: % change, dtype: float64
count    99
mean     -1
std       8
min     -35
25%     -0
50%      0
75%      0
max      19
Name: % change base -> paa union, dtype: float64
```

TPC-H Comparison (Peak memory)





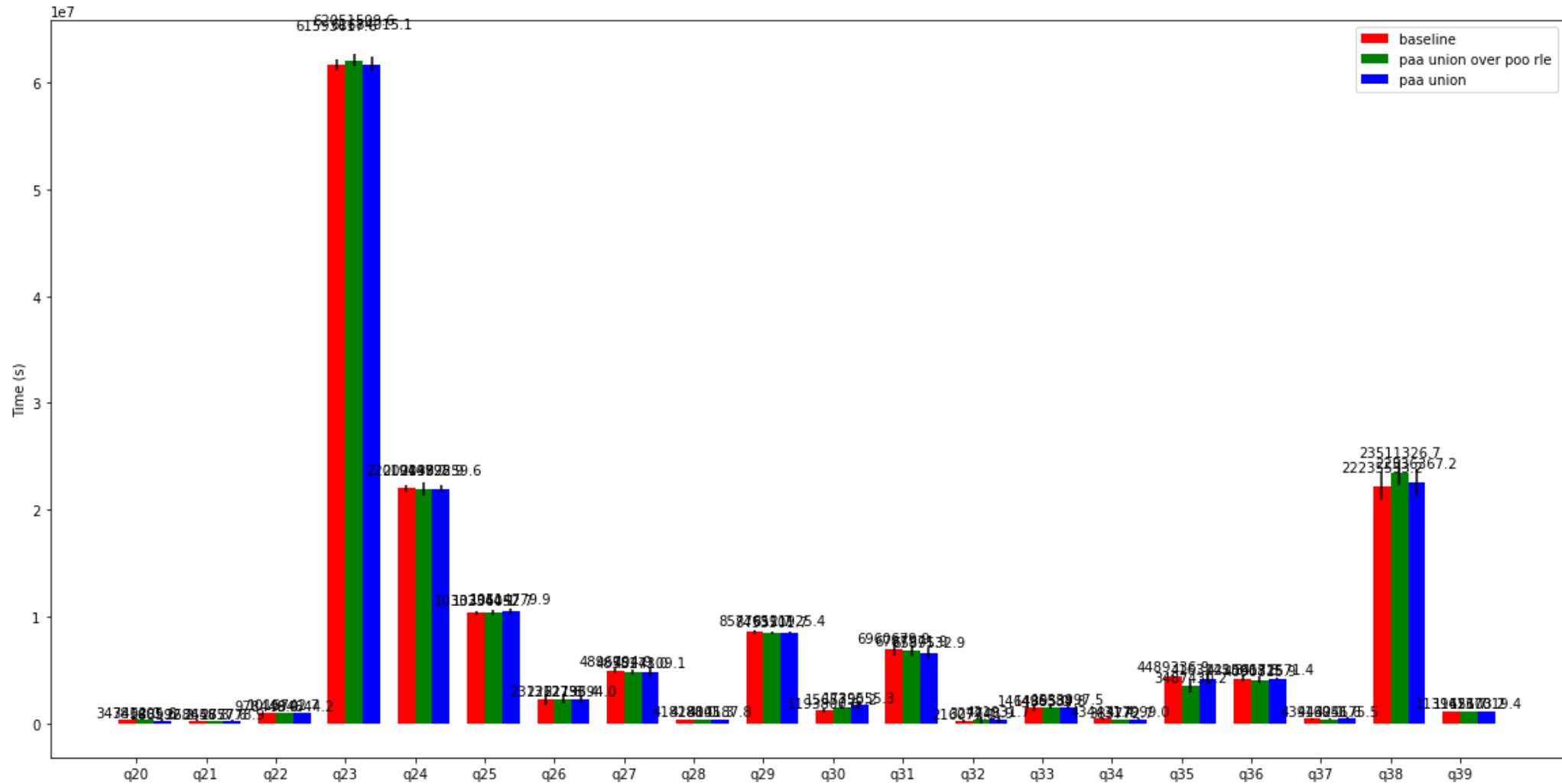
query	baseline mean	baseline std.dev	paa union over poo rle mean	paa union over poo rle std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
7 presto/tpch: q08	22066246.99	1826440.10	19451325.37	632541.80	20250046.01	836197.10	-11.85	-8.23	8.28	3.25	4.13	0.00783
11 presto/tpch: q12	3532456.17	28114.15	3399047.59	59971.92	3666686.47	278709.25	-3.78	3.80	0.80	1.76	7.60	0.00059
6 presto/tpch: q07	17801611.88	1279281.29	17183860.14	455959.54	16622930.71	863969.87	-3.47	-6.62	7.19	2.65	5.20	0.29126
0 presto/tpch: q01	9060086.41	295220.04	8761609.08	427545.39	9028412.87	498735.86	-3.29	-0.35	3.26	4.88	5.52	0.18969
18 presto/tpch: q19	26034865.76	1366025.48	25183717.98	1797592.50	25519013.01	1241678.30	-3.27	-1.98	5.25	7.14	4.87	0.37752

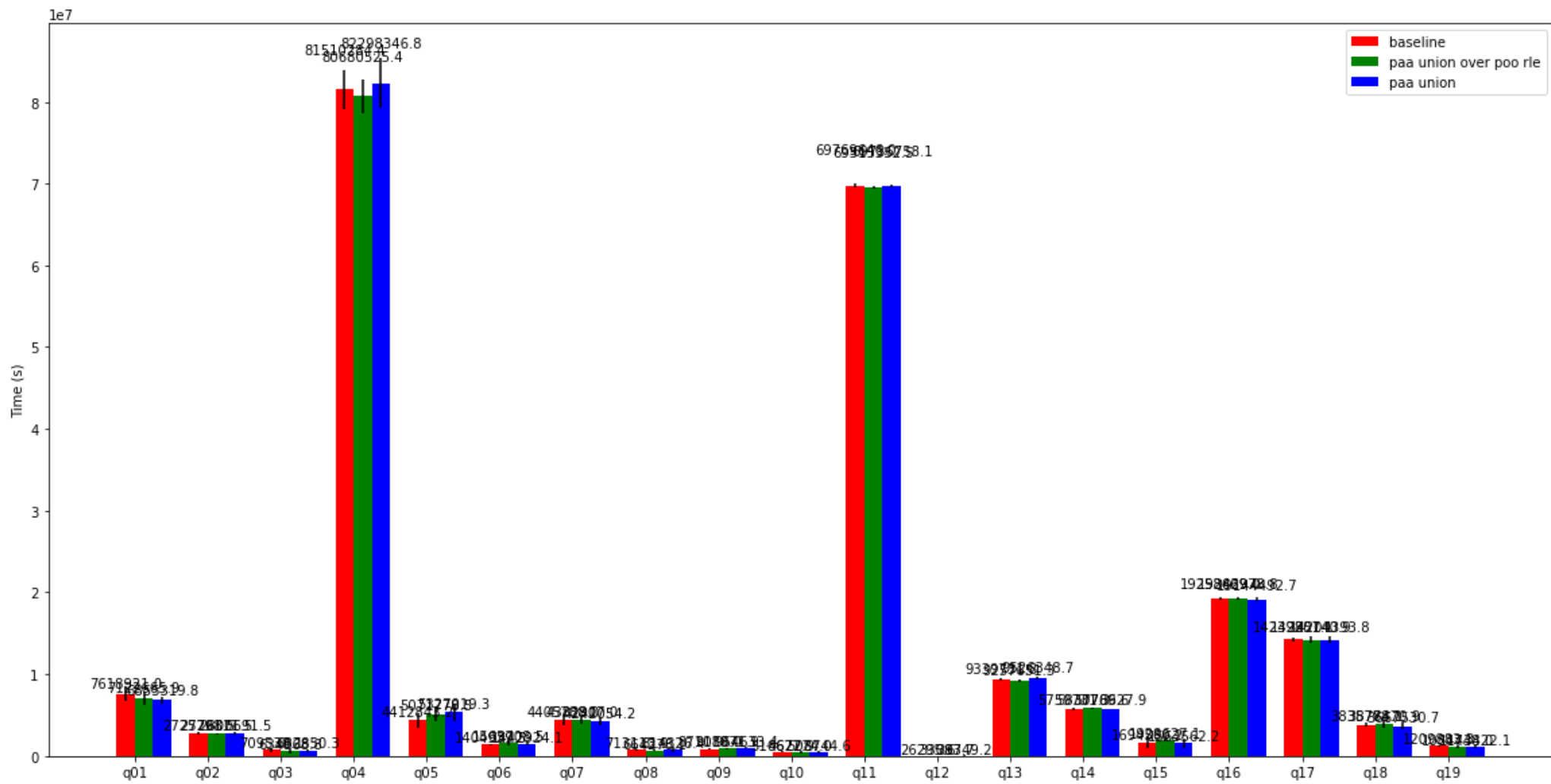

```

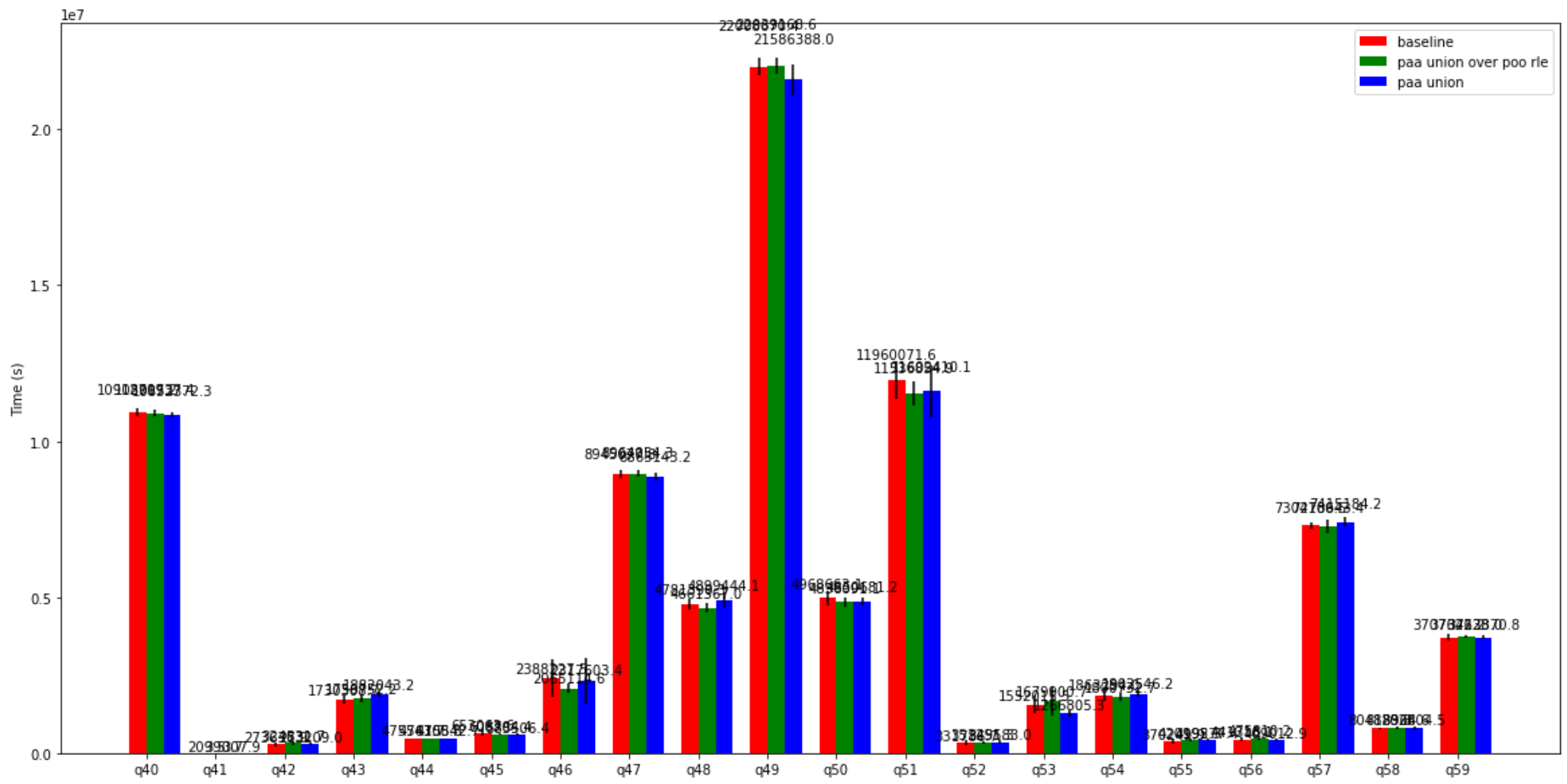
50%      -0
75%       1
max       6
Name: % change, dtype: float64
count    22
mean     0
std      4
min     -8
25%     -1
50%     -0
75%      1
max     13
Name: % change base -> paa union, dtype: float64

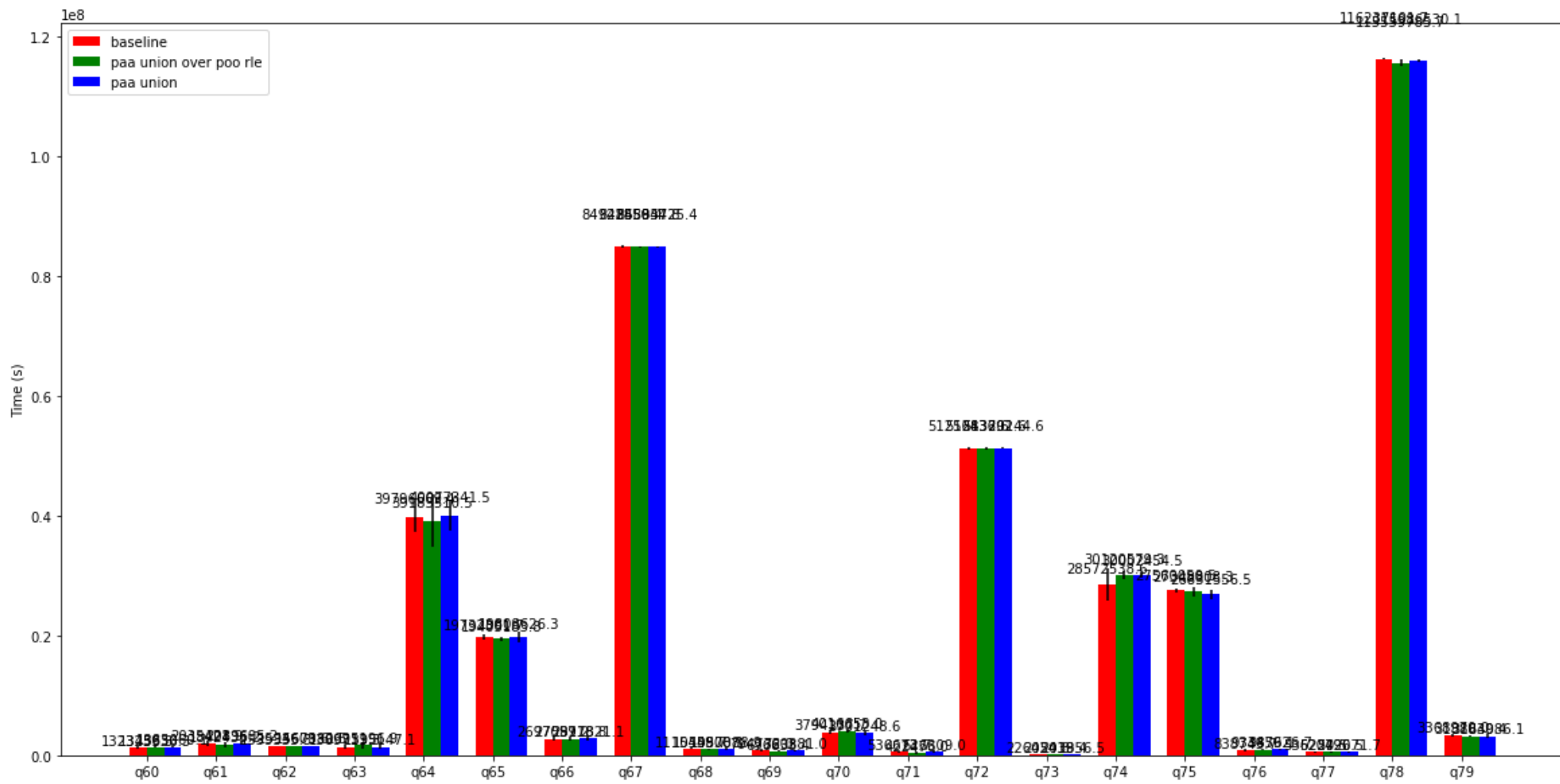
```

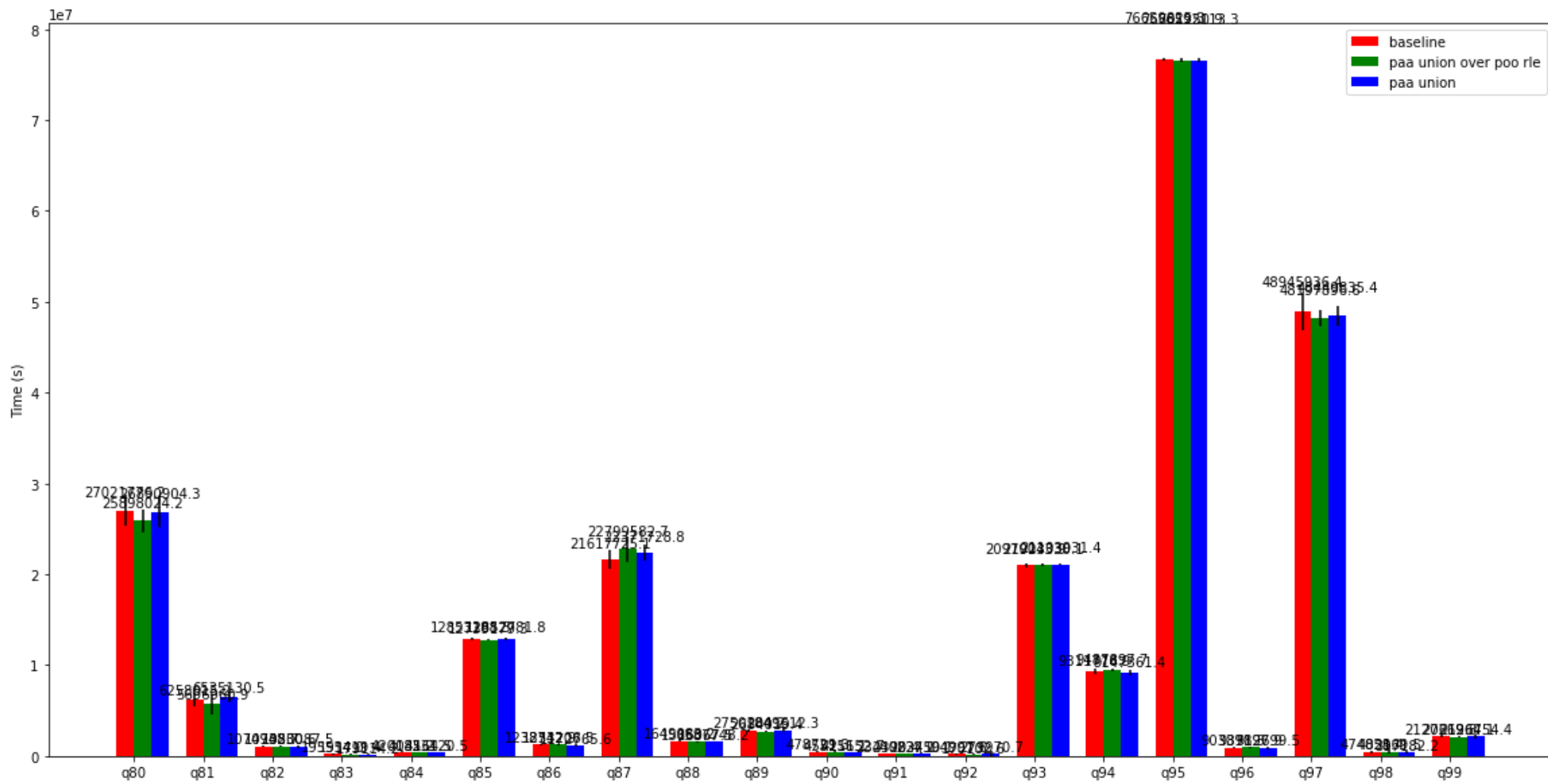
TPC-DS Comparison (Peak memory)

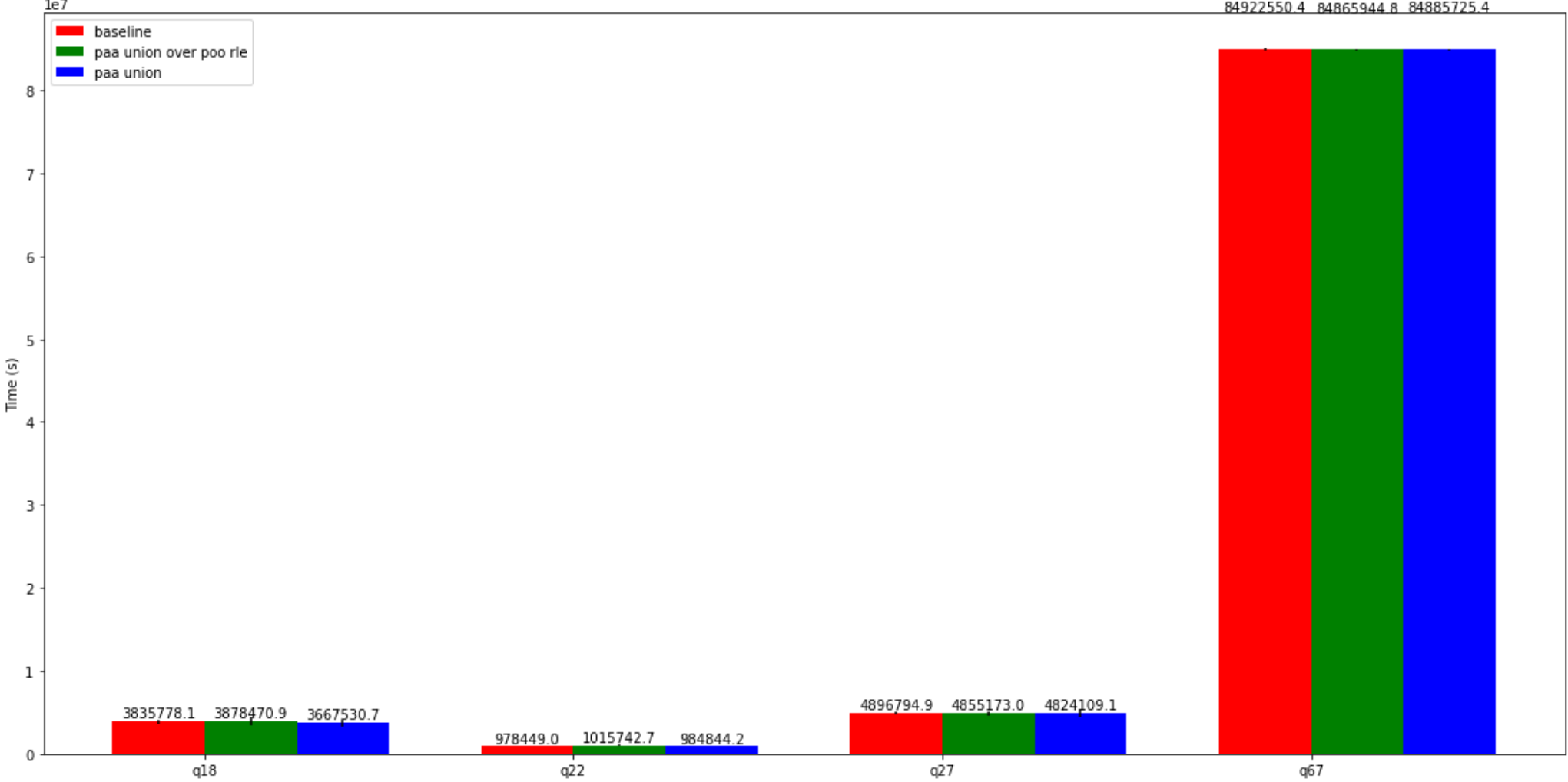












query	baseline mean	baseline std.dev	paa union over poo rle mean	paa union over poo rle std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
34 presto/tpcds: q35	4489336.91	94976.54	3487430.16	533221.97	4163245.80	482841.67	-22.32	-7.26	2.12	15.29	11.60	0.00109
70 presto/tpcds: q71	536673.70	164452.72	422476.04	142302.58	626308.98	128292.13	-21.28	16.70	30.64	33.68	20.48	0.22734
45 presto/tpcds: q46	2388227.54	604828.10	2065114.62	154874.90	2317603.38	749876.42	-13.53	-2.96	25.33	7.50	32.36	0.23364
91 presto/tpcds: q92	194997.58	141680.83	170102.59	113363.16	279970.74	258857.57	-12.77	43.58	72.66	66.64	92.46	0.74376
68 presto/tpcds: q69	794732.00	175227.98	696638.36	107463.39	760381.01	127589.24	-12.34	-4.32	22.05	15.43	16.78	0.26954

	query	baseline mean	baseline std.dev	paa union over poo rle mean	paa union over poo rle std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
33	presto/tpcds:q34	434431.40	103689.89	383772.72	34123.46	417999.03	91664.39	-11.66	-3.78	23.87	8.89	21.93	0.28215
9	presto/tpcds:q10	516677.94	132339.25	462274.00	140287.79	508744.63	131022.63	-10.53	-1.54	25.61	30.35	25.75	0.50530
2	presto/tpcds:q03	709538.07	302400.67	634968.83	299875.03	682850.33	179959.11	-10.51	-3.76	42.62	47.23	26.35	0.67709
18	presto/tpcds:q19	1209883.29	119648.79	1084748.00	124608.59	1143422.13	146306.78	-10.34	-5.49	9.89	11.49	12.80	0.10640
60	presto/tpcds:q61	2035421.87	499297.87	1842436.25	442430.90	2089695.23	349462.29	-9.48	2.67	24.53	24.01	16.72	0.49476
72	presto/tpcds:q73	226424.82	28573.29	205419.40	27735.34	203856.48	26801.71	-9.28	-9.97	12.62	13.50	13.15	0.22538
80	presto/tpcds:q81	6258015.21	746491.86	5696960.87	1060081.46	6535130.52	569477.72	-8.97	4.43	11.93	18.61	8.71	0.31409
20	presto/tpcds:q21	268658.34	36518.93	244657.59	30238.48	277778.88	42660.63	-8.93	3.39	13.59	12.36	15.36	0.24330
7	presto/tpcds:q08	713113.91	47841.64	664278.09	95867.47	814326.42	355335.32	-6.85	14.19	6.71	14.43	43.64	0.29032
44	presto/tpcds:q45	653063.65	120458.43	608704.43	21423.07	585506.39	38856.07	-6.79	-10.34	18.45	3.52	6.64	0.39535
0	presto/tpcds:q01	7618921.03	894201.09	7122665.89	810292.51	6855319.82	391938.76	-6.51	-10.02	11.74	11.38	5.72	0.33753
67	presto/tpcds:q68	1115459.68	81112.14	1054808.09	98052.53	1057088.91	143368.52	-5.44	-5.23	7.27	9.30	13.56	0.27010
78	presto/tpcds:q79	3368969.98	280123.78	3188839.39	141184.47	3164086.13	283887.29	-5.35	-6.08	8.31	4.43	8.97	0.18986
36	presto/tpcds:q37	439432.12	66138.07	416056.60	92770.27	494175.51	86730.58	-5.32	12.46	15.05	22.30	17.55	0.62615
89	presto/tpcds:q90	478729.35	78873.06	455156.11	73155.19	421152.67	51170.94	-4.92	-12.03	16.48	16.07	12.15	0.60317
79	presto/tpcds:q80	27021776.22	1745300.80	25898024.24	1224079.65	26890904.33	1706140.23	-4.16	-0.48	6.46	4.73	6.34	0.22567
83	presto/tpcds:q84	420185.18	73797.86	403164.50	34409.10	423120.51	56767.30	-4.05	0.70	17.56	8.53	13.42	0.61975
87	presto/tpcds:q88	1649083.16	55394.82	1586067.52	72398.30	1587748.16	42074.25	-3.82	-3.72	3.36	4.56	2.65	0.12128
50	presto/tpcds:q51	11960071.58	583690.04	11536854.92	396809.17	11602410.09	828735.36	-3.54	-2.99	4.88	3.44	7.14	0.17263

	query	baseline mean	baseline std.dev	paa union over poo rle mean	paa union over poo rle std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
53	presto/tpcds:q54	1863293.96	183293.49	1800732.68	115572.95	1902546.24	92077.47	-3.36	2.11	9.84	6.42	4.84	0.49559
98	presto/tpcds:q99	2127269.79	151994.39	2061964.12	74624.79	2126754.43	198299.70	-3.07	-0.02	7.15	3.62	9.32	0.36707
35	presto/tpcds:q36	4215663.78	310708.45	4090815.93	318914.25	4172571.39	111862.93	-2.96	-1.02	7.37	7.80	2.68	0.50780
76	presto/tpcds:q77	536220.50	36303.64	520796.46	40021.15	542071.75	52007.55	-2.88	1.09	6.77	7.68	9.59	0.50036
49	presto/tpcds:q50	4968663.13	237389.13	4836091.09	146621.67	4850681.16	138464.69	-2.67	-2.37	4.78	3.03	2.85	0.27150
47	presto/tpcds:q48	4781390.30	179834.49	4661367.00	160373.34	4899444.10	261878.04	-2.51	2.47	3.76	3.44	5.35	0.25041
30	presto/tpcds:q31	6960679.91	667454.62	6787971.93	441131.54	6589532.89	463906.68	-2.48	-5.33	9.59	6.50	7.04	0.60850
88	presto/tpcds:q89	2750104.15	143238.38	2684019.37	90780.82	2849612.31	187715.46	-2.40	3.62	5.21	3.38	6.59	0.36231
82	presto/tpcds:q83	195553.99	27844.05	191419.39	23806.62	179114.17	41202.56	-2.11	-8.41	14.24	12.44	23.00	0.78783
64	presto/tpcds:q65	19732301.73	408519.15	19405183.81	316253.69	19808626.34	909252.53	-1.66	0.39	2.07	1.63	4.59	0.15196
63	presto/tpcds:q64	39796669.42	2483655.57	39183510.49	4337532.27	40077341.46	2497984.34	-1.54	0.71	6.24	11.07	6.23	0.76996
96	presto/tpcds:q97	48945936.41	2021243.81	48197896.59	934733.45	48449835.37	1068365.63	-1.53	-1.01	4.13	1.94	2.21	0.42980
28	presto/tpcds:q29	8577612.74	183373.22	8453501.71	153794.78	8511925.41	122141.26	-1.45	-0.77	2.14	1.82	1.43	0.23275
3	presto/tpcds:q04	81510284.38	2378839.39	80680525.43	2045054.94	82298346.85	3046557.22	-1.02	0.97	2.92	2.53	3.70	0.53165
84	presto/tpcds:q85	12853188.31	170197.17	12739179.34	75369.47	12852781.77	120394.65	-0.89	-0.00	1.32	0.59	0.94	0.16443
12	presto/tpcds:q13	9339731.83	164096.94	9257651.26	187806.19	9526348.65	201643.89	-0.88	2.00	1.76	2.03	2.12	0.43890
26	presto/tpcds:q27	4896794.92	239707.62	4855173.00	258820.02	4824109.07	497055.69	-0.85	-1.48	4.90	5.33	10.30	0.77848
74	presto/tpcds:q75	27560050.53	318027.72	27348808.33	818054.11	26831556.51	703126.50	-0.77	-2.64	1.15	2.99	2.62	0.56858
77	presto/tpcds:q78	116237101.72	149997.18	115559785.71	518651.73	115986530.10	184892.91	-0.58	-0.22	0.13	0.45	0.16	0.01178

	query	baseline mean	baseline std.dev	paa union over poole mean	paa union over poole std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline std.dev %	paa union over poole std.dev %	paa union std.dev %	p-value
6	presto/tpcds:q07	4405787.97	618675.38	4382907.04	440762.45	4242054.21	439076.34	-0.52	-3.72	14.04	10.06	10.35	0.94264
10	presto/tpcds:q11	69769645.98	255023.49	69515352.51	175496.15	69736758.06	207162.94	-0.36	-0.05	0.37	0.25	0.30	0.07192
56	presto/tpcds:q57	7304100.51	105765.91	7278643.42	206915.79	7415184.17	132945.64	-0.35	1.52	1.45	2.84	1.79	0.79389
23	presto/tpcds:q24	2200038.74	333306.71	21944798.86	641144.02	21992259.58	286083.68	-0.25	-0.04	1.52	2.92	1.30	0.85521
39	presto/tpcds:q40	10912709.21	123310.26	10891737.37	100672.73	10852372.30	86944.37	-0.19	-0.55	1.13	0.92	0.80	0.75356
81	presto/tpcds:q82	1074948.72	111539.19	1073230.56	101462.62	1050087.47	125137.57	-0.16	-2.31	10.38	9.45	11.92	0.97828
16	presto/tpcds:q17	14239807.05	237114.92	14225140.93	399049.60	14204393.84	407633.73	-0.10	-0.25	1.67	2.81	2.87	0.93984
15	presto/tpcds:q16	19258669.00	200156.45	19242978.82	120482.43	19144492.74	237222.36	-0.08	-0.59	1.04	0.63	1.24	0.87261
94	presto/tpcds:q95	76659825.31	154027.51	76601250.95	219980.90	76592113.32	233778.00	-0.08	-0.09	0.20	0.29	0.31	0.60482
27	presto/tpcds:q28	418288.04	7411.96	418005.29	6016.76	414187.76	1575.12	-0.07	-0.98	1.77	1.44	0.38	0.94360
66	presto/tpcds:q67	84922550.44	152634.46	84865944.80	113558.77	84885725.36	87034.16	-0.07	-0.04	0.18	0.13	0.10	0.48283
25	presto/tpcds:q26	2312611.78	502946.55	2312733.37	480374.58	2279694.02	395880.31	0.01	-1.42	21.75	20.77	17.37	0.99967
1	presto/tpcds:q02	2725791.48	164536.36	2726811.53	109967.66	2800691.49	136441.92	0.04	2.75	6.04	4.03	4.87	0.99017
71	presto/tpcds:q72	51256436.61	161225.51	51283792.59	249820.58	51320144.64	179894.83	0.05	0.12	0.31	0.49	0.35	0.82623
43	presto/tpcds:q44	475543.67	868.54	476108.77	817.49	475542.67	609.89	0.12	-0.00	0.18	0.17	0.13	0.27280
48	presto/tpcds:q49	22008670.44	261996.13	22039168.63	248154.14	21586388.02	507505.08	0.14	-1.92	1.19	1.13	2.35	0.84015
92	presto/tpcds:q93	20979043.93	189254.42	21023330.07	124216.26	21103931.44	72629.17	0.21	0.60	0.90	0.59	0.34	0.64211
46	presto/tpcds:q47	8945077.79	132316.39	8964054.26	98037.17	8865143.21	140818.89	0.21	-0.89	1.48	1.09	1.59	0.78350
24	presto/tpcds:q25	10332344.10	200282.45	10356052.67	265211.23	10514779.86	263539.78	0.23	1.77	1.94	2.56	2.51	0.86477

	query	baseline mean	baseline std.dev	paa union over poo rle mean	paa union over poo rle std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
38	presto/tpcds:q39	1139626.74	13014.38	1145103.22	19460.80	1137019.42	8710.98	0.48	-0.23	1.14	1.70	0.77	0.57931
58	presto/tpcds:q59	3707622.22	96306.73	3734622.97	52174.84	3713870.80	61609.06	0.73	0.17	2.60	1.40	1.66	0.55941
22	presto/tpcds:q23	61593617.59	501238.97	62051509.56	601993.94	61684015.07	687689.32	0.74	0.15	0.81	0.97	1.11	0.18271
17	presto/tpcds:q18	3835778.12	293142.24	3878470.95	515973.07	3667530.72	476310.13	1.11	-4.39	7.64	13.30	12.99	0.86364
85	presto/tpcds:q86	1238742.91	48153.71	1253206.55	37601.85	1172765.63	125808.01	1.17	-5.33	3.89	3.00	10.73	0.57482
13	presto/tpcds:q14	5759731.32	125156.47	5830769.61	34572.40	5778627.92	15255.98	1.23	0.33	2.17	0.59	0.26	0.20986
42	presto/tpcds:q43	1730308.71	130394.45	1756752.17	143719.24	1882043.19	103171.62	1.53	8.77	7.54	8.18	5.48	0.74544
59	presto/tpcds:q60	1323259.32	158445.87	1343636.35	103049.81	1385060.13	163763.85	1.54	4.67	11.97	7.67	11.82	0.79708
97	presto/tpcds:q98	474058.41	138022.95	482169.53	266512.02	397182.16	125759.44	1.71	-16.22	29.12	55.27	31.66	0.94852
57	presto/tpcds:q58	804823.76	22209.52	818964.57	35008.12	802804.47	65536.59	1.76	-0.25	2.76	4.27	8.16	0.42296
93	presto/tpcds:q94	9311776.91	256084.33	9487897.66	201018.95	9147361.39	251786.06	1.89	-1.77	2.75	2.12	2.75	0.21461
32	presto/tpcds:q33	1464894.99	274065.92	1496584.84	84944.92	1533997.51	206169.32	2.16	4.72	18.71	5.68	13.44	0.79225
65	presto/tpcds:q66	2697057.18	336054.32	2759918.85	425828.34	2817821.06	338170.66	2.33	4.48	12.46	15.43	12.00	0.78231
90	presto/tpcds:q91	234390.43	15247.74	240227.09	17195.52	283450.06	73375.84	2.49	20.93	6.51	7.16	25.89	0.54781
61	presto/tpcds:q62	1539335.25	27334.14	1594609.57	29438.29	1567380.46	44249.04	3.59	1.82	1.78	1.85	2.82	0.00712
21	presto/tpcds:q22	978449.05	8603.30	1015742.71	29356.12	984844.22	19939.37	3.81	0.65	0.88	2.89	2.02	0.01366
8	presto/tpcds:q09	871109.99	74667.28	908871.94	121165.84	964633.40	81077.63	4.33	10.74	8.57	13.33	8.41	0.53040
73	presto/tpcds:q74	28572538.57	2733540.49	30120579.31	711349.10	30002454.52	479082.01	5.42	5.00	9.57	2.36	1.60	0.20912
86	presto/tpcds:q87	21617725.15	1008774.01	22799582.73	1397054.85	22371728.83	836945.81	5.47	3.49	4.67	6.13	3.74	0.12388


```
std      13
min     -22
25%     -3
50%     -0
75%      2
max      86
Name: % change, dtype: float64
count    99
mean      3
std      15
min     -18
25%     -3
50%     -0
75%      3
max      95
Name: % change base -> paa union, dtype: float64
```