

Out[1]: [Show Code](#)

```
Out[4]: [('paa-union-baseline-oss-379-S-da1858e95b-hive_sf1000_orc_unpart-t67',  
         'baseline unpart',  
         'r'),  
        ('paa-union-over-poo-rle-oss-379-S-b3b339f165-hive_sf1000_orc_unpart-t71',  
         'paa union over poo rle',  
         'g'),  
        ('paa-union-oss-379-S-c5b8233c12-hive_sf1000_orc_unpart-t68',  
         'paa union',  
         'b')]
```

## 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 unpart	553	1,533	65,436	209,454	1,913	3,105	601,302,945	1,074,280,804	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	paa union over poo rle	528	1,526	61,953	207,275	1,723	3,002	604,075,655	1,070,532,458	-4.56	-0.51	-5.32	-1.04	-9.92	-3.30	0.46	-0.35
2	paa union	527	1,519	62,845	206,236	1,740	3,009	601,753,912	1,074,434,534	-4.67	-0.93	-3.96	-1.54	-9.06	-3.09	0.07	0.01

## FAILED QUERIES

### baseline unpart

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

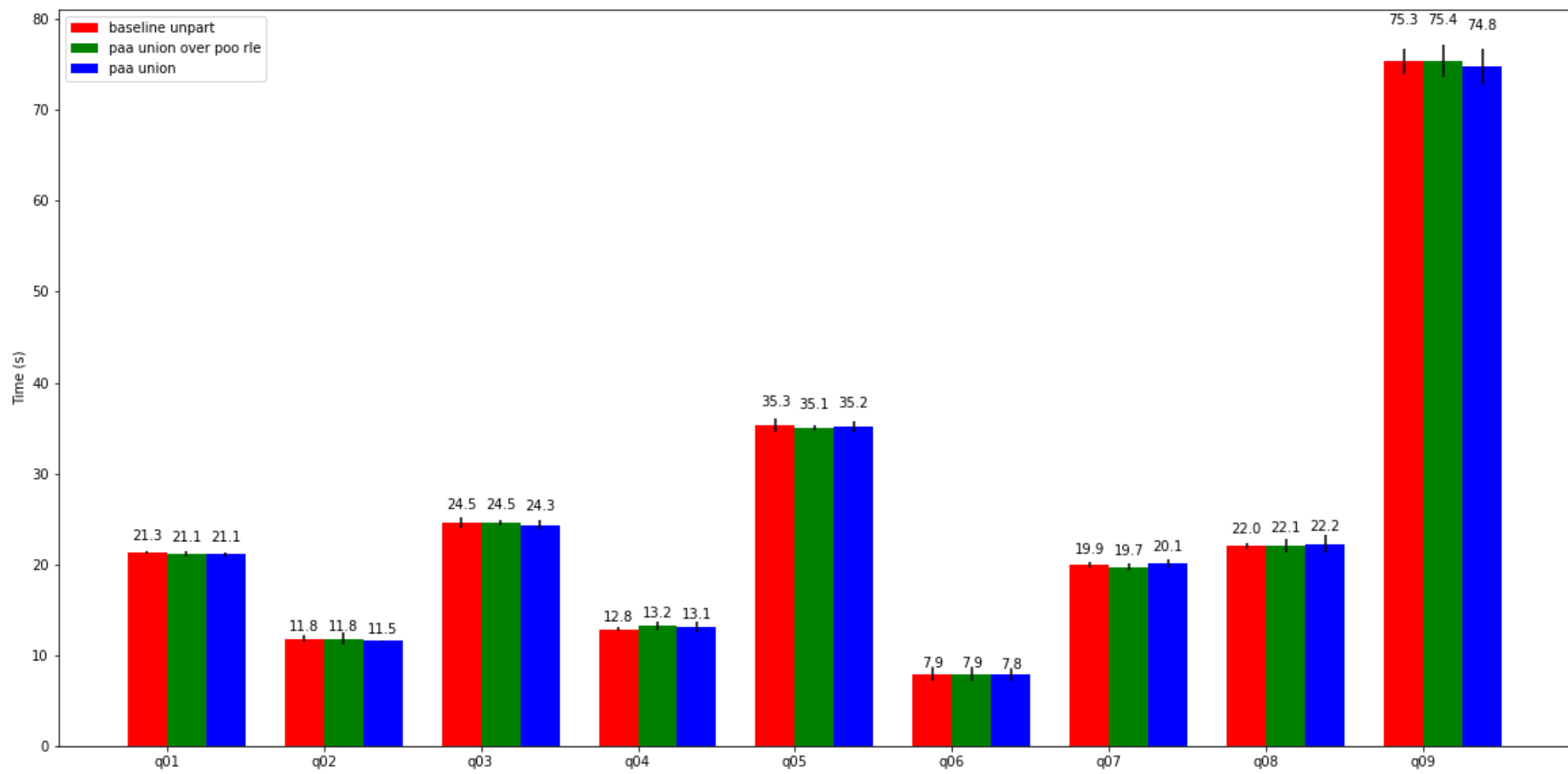
### paa union over poo rle

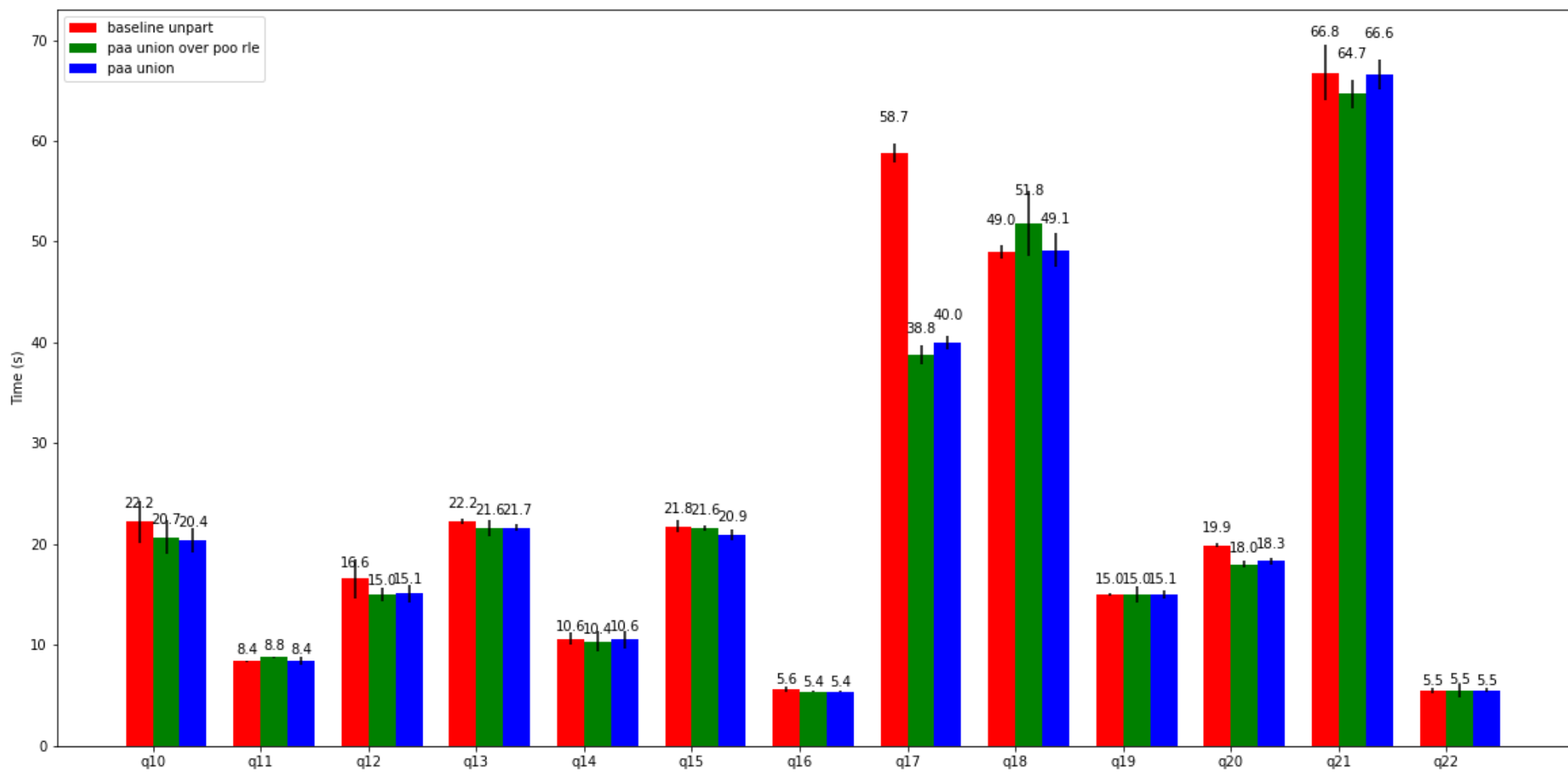
benchmark	query	mean_duration	std_dev
-----------	-------	---------------	---------

### paa union

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

## TPC-H Comparison (DURATION)





query	baseline unpart mean	baseline unpart 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 unpart std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
16 presto/tpch: q17	58.73	0.94	38.77	0.93	40.01	0.69	-33.98	-31.88	1.61	2.41	1.72	0.00000
11 presto/tpch: q12	16.56	1.89	14.97	0.68	15.09	0.92	-9.63	-8.89	11.42	4.52	6.09	0.08046
19 presto/tpch: q20	19.87	0.20	18.03	0.30	18.34	0.34	-9.23	-7.71	1.00	1.67	1.88	0.00000
9 presto/tpch: q10	22.21	2.13	20.68	1.67	20.39	1.15	-6.91	-8.22	9.58	8.07	5.63	0.19417
15 presto/tpch: q16	5.58	0.27	5.36	0.07	5.40	0.11	-3.99	-3.18	4.90	1.32	2.11	0.08249

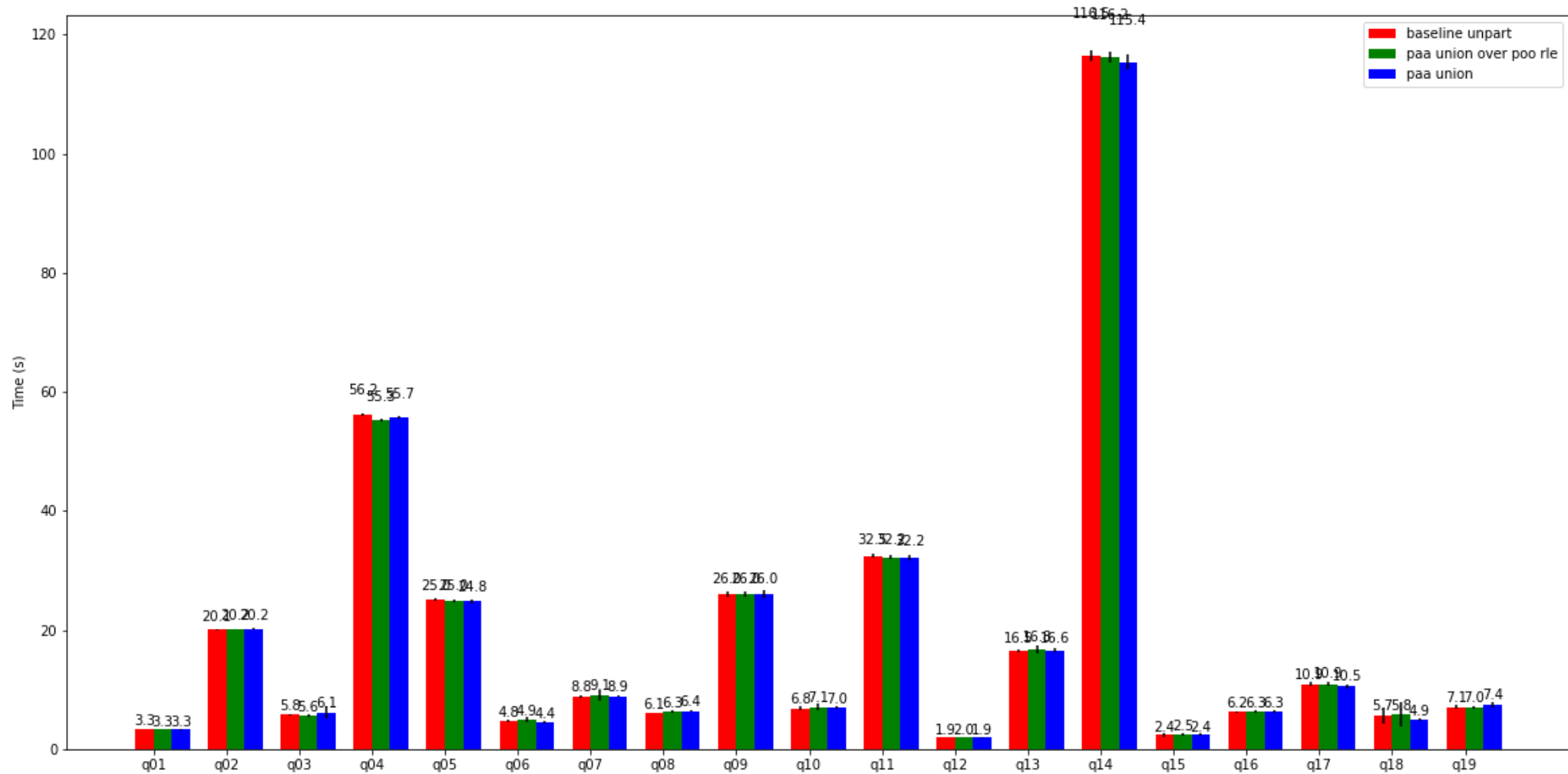


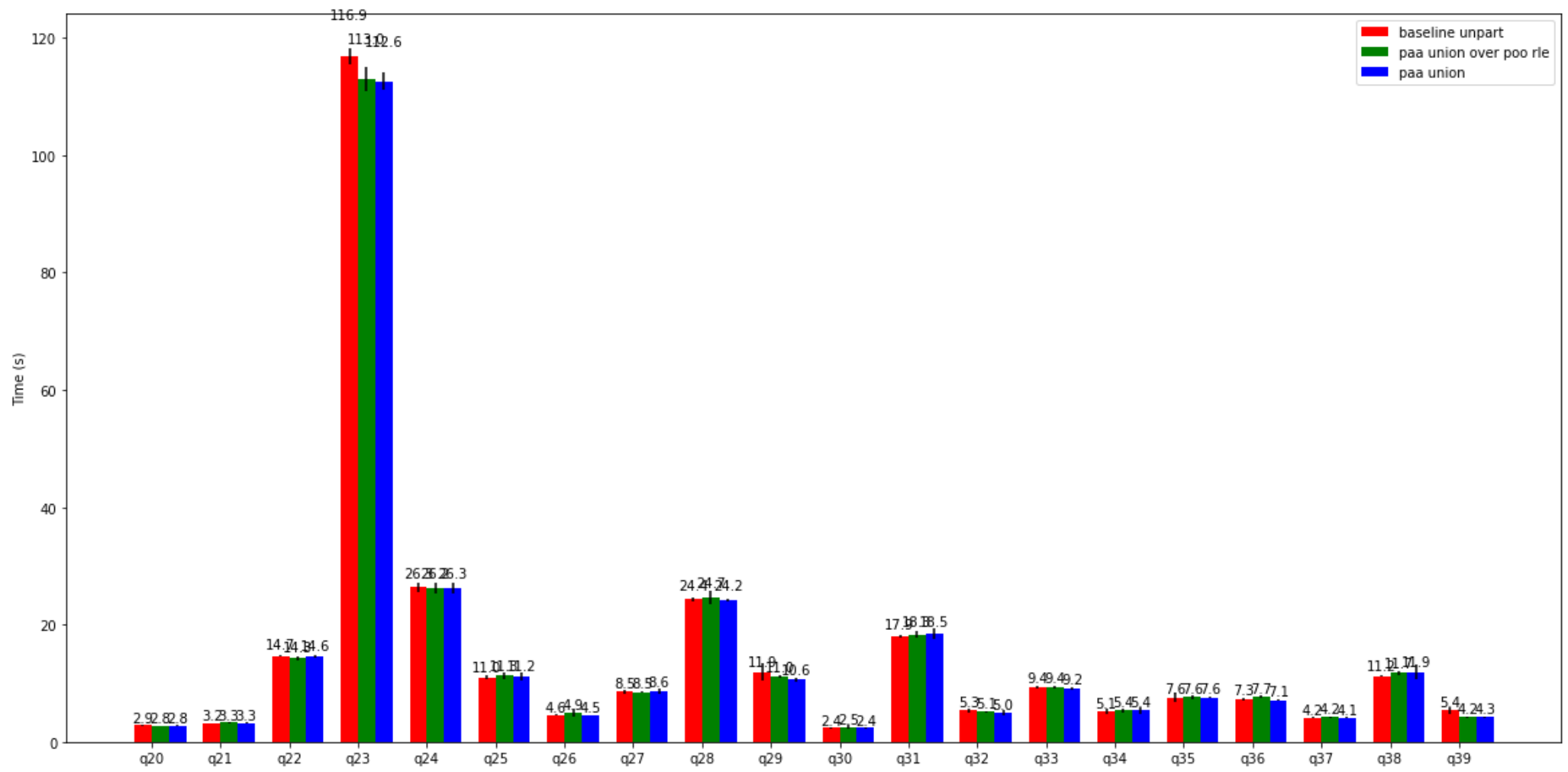
```

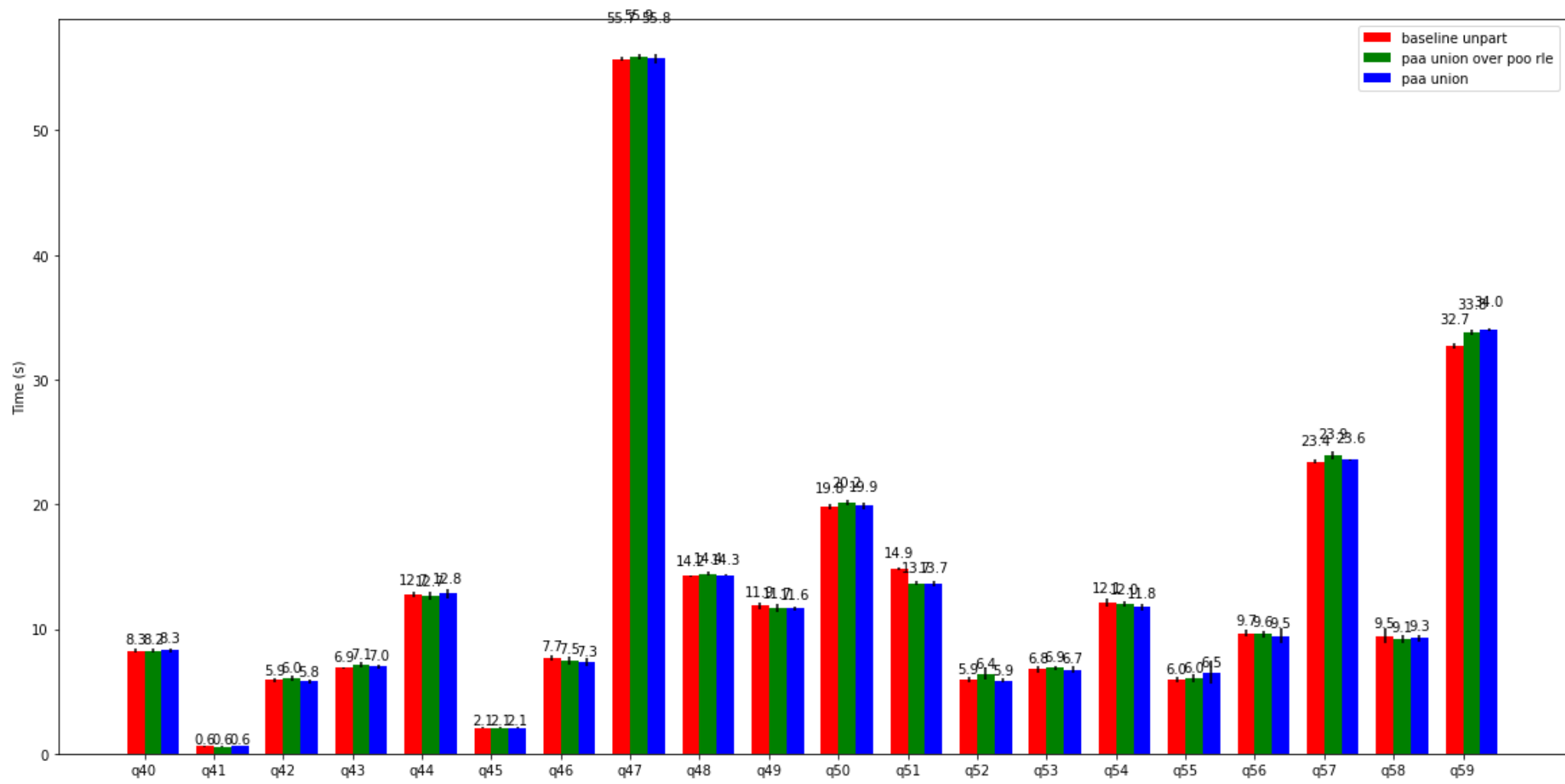
75%      0
max       6
Name: % change, dtype: float64
count    22
mean     -3
std       7
min     -32
25%     -3
50%     -1
75%      0
max       2
Name: % change base -> paa union, dtype: float64

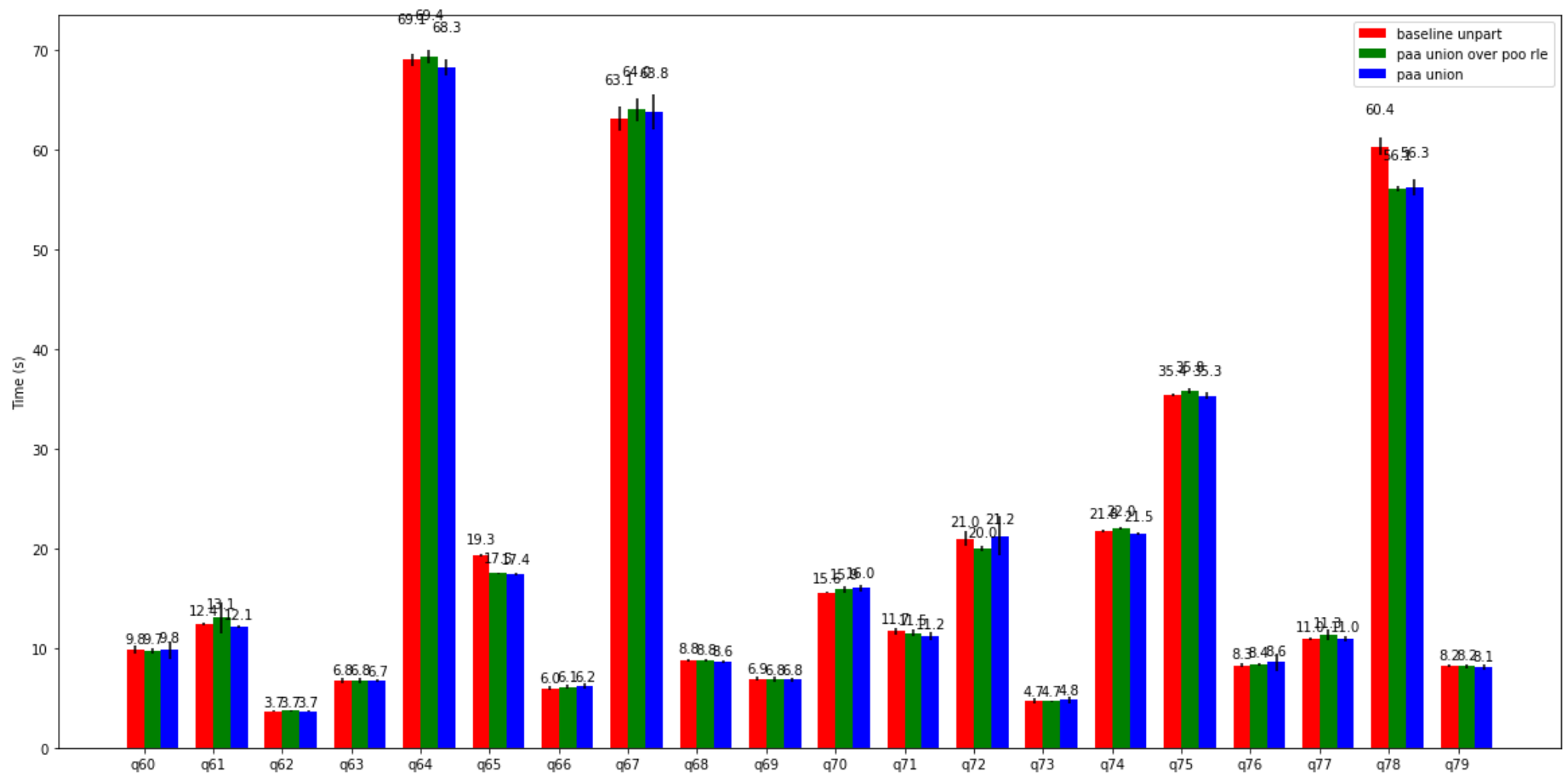
```

## TPC-DS Comparison (DURATION)

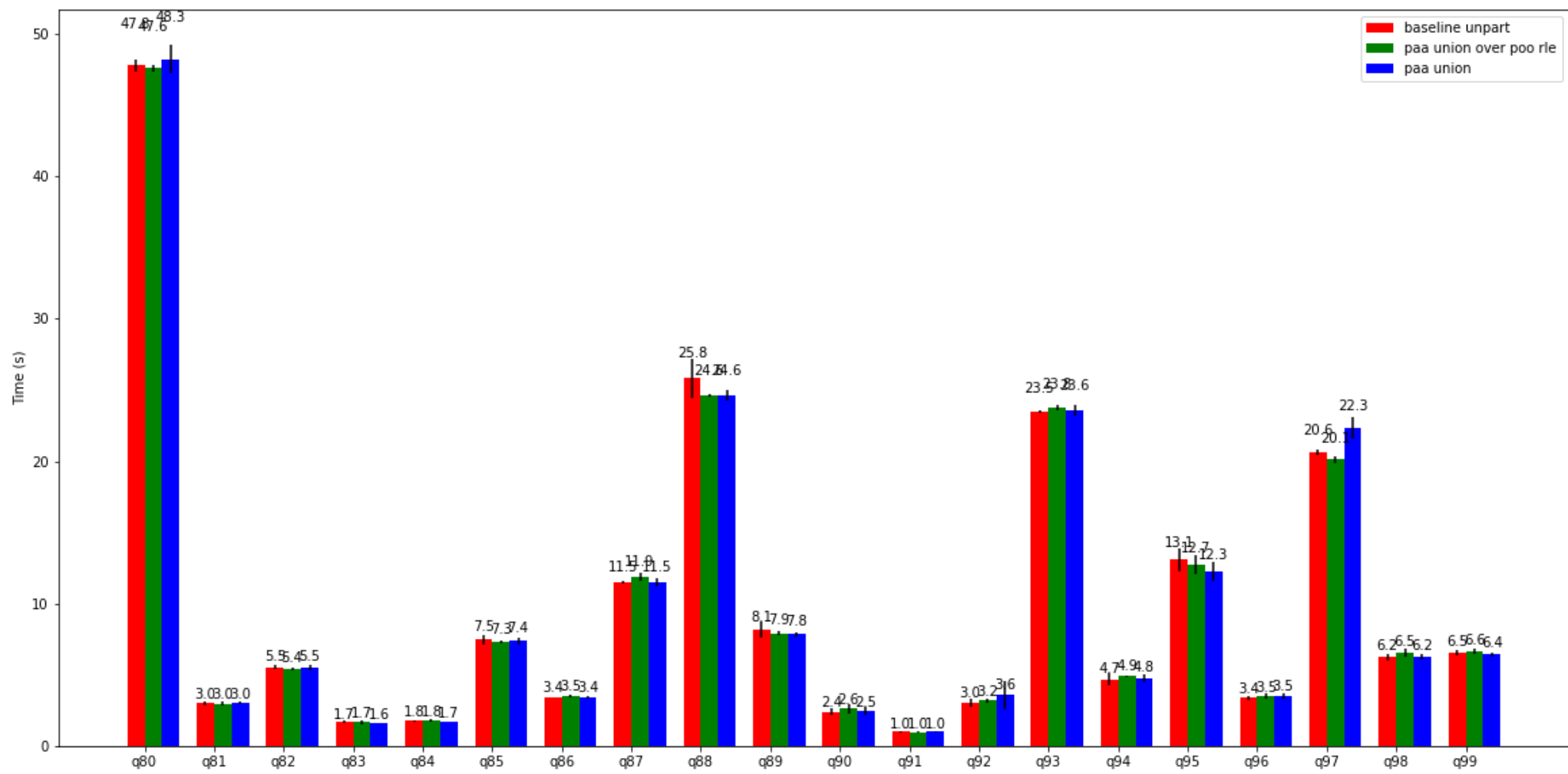


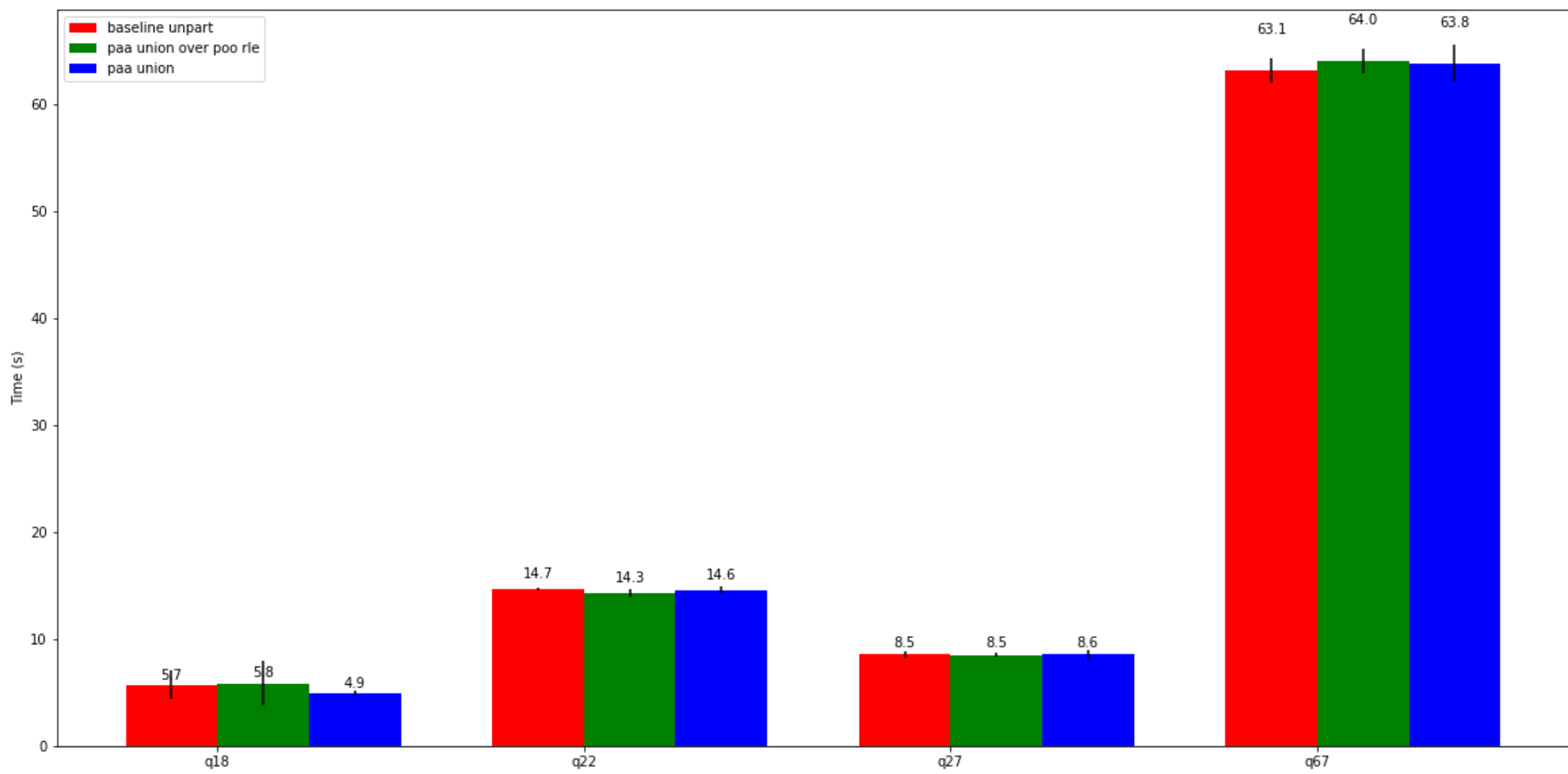












query	baseline unpart mean	baseline unpart std.dev	paa union over poo rle mean	paa union over poo rle std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline unpart std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
38 presto/tpcds: q39	5.37	0.58	4.19	0.13	4.27	0.12	-22.05	-20.60	10.87	3.06	2.91	0.00067
64 presto/tpcds: q65	19.29	0.10	17.52	0.10	17.37	0.13	-9.21	-9.95	0.54	0.56	0.73	0.00000
40 presto/tpcds: q41	0.62	0.06	0.57	0.03	0.62	0.03	-8.12	-1.31	9.12	5.24	5.57	0.08263
50 presto/tpcds: q51	14.87	0.10	13.67	0.16	13.65	0.21	-8.06	-8.20	0.68	1.19	1.51	0.00000
77 presto/tpcds: q78	60.36	0.85	56.05	0.27	56.27	0.85	-7.13	-6.77	1.40	0.48	1.50	0.00000

	query	baseline unpart mean	baseline unpart 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 unpart std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
28	presto/tpcds: q29	11.89	1.54	11.05	0.25	10.62	0.35	-7.05	-10.63	12.93	2.25	3.27	0.21695
71	presto/tpcds: q72	20.98	0.74	19.96	0.28	21.22	1.95	-4.87	1.16	3.53	1.41	9.19	0.01019
31	presto/tpcds: q32	5.34	0.39	5.10	0.12	4.97	0.44	-4.61	-6.96	7.22	2.38	8.90	0.16683
87	presto/tpcds: q88	25.82	1.37	24.64	0.10	24.64	0.41	-4.57	-4.57	5.31	0.40	1.67	0.06197
19	presto/tpcds: q20	2.88	0.16	2.75	0.05	2.78	0.14	-4.26	-3.33	5.48	1.76	5.00	0.09907
57	presto/tpcds: q58	9.46	0.58	9.14	0.32	9.29	0.28	-3.37	-1.85	6.12	3.53	3.01	0.26640
22	presto/tpcds: q23	116.90	1.32	113.03	2.10	112.59	1.51	-3.31	-3.68	1.13	1.86	1.34	0.00338
90	presto/tpcds: q91	0.98	0.07	0.95	0.07	0.99	0.07	-2.92	0.95	6.78	7.16	7.36	0.47874
94	presto/tpcds: q95	13.09	0.80	12.72	0.65	12.27	0.64	-2.87	-6.31	6.15	5.14	5.21	0.39467
45	presto/tpcds: q46	7.68	0.23	7.47	0.28	7.32	0.31	-2.81	-4.64	3.02	3.76	4.30	0.17789
88	presto/tpcds: q89	8.14	0.57	7.92	0.14	7.84	0.14	-2.65	-3.71	7.04	1.74	1.78	0.39163
21	presto/tpcds: q22	14.66	0.16	14.28	0.37	14.58	0.28	-2.62	-0.56	1.06	2.60	1.92	0.04138
96	presto/tpcds: q97	20.61	0.22	20.11	0.24	22.31	0.77	-2.45	8.21	1.06	1.18	3.44	0.00321
2	presto/tpcds: q03	5.75	0.14	5.62	0.27	6.14	1.03	-2.27	6.72	2.50	4.76	16.73	0.31651
81	presto/tpcds: q82	5.52	0.16	5.42	0.11	5.47	0.20	-1.81	-0.88	2.93	2.08	3.61	0.24180
84	presto/tpcds: q85	7.46	0.33	7.33	0.12	7.38	0.24	-1.73	-1.02	4.37	1.61	3.18	0.38313
3	presto/tpcds: q04	56.21	0.28	55.25	0.28	55.71	0.18	-1.70	-0.89	0.50	0.50	0.32	0.00015
48	presto/tpcds: q49	11.86	0.26	11.69	0.33	11.64	0.16	-1.41	-1.87	2.17	2.82	1.41	0.35131
70	presto/tpcds: q71	11.67	0.32	11.51	0.31	11.19	0.40	-1.40	-4.14	2.71	2.66	3.60	0.38537

	query	baseline unpart mean	baseline unpart 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 unpart std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
0	presto/tpcds:q01	3.34	0.02	3.30	0.04	3.26	0.07	-1.17	-2.45	0.73	1.34	2.05	0.08643
59	presto/tpcds:q60	9.80	0.41	9.70	0.23	9.83	0.89	-1.01	0.31	4.23	2.34	9.05	0.62064
53	presto/tpcds:q54	12.12	0.34	12.01	0.21	11.75	0.28	-0.96	-3.06	2.76	1.76	2.42	0.48650
55	presto/tpcds:q56	9.67	0.29	9.58	0.29	9.45	0.61	-0.93	-2.25	2.99	3.02	6.40	0.60353
72	presto/tpcds:q73	4.71	0.21	4.67	0.09	4.80	0.33	-0.85	1.93	4.50	1.94	6.96	0.67845
68	presto/tpcds:q69	6.89	0.22	6.83	0.25	6.84	0.20	-0.85	-0.66	3.22	3.69	2.87	0.67961
18	presto/tpcds:q19	7.06	0.29	7.00	0.17	7.42	0.54	-0.80	5.09	4.12	2.44	7.34	0.69006
80	presto/tpcds:q81	2.99	0.12	2.97	0.11	3.02	0.11	-0.72	1.00	3.98	3.77	3.62	0.75342
10	presto/tpcds:q11	32.45	0.37	32.25	0.31	32.20	0.41	-0.63	-0.77	1.14	0.96	1.26	0.32192
26	presto/tpcds:q27	8.53	0.26	8.48	0.18	8.56	0.44	-0.62	0.37	3.10	2.17	5.14	0.69644
43	presto/tpcds:q44	12.75	0.24	12.67	0.32	12.83	0.37	-0.58	0.70	1.92	2.56	2.91	0.66288
67	presto/tpcds:q68	8.80	0.14	8.76	0.19	8.64	0.11	-0.44	-1.82	1.62	2.20	1.29	0.70075
23	presto/tpcds:q24	26.34	0.83	26.23	0.82	26.29	0.92	-0.41	-0.16	3.13	3.12	3.49	0.82342
4	presto/tpcds:q05	25.05	0.21	24.95	0.23	24.81	0.27	-0.38	-0.92	0.83	0.93	1.09	0.47018
79	presto/tpcds:q80	47.80	0.46	47.63	0.24	48.26	0.99	-0.35	0.96	0.96	0.51	2.06	0.45434
44	presto/tpcds:q45	2.07	0.07	2.07	0.06	2.07	0.03	-0.23	-0.29	3.19	2.72	1.69	0.89419
13	presto/tpcds:q14	116.50	0.85	116.24	0.95	115.43	1.17	-0.22	-0.91	0.73	0.82	1.01	0.62867
78	presto/tpcds:q79	8.19	0.14	8.17	0.25	8.14	0.27	-0.15	-0.60	1.73	3.03	3.30	0.91554
39	presto/tpcds:q40	8.26	0.14	8.25	0.14	8.29	0.18	-0.14	0.36	1.72	1.72	2.21	0.88948

	query	baseline unpart mean	baseline unpart 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 unpart std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
62	presto/tpcds:q63	6.78	0.26	6.78	0.28	6.72	0.14	-0.09	-0.97	3.91	4.15	2.12	0.96958
8	presto/tpcds:q09	26.03	0.53	26.02	0.51	26.04	0.60	-0.04	0.02	2.03	1.97	2.29	0.97068
32	presto/tpcds:q33	9.37	0.26	9.39	0.21	9.16	0.23	0.20	-2.25	2.82	2.22	2.49	0.89351
46	presto/tpcds:q47	55.71	0.14	55.89	0.22	55.75	0.34	0.32	0.07	0.25	0.39	0.61	0.12560
1	presto/tpcds:q02	20.07	0.06	20.16	0.07	20.16	0.11	0.45	0.47	0.32	0.34	0.52	0.04138
63	presto/tpcds:q64	69.05	0.60	69.37	0.65	68.27	0.77	0.46	-1.14	0.87	0.94	1.13	0.40254
16	presto/tpcds:q17	10.86	0.35	10.93	0.37	10.55	0.37	0.62	-2.93	3.20	3.42	3.52	0.75156
34	presto/tpcds:q35	7.57	0.77	7.63	0.30	7.58	0.19	0.78	0.11	10.21	3.89	2.55	0.86569
82	presto/tpcds:q83	1.65	0.09	1.67	0.14	1.61	0.02	0.83	-2.46	5.51	8.19	1.30	0.84244
15	presto/tpcds:q16	6.22	0.15	6.28	0.25	6.33	0.15	1.03	1.77	2.47	3.98	2.36	0.60592
73	presto/tpcds:q74	21.77	0.14	22.01	0.12	21.52	0.15	1.12	-1.15	0.65	0.55	0.70	0.00947
98	presto/tpcds:q99	6.55	0.18	6.62	0.17	6.40	0.16	1.15	-2.24	2.68	2.57	2.45	0.46939
74	presto/tpcds:q75	35.39	0.12	35.82	0.21	35.34	0.35	1.21	-0.15	0.33	0.59	0.98	0.00137
92	presto/tpcds:q93	23.47	0.13	23.76	0.22	23.61	0.37	1.21	0.57	0.56	0.93	1.57	0.02133
27	presto/tpcds:q28	24.36	0.34	24.66	1.14	24.22	0.21	1.23	-0.54	1.38	4.62	0.86	0.55014
52	presto/tpcds:q53	6.77	0.25	6.86	0.20	6.74	0.28	1.35	-0.44	3.67	2.96	4.09	0.50110
54	presto/tpcds:q55	5.95	0.20	6.04	0.30	6.51	0.94	1.39	9.34	3.38	5.04	14.45	0.59199
66	presto/tpcds:q67	63.15	1.18	64.03	1.16	63.82	1.73	1.39	1.06	1.87	1.81	2.72	0.22331
47	presto/tpcds:q48	14.23	0.07	14.44	0.15	14.31	0.07	1.47	0.55	0.50	1.06	0.46	0.01260

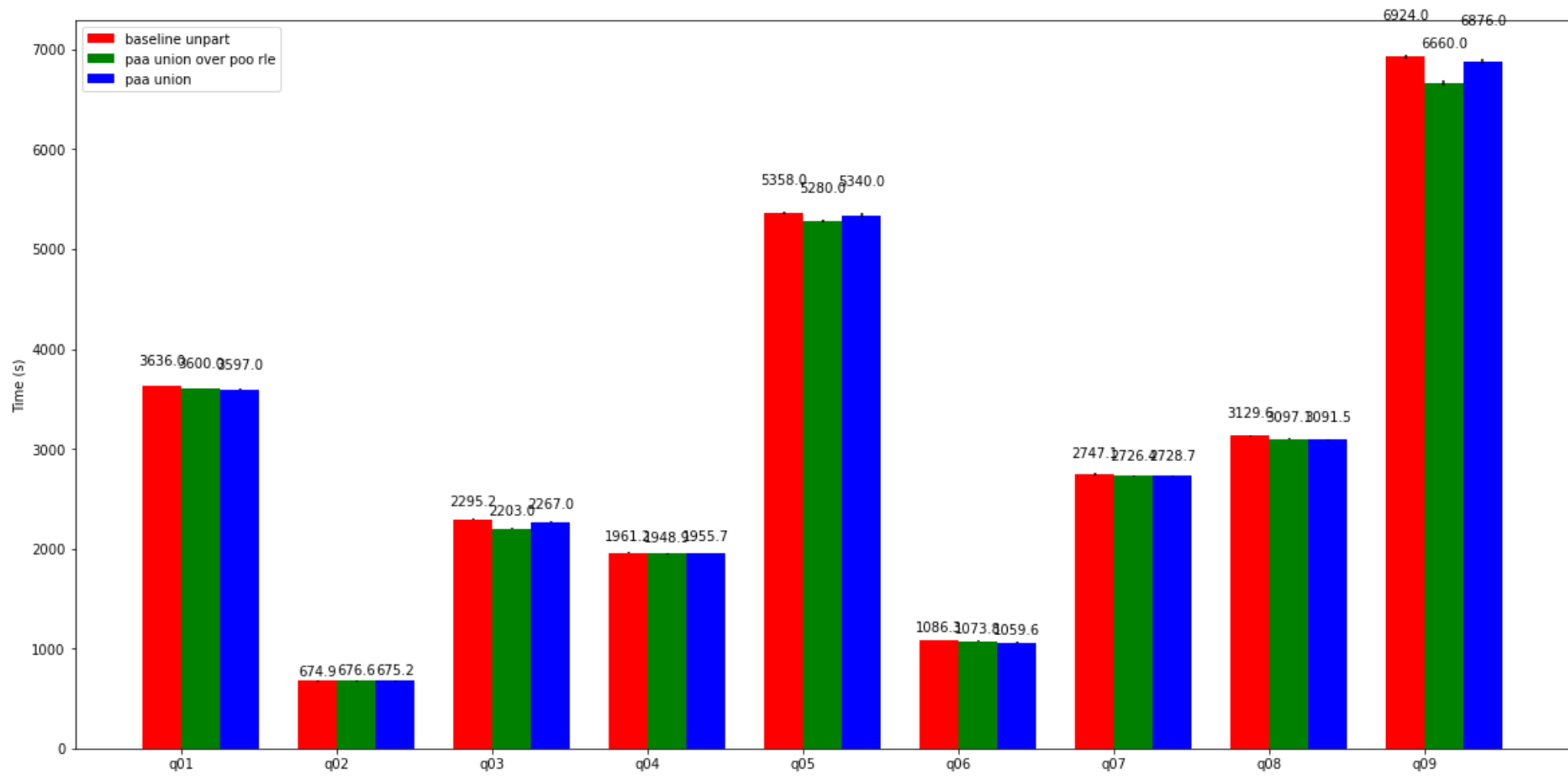
	query	baseline unpart mean	baseline unpart std.dev	paa union over poo rle mean	paa union over poo rle std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline unpart std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
75	presto/tpcds:q76	8.28	0.17	8.40	0.14	8.57	0.84	1.48	3.54	2.08	1.70	9.83	0.20908
36	presto/tpcds:q37	4.16	0.05	4.22	0.15	4.11	0.12	1.51	-1.10	1.32	3.47	2.98	0.34834
49	presto/tpcds:q50	19.81	0.25	20.15	0.23	19.87	0.24	1.75	0.31	1.29	1.15	1.20	0.03368
12	presto/tpcds:q13	16.53	0.16	16.83	0.68	16.58	0.40	1.84	0.31	0.95	4.06	2.39	0.31399
65	presto/tpcds:q66	5.99	0.21	6.10	0.18	6.16	0.26	1.86	2.85	3.47	2.96	4.25	0.34395
61	presto/tpcds:q62	3.65	0.05	3.72	0.07	3.66	0.07	1.94	0.17	1.29	1.90	2.04	0.06888
41	presto/tpcds:q42	5.90	0.15	6.01	0.23	5.78	0.19	1.94	-1.92	2.62	3.83	3.31	0.33618
56	presto/tpcds:q57	23.42	0.13	23.88	0.33	23.57	0.09	1.96	0.61	0.57	1.39	0.37	0.01042
20	presto/tpcds:q21	3.20	0.05	3.27	0.08	3.25	0.16	2.01	1.58	1.62	2.34	4.81	0.11749
69	presto/tpcds:q70	15.55	0.04	15.91	0.34	16.03	0.36	2.33	3.11	0.28	2.15	2.25	0.02788
30	presto/tpcds:q31	17.91	0.24	18.33	0.65	18.49	0.98	2.35	3.24	1.35	3.55	5.27	0.16836
5	presto/tpcds:q06	4.82	0.22	4.93	0.38	4.44	0.21	2.45	-7.81	4.49	7.72	4.76	0.52355
83	presto/tpcds:q84	1.76	0.05	1.80	0.10	1.72	0.02	2.46	-2.26	2.56	5.28	1.11	0.33730
95	presto/tpcds:q96	3.38	0.16	3.47	0.19	3.51	0.16	2.73	3.80	4.85	5.62	4.51	0.39627
24	presto/tpcds:q25	11.03	0.27	11.33	0.56	11.15	0.60	2.78	1.16	2.42	4.93	5.35	0.25292
17	presto/tpcds:q18	5.69	1.32	5.85	2.04	4.93	0.23	2.86	-13.33	23.19	34.85	4.63	0.87292
11	presto/tpcds:q12	1.94	0.03	1.99	0.09	1.92	0.06	2.95	-0.84	1.69	4.50	3.11	0.17403
85	presto/tpcds:q86	3.40	0.02	3.50	0.11	3.44	0.09	3.00	1.30	0.60	3.28	2.66	0.05748
6	presto/tpcds:q07	8.78	0.18	9.06	0.84	8.89	0.20	3.14	1.19	2.02	9.26	2.29	0.44855

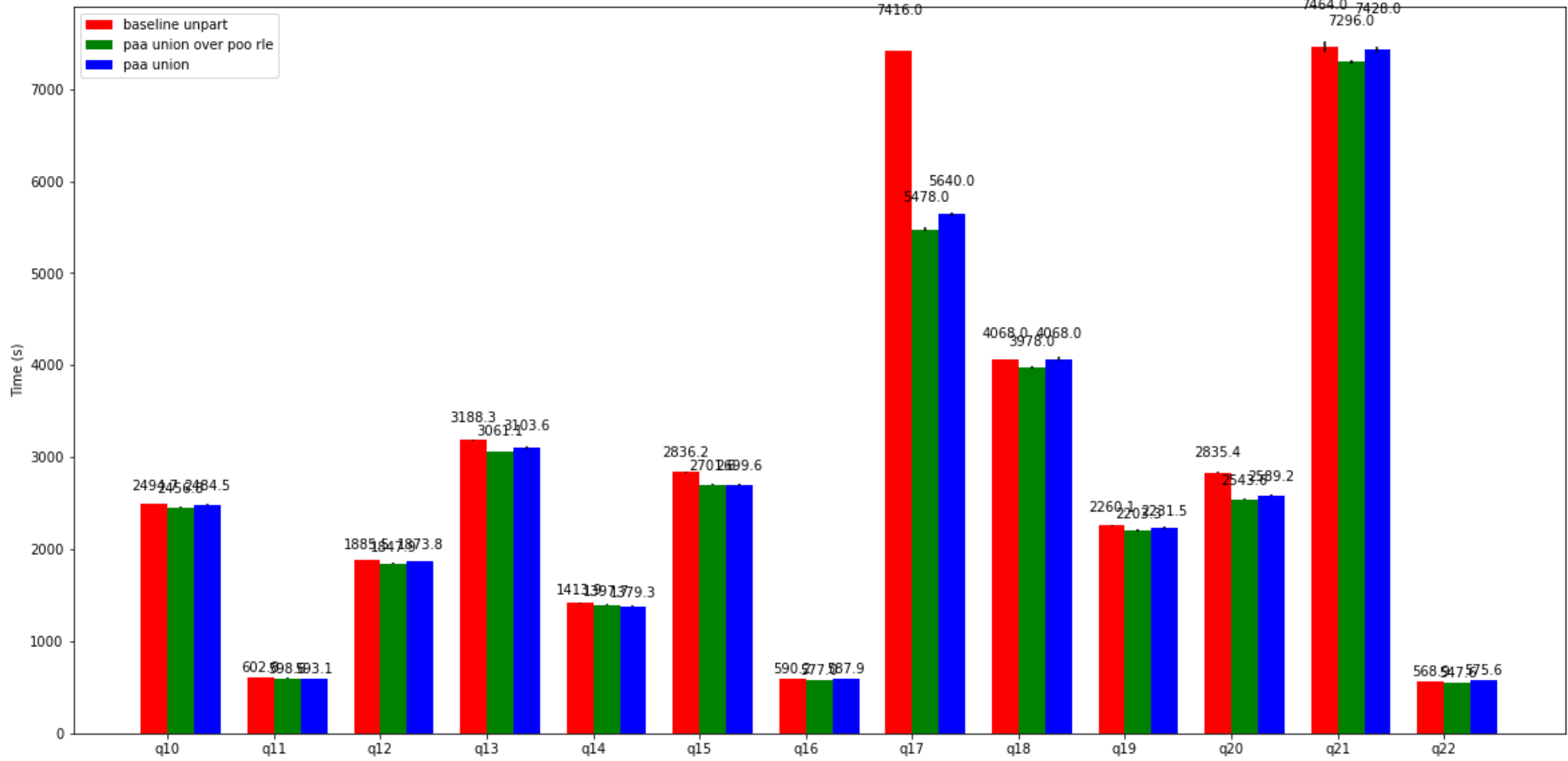


```
min      -22
25%     -1
50%      1
75%      2
max       9
Name: % change, dtype: float64
count    99
mean     -1
std       4
min     -21
25%     -2
50%     -0
75%      1
max      17
Name: % change base -> paa union, dtype: float64
```

## TPC-H Comparison (CPU)







query	baseline unpart mean	baseline unpart 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 unpart std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
16 presto/tpch: q17	7416.00	0.00	5478.00	27.10	5640.00	18.59	-26.13	-23.95	0.00	0.49	0.33	0.00000
19 presto/tpch: q20	2835.40	4.15	2543.60	4.37	2589.20	9.22	-10.29	-8.68	0.15	0.17	0.36	0.00000
14 presto/tpch: q15	2836.20	12.55	2701.60	8.91	2699.60	13.91	-4.75	-4.82	0.44	0.33	0.52	0.00000
2 presto/tpch: q03	2295.20	3.55	2203.00	6.39	2267.00	5.06	-4.02	-1.23	0.15	0.29	0.22	0.00000
12 presto/tpch: q13	3188.30	5.98	3061.10	4.67	3103.60	14.36	-3.99	-2.66	0.19	0.15	0.46	0.00000

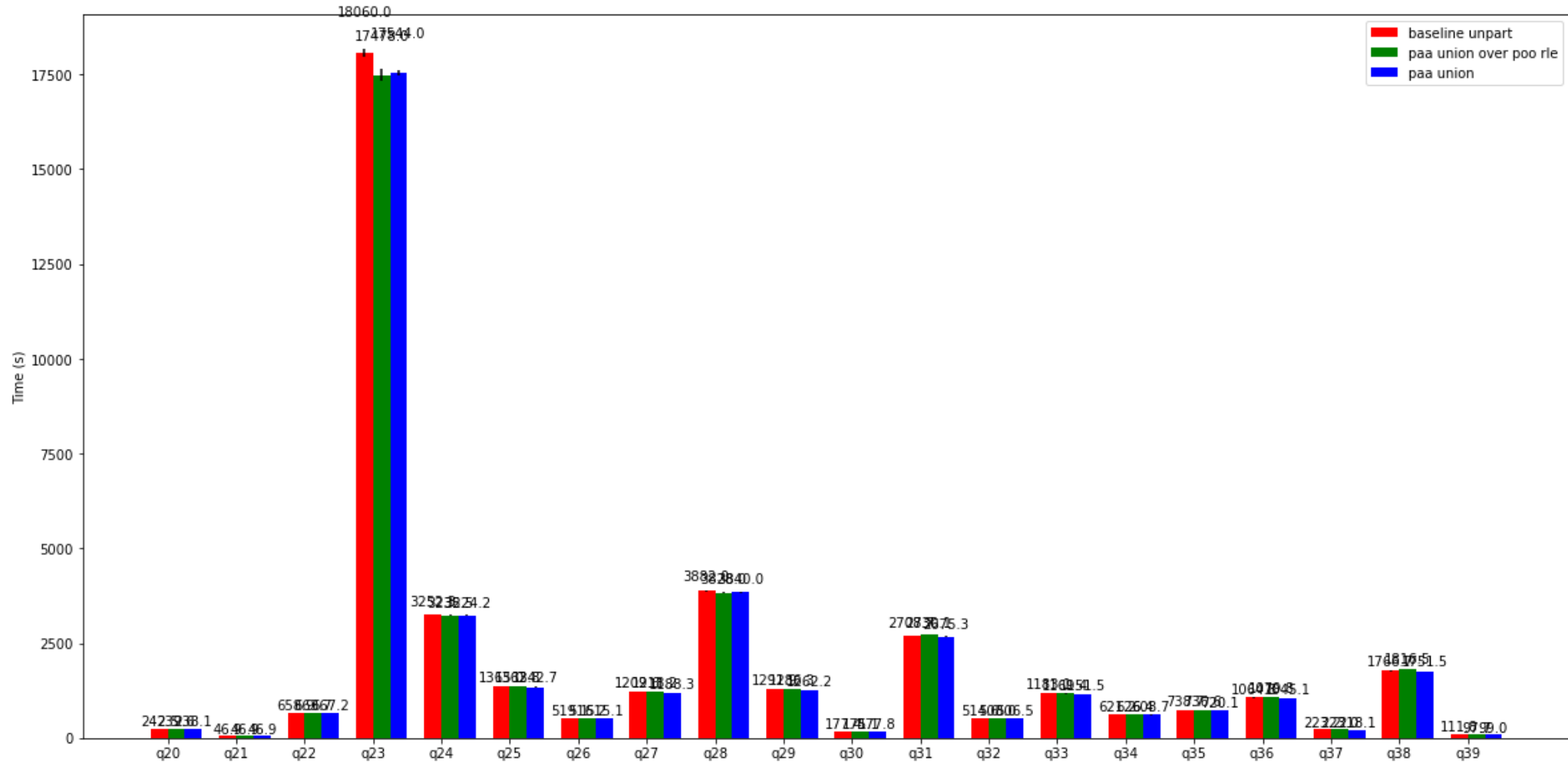


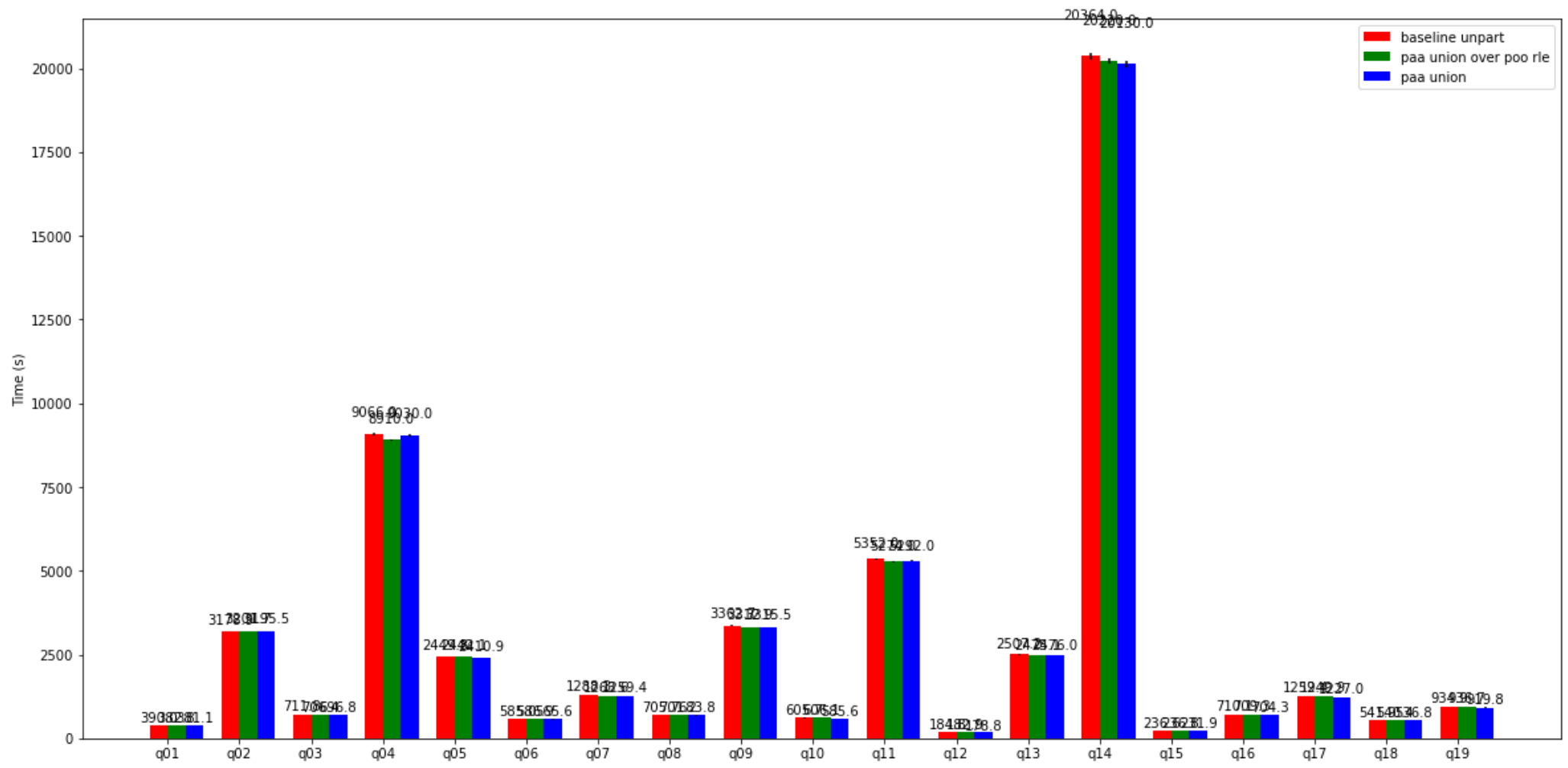
```

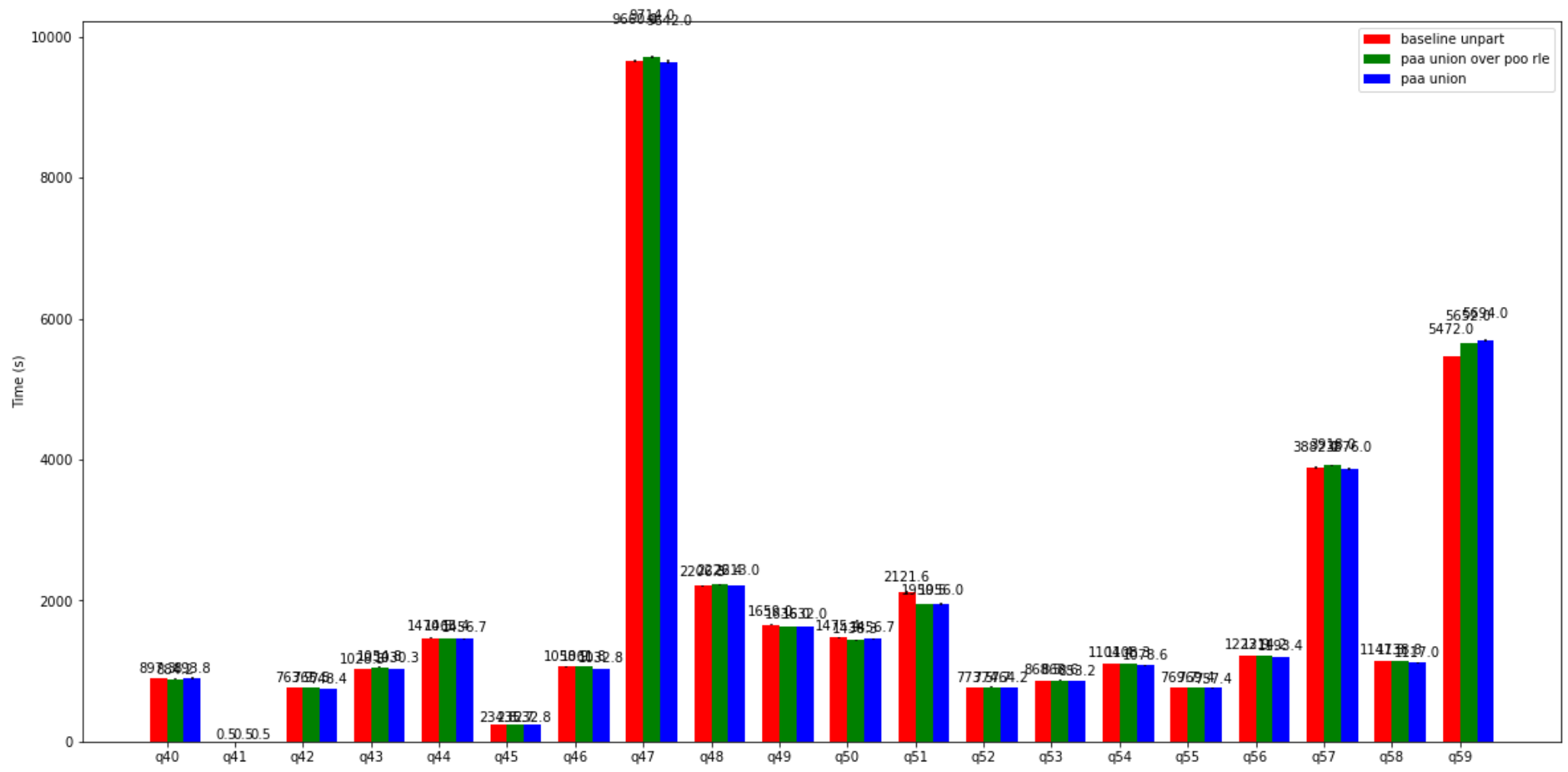
75%      -1
max       0
Name: % change, dtype: float64
count    22
mean     -2
std       5
min     -24
25%     -2
50%     -1
75%     -0
max       1
Name: % change base -> paa union, dtype: float64

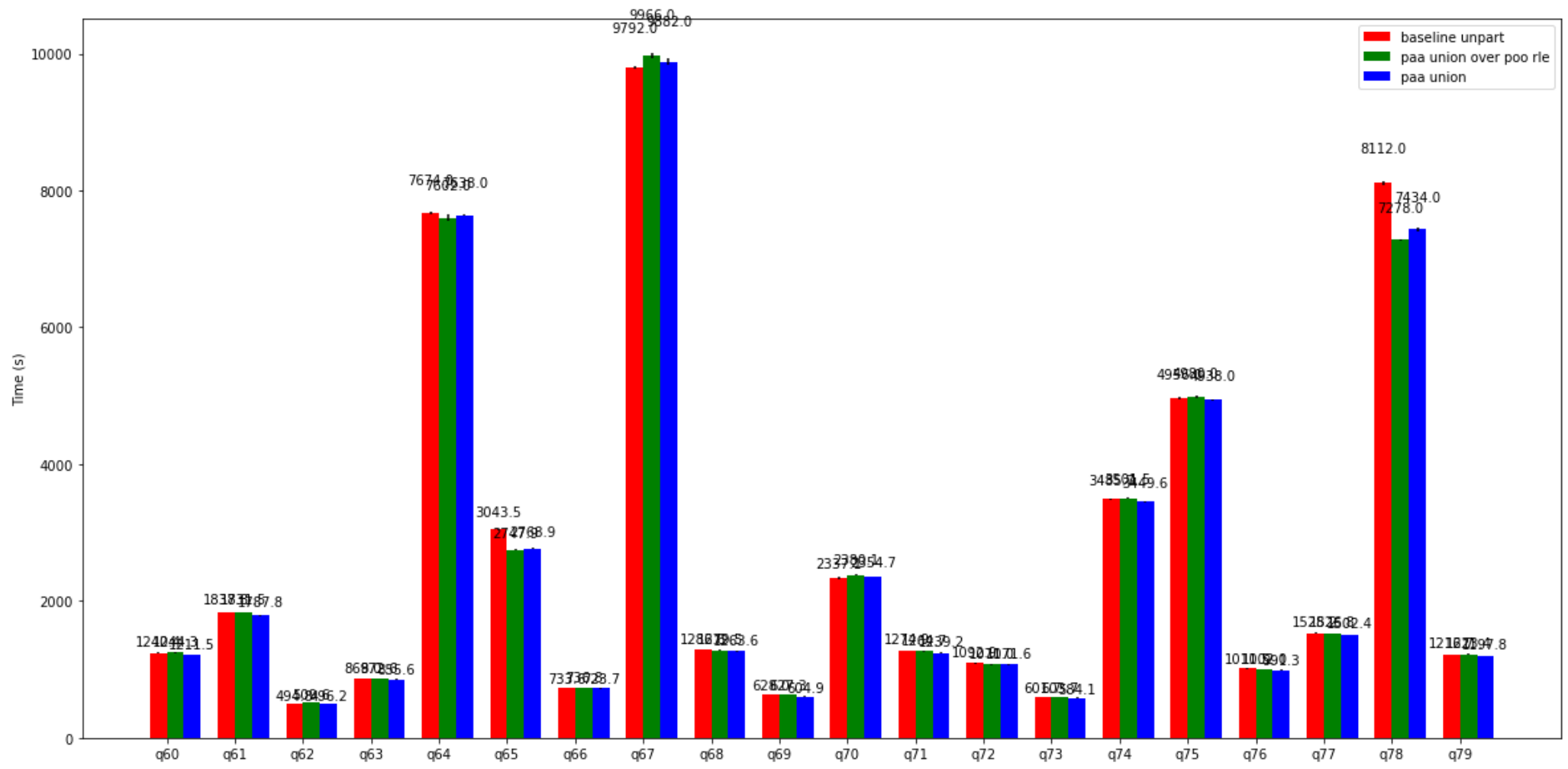
```

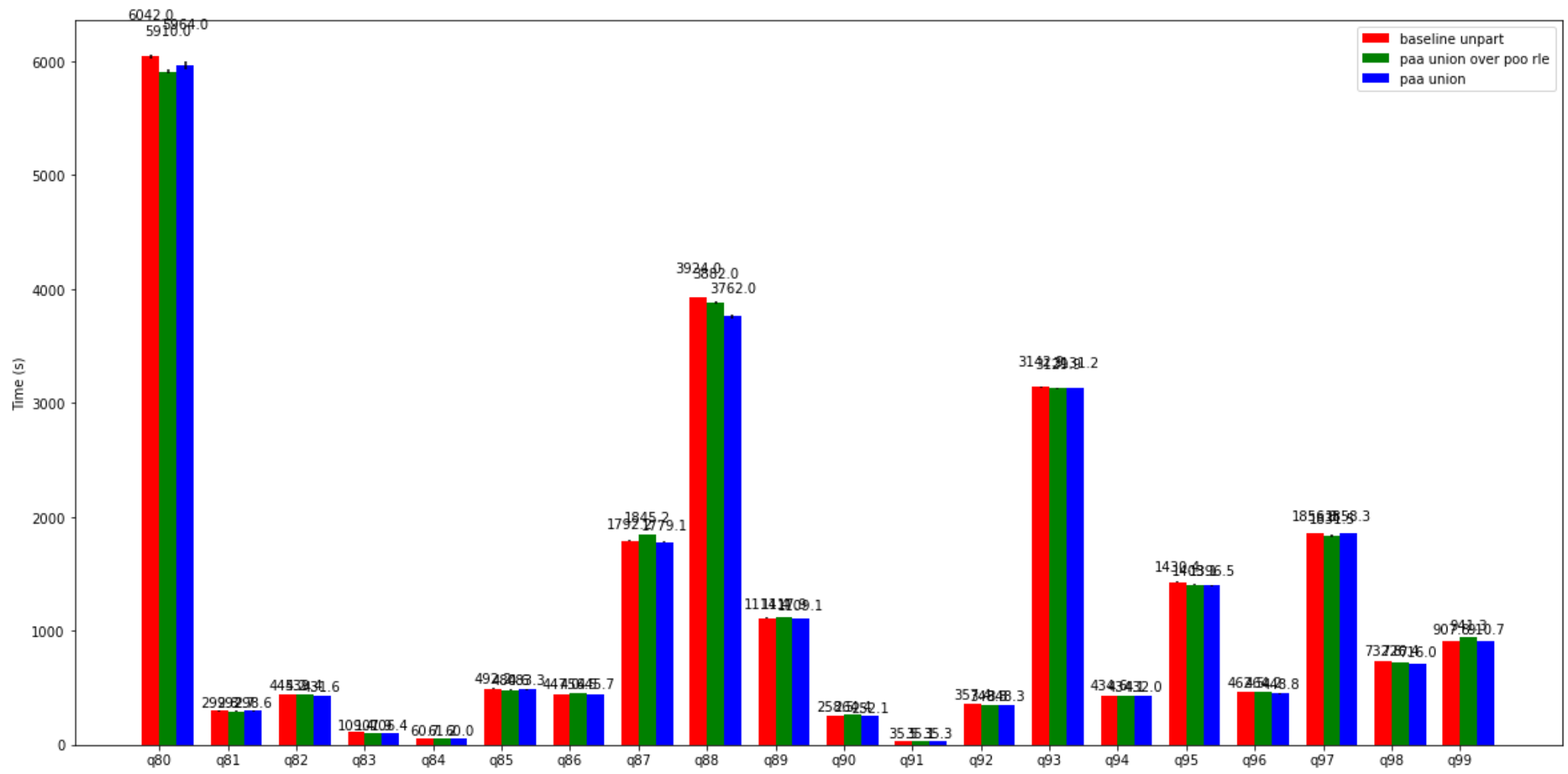
## TPC-DS Comparison (CPU)



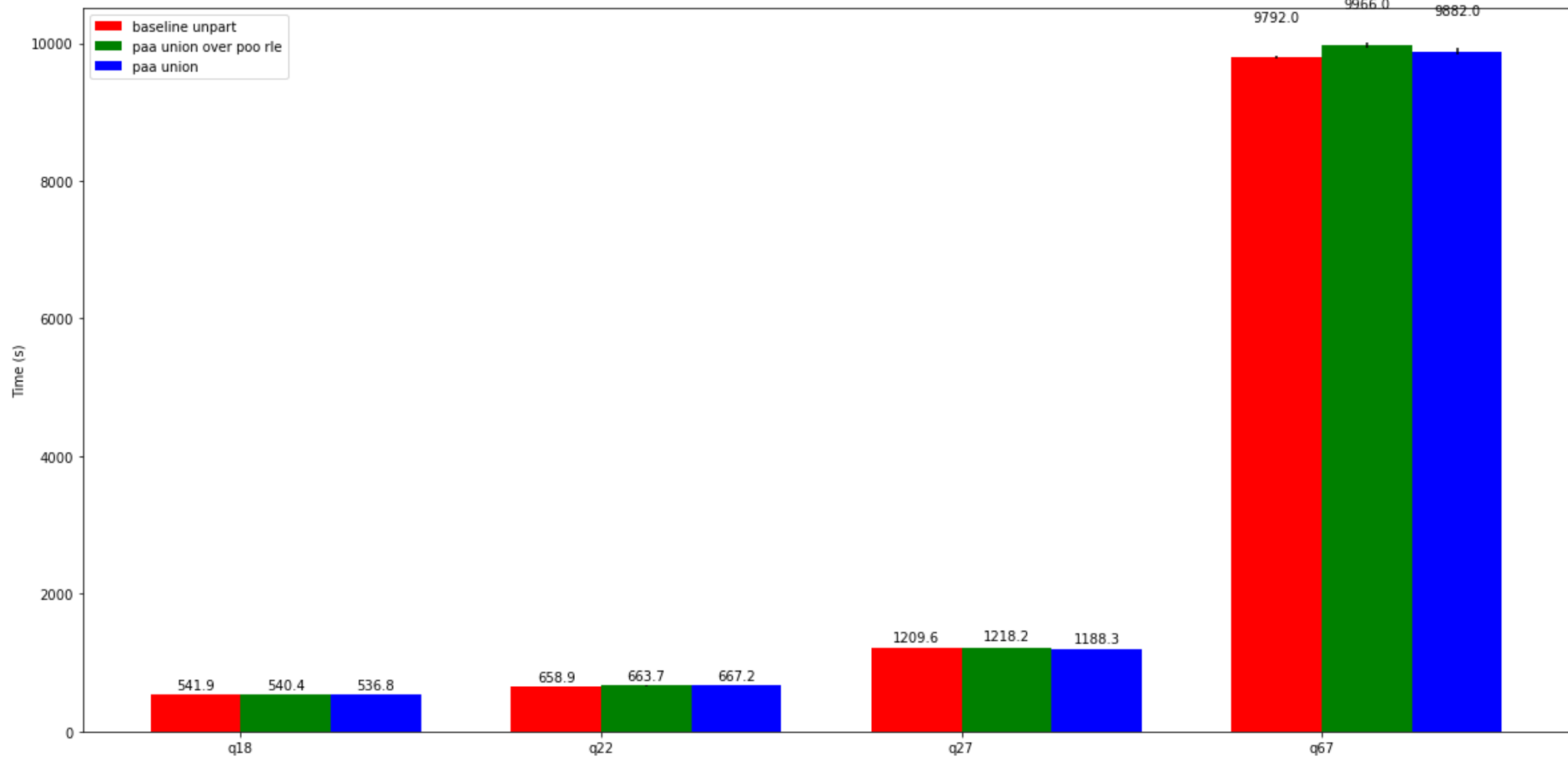












query	baseline unpart mean	baseline unpart std.dev	paa union over poo rle mean	paa union over poo rle std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline unpart std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
38 presto/tpcds: q39	111.80	0.49	97.70	0.59	99.00	0.38	-12.61	-11.45	0.44	0.60	0.38	0.00000
77 presto/tpcds: q78	8112.00	29.39	7278.00	14.70	7434.00	30.12	-10.28	-8.36	0.36	0.20	0.41	0.00000
64 presto/tpcds: q65	3043.50	4.01	2747.90	8.08	2768.90	2.72	-9.71	-9.02	0.13	0.29	0.10	0.00000
50 presto/tpcds: q51	2121.60	14.21	1950.50	9.06	1956.00	17.56	-8.06	-7.81	0.67	0.46	0.90	0.00000
22 presto/tpcds: q23	18060.00	110.76	17478.00	162.20	17544.00	58.79	-3.22	-2.86	0.61	0.93	0.34	0.00003

	query	baseline unpart mean	baseline unpart 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 unpart std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
49	presto/tpcds:q50	1475.40	4.63	1438.30	6.30	1456.70	5.03	-2.51	-1.27	0.31	0.44	0.35	0.00000
91	presto/tpcds:q92	357.40	0.31	348.80	0.62	348.30	0.33	-2.41	-2.55	0.09	0.18	0.09	0.00000
80	presto/tpcds:q81	299.80	6.88	292.70	8.20	298.60	8.06	-2.37	-0.40	2.29	2.80	2.70	0.13515
84	presto/tpcds:q85	492.20	3.90	480.60	3.46	483.30	3.99	-2.36	-1.81	0.79	0.72	0.83	0.00028
79	presto/tpcds:q80	6042.00	14.70	5910.00	14.70	5964.00	29.39	-2.18	-1.29	0.24	0.25	0.49	0.00000
71	presto/tpcds:q72	1092.90	13.84	1071.00	14.75	1071.60	16.74	-2.00	-1.95	1.27	1.38	1.56	0.02424
6	presto/tpcds:q07	1288.30	4.88	1263.60	4.19	1259.40	3.87	-1.92	-2.24	0.38	0.33	0.31	0.00000
94	presto/tpcds:q95	1430.40	1.52	1403.10	4.77	1396.50	2.14	-1.91	-2.37	0.11	0.34	0.15	0.00000
0	presto/tpcds:q01	390.00	1.37	382.80	1.37	381.10	2.13	-1.85	-2.28	0.35	0.36	0.56	0.00000
3	presto/tpcds:q04	9066.00	42.09	8910.00	30.12	9030.00	42.09	-1.72	-0.40	0.46	0.34	0.47	0.00002
8	presto/tpcds:q09	3362.70	9.30	3312.90	10.84	3315.50	9.74	-1.48	-1.40	0.28	0.33	0.29	0.00001
39	presto/tpcds:q40	897.30	7.39	884.20	11.28	893.80	14.17	-1.46	-0.39	0.82	1.28	1.58	0.03868
10	presto/tpcds:q11	5352.00	18.59	5274.00	19.72	5292.00	22.77	-1.46	-1.12	0.35	0.37	0.43	0.00003
27	presto/tpcds:q28	3882.00	14.70	3828.00	18.59	3840.00	18.59	-1.39	-1.08	0.38	0.49	0.48	0.00023
48	presto/tpcds:q49	1659.00	4.92	1636.00	3.12	1632.00	3.70	-1.39	-1.63	0.30	0.19	0.23	0.00000
82	presto/tpcds:q83	109.40	0.31	107.90	0.45	106.40	0.82	-1.37	-2.74	0.28	0.42	0.77	0.00005
96	presto/tpcds:q97	1856.80	4.29	1831.50	12.24	1858.30	5.33	-1.36	0.08	0.23	0.67	0.29	0.00075
81	presto/tpcds:q82	445.20	0.76	439.40	0.73	431.60	1.30	-1.30	-3.05	0.17	0.17	0.30	0.00000
29	presto/tpcds:q30	177.40	7.06	175.10	7.11	177.80	7.01	-1.30	0.23	3.98	4.06	3.95	0.58628

	query	baseline unpart mean	baseline unpart 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 unpart std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
31	presto/tpcds:q32	514.60	0.73	508.00	1.59	506.50	0.70	-1.28	-1.57	0.14	0.31	0.14	0.00000
12	presto/tpcds:q13	2507.20	10.83	2475.10	4.18	2476.00	8.11	-1.28	-1.24	0.43	0.17	0.33	0.00005
19	presto/tpcds:q20	242.50	0.45	239.60	0.49	238.10	0.24	-1.20	-1.81	0.19	0.20	0.10	0.00000
90	presto/tpcds:q91	35.54	0.44	35.12	0.40	35.26	0.52	-1.18	-0.77	1.24	1.14	1.49	0.11610
32	presto/tpcds:q33	1183.10	4.64	1169.40	3.37	1151.50	3.00	-1.16	-2.67	0.39	0.29	0.26	0.00016
87	presto/tpcds:q88	3924.00	0.00	3882.00	14.70	3762.00	19.72	-1.07	-4.13	0.00	0.38	0.52	0.00004
11	presto/tpcds:q12	184.80	0.38	182.90	0.24	178.80	0.54	-1.03	-3.25	0.21	0.13	0.30	0.00000
75	presto/tpcds:q76	1011.50	2.19	1002.00	2.40	991.30	6.22	-0.94	-2.00	0.22	0.24	0.63	0.00003
63	presto/tpcds:q64	7674.00	14.70	7602.00	42.09	7638.00	14.70	-0.94	-0.47	0.19	0.55	0.19	0.00270
97	presto/tpcds:q98	732.80	0.98	726.40	1.59	716.00	0.98	-0.87	-2.29	0.13	0.22	0.14	0.00001
70	presto/tpcds:q71	1274.90	4.85	1264.70	7.92	1239.20	6.61	-0.80	-2.80	0.38	0.63	0.53	0.02268
55	presto/tpcds:q56	1223.90	2.19	1214.20	5.04	1193.40	3.33	-0.79	-2.49	0.18	0.42	0.28	0.00151
2	presto/tpcds:q03	711.80	2.30	706.40	1.77	696.80	1.40	-0.76	-2.11	0.32	0.25	0.20	0.00104
16	presto/tpcds:q17	1259.40	3.01	1249.90	1.49	1227.00	1.78	-0.75	-2.57	0.24	0.12	0.15	0.00004
57	presto/tpcds:q58	1147.30	3.76	1138.80	3.91	1117.00	4.42	-0.74	-2.64	0.33	0.34	0.40	0.00328
13	presto/tpcds:q14	20364.00	92.95	20220.00	81.03	20130.00	95.02	-0.71	-1.15	0.46	0.40	0.47	0.01695
7	presto/tpcds:q08	705.70	1.49	701.20	1.59	683.80	0.49	-0.64	-3.10	0.21	0.23	0.07	0.00050
25	presto/tpcds:q26	519.10	0.96	516.20	1.12	515.10	5.30	-0.56	-0.77	0.19	0.22	1.03	0.00070
67	presto/tpcds:q68	1286.60	1.64	1279.50	2.78	1263.60	3.35	-0.55	-1.79	0.13	0.22	0.27	0.00031

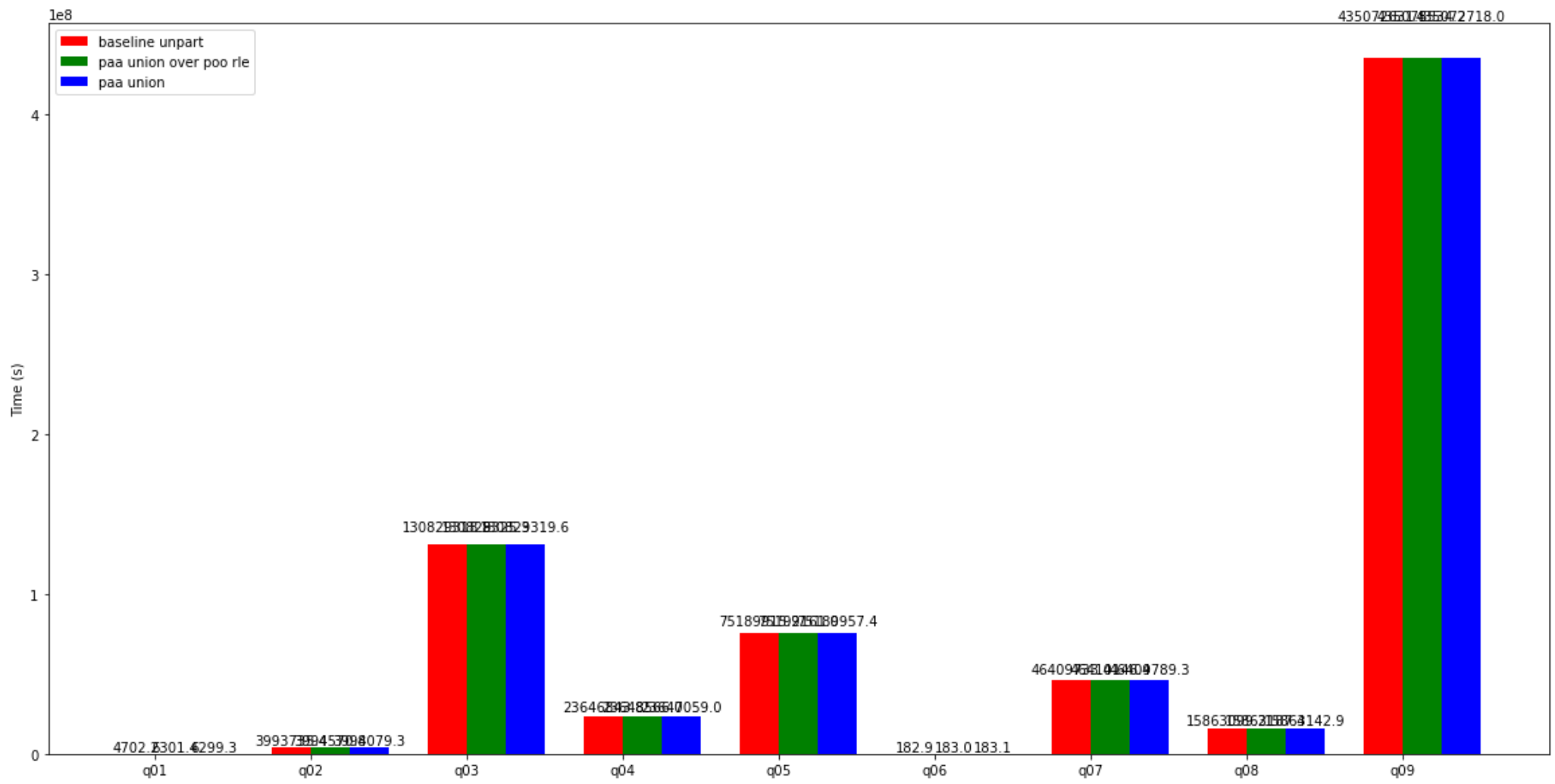
	query	baseline unpart mean	baseline unpart std.dev	paa union over poo rle mean	paa union over poo rle std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline unpart std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
23	presto/tpcds:q24	3252.30	10.42	3235.50	4.53	3224.20	18.57	-0.52	-0.86	0.32	0.14	0.58	0.00468
28	presto/tpcds:q29	1291.90	11.83	1286.30	10.72	1262.20	6.68	-0.43	-2.30	0.92	0.83	0.53	0.41033
92	presto/tpcds:q93	3142.90	4.75	3129.90	8.52	3131.20	3.96	-0.41	-0.37	0.15	0.27	0.13	0.00849
43	presto/tpcds:q44	1470.50	10.30	1465.40	4.63	1456.70	11.36	-0.35	-0.94	0.70	0.32	0.78	0.29440
60	presto/tpcds:q61	1837.80	1.65	1831.50	4.50	1787.80	4.45	-0.34	-2.72	0.09	0.25	0.25	0.00921
4	presto/tpcds:q05	2449.80	5.03	2442.10	5.26	2410.90	7.24	-0.31	-1.59	0.21	0.22	0.30	0.02697
34	presto/tpcds:q35	738.70	0.88	736.60	3.12	720.10	0.88	-0.28	-2.52	0.12	0.42	0.12	0.14390
17	presto/tpcds:q18	541.90	1.84	540.40	1.12	536.80	2.78	-0.28	-0.94	0.34	0.21	0.52	0.11817
40	presto/tpcds:q41	0.50	0.04	0.50	0.02	0.51	0.04	-0.17	1.59	8.53	4.20	8.48	0.96672
24	presto/tpcds:q25	1365.00	5.08	1362.80	6.58	1342.70	5.39	-0.16	-1.63	0.37	0.48	0.40	0.53133
93	presto/tpcds:q94	434.60	1.35	434.10	1.51	432.00	2.55	-0.12	-0.60	0.31	0.35	0.59	0.55837
15	presto/tpcds:q16	710.10	3.88	709.30	1.44	704.30	1.54	-0.11	-0.82	0.55	0.20	0.22	0.64633
68	presto/tpcds:q69	628.00	1.18	627.30	1.46	604.90	0.88	-0.11	-3.68	0.19	0.23	0.15	0.38201
76	presto/tpcds:q77	1528.20	5.23	1526.80	3.17	1502.40	1.82	-0.09	-1.69	0.34	0.21	0.12	0.58727
36	presto/tpcds:q37	223.20	0.54	223.00	0.49	218.10	0.33	-0.09	-2.28	0.24	0.22	0.15	0.51547
54	presto/tpcds:q55	769.70	2.19	769.40	0.98	757.40	2.42	-0.04	-1.60	0.28	0.13	0.32	0.76598
20	presto/tpcds:q21	46.91	0.18	46.91	0.19	46.87	0.36	-0.00	-0.10	0.38	0.40	0.78	0.98768
52	presto/tpcds:q53	868.50	0.50	868.60	1.59	853.20	0.93	0.01	-1.76	0.06	0.18	0.11	0.88645
9	presto/tpcds:q10	605.70	1.89	606.10	1.39	585.60	1.26	0.07	-3.32	0.31	0.23	0.21	0.68482

	query	baseline unpart mean	baseline unpart 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 unpart std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
14	presto/tpcds:q15	236.60	0.31	236.80	0.82	231.90	0.50	0.08	-1.99	0.13	0.35	0.22	0.58845
51	presto/tpcds:q52	773.50	1.03	774.70	2.26	764.20	0.90	0.16	-1.20	0.13	0.29	0.12	0.26396
18	presto/tpcds:q19	934.90	4.43	936.70	4.98	919.80	3.60	0.19	-1.62	0.47	0.53	0.39	0.52345
41	presto/tpcds:q42	763.90	1.49	765.50	0.45	748.40	1.68	0.21	-2.03	0.20	0.06	0.22	0.03053
45	presto/tpcds:q46	1058.90	1.28	1061.80	1.05	1032.80	2.73	0.27	-2.46	0.12	0.10	0.26	0.00160
88	presto/tpcds:q89	1114.40	3.23	1117.90	1.49	1109.10	1.41	0.31	-0.48	0.29	0.13	0.13	0.03686
59	presto/tpcds:q60	1240.40	8.17	1244.30	2.61	1211.50	5.13	0.31	-2.33	0.66	0.21	0.42	0.29152
5	presto/tpcds:q06	585.00	0.54	586.90	0.88	565.60	2.33	0.32	-3.32	0.09	0.15	0.41	0.00114
72	presto/tpcds:q73	601.70	0.70	603.70	0.45	584.10	1.64	0.33	-2.93	0.12	0.07	0.28	0.00016
53	presto/tpcds:q54	1104.40	6.73	1108.30	4.30	1078.60	2.45	0.35	-2.34	0.61	0.39	0.23	0.25930
95	presto/tpcds:q96	462.50	0.45	464.20	1.24	448.80	0.76	0.37	-2.96	0.10	0.27	0.17	0.01021
44	presto/tpcds:q45	234.80	0.49	235.70	0.45	232.80	0.66	0.38	-0.85	0.21	0.19	0.28	0.00790
62	presto/tpcds:q63	869.00	1.18	872.60	1.77	855.60	3.13	0.41	-1.54	0.14	0.20	0.37	0.00198
65	presto/tpcds:q66	733.60	5.65	736.80	2.21	723.70	2.97	0.44	-1.35	0.77	0.30	0.41	0.22547
73	presto/tpcds:q74	3485.70	10.40	3501.50	10.21	3449.60	12.62	0.45	-1.04	0.30	0.29	0.37	0.02409
74	presto/tpcds:q75	4956.00	18.59	4980.00	18.59	4938.00	14.70	0.48	-0.36	0.38	0.37	0.30	0.04933
78	presto/tpcds:q79	1216.70	1.84	1223.40	5.37	1197.80	1.30	0.55	-1.55	0.15	0.44	0.11	0.01601
46	presto/tpcds:q47	9660.00	18.59	9714.00	14.70	9642.00	27.10	0.56	-0.19	0.19	0.15	0.28	0.00023
26	presto/tpcds:q27	1209.60	1.90	1218.20	3.83	1188.30	2.03	0.71	-1.76	0.16	0.31	0.17	0.00059

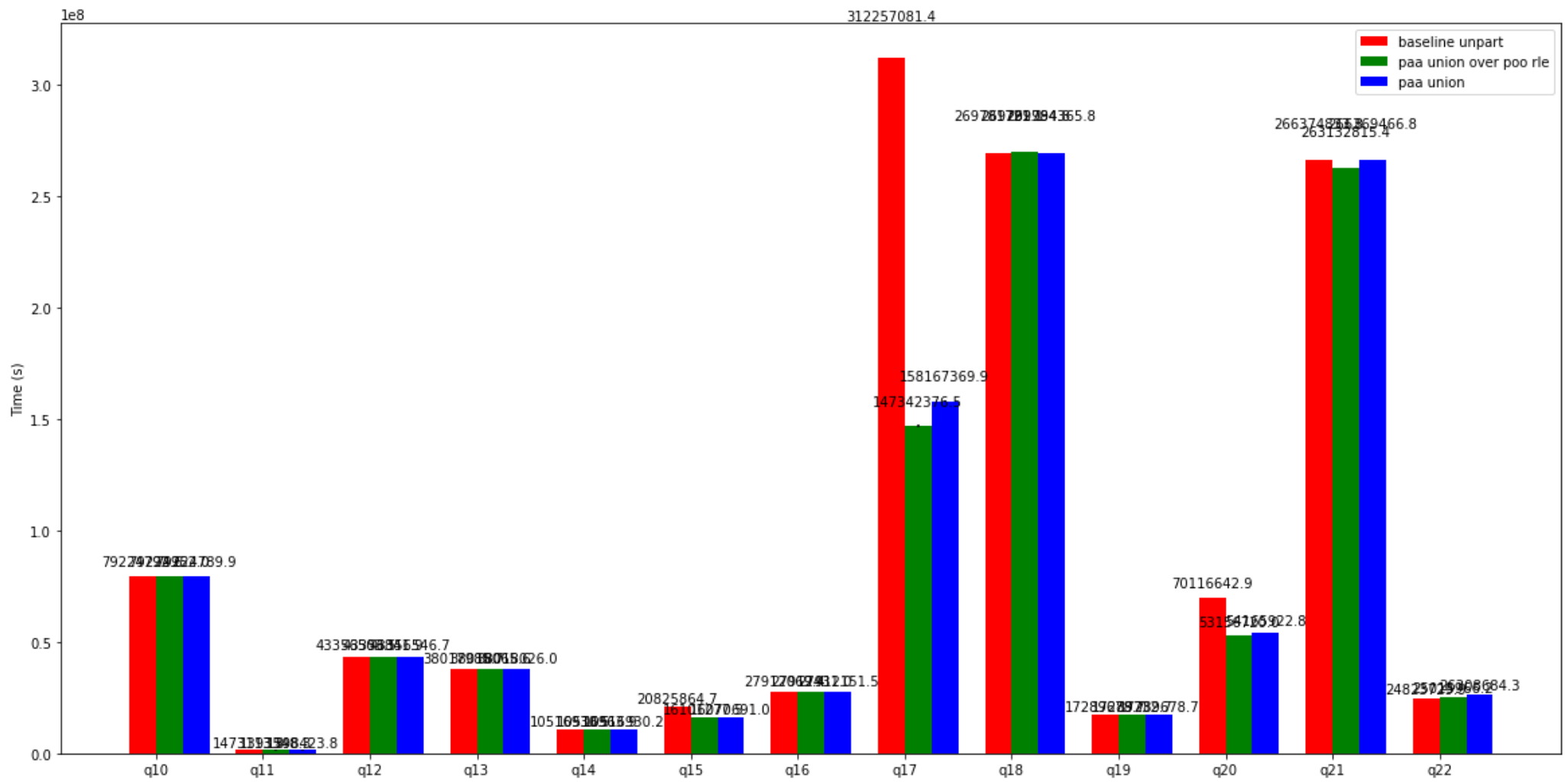


```
min      -13
25%     -1
50%     -0
75%      0
max       4
Name: % change, dtype: float64
count    99
mean     -2
std       2
min     -11
25%     -2
50%     -2
75%     -1
max       4
Name: % change base -> paa union, dtype: float64
```

## TPC-H Comparison (Network)







query	baseline unpart mean	baseline unpart 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 unpart std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
16 presto/tpch: q17	312257081.41	629.86	147342376.45	599016.46	158167369.94	542477.16	-52.81	-49.35	0.00	0.41	0.34	0.00000
19 presto/tpch: q20	70116642.94	95.12	53156720.03	71778.41	54165922.78	71138.94	-24.19	-22.75	0.00	0.14	0.13	0.00000
14 presto/tpch: q15	20825864.69	1446.86	16101277.53	17104.10	16070690.96	44535.28	-22.69	-22.83	0.01	0.11	0.28	0.00000
10 presto/tpch: q11	1473113.76	8827.01	1393548.32	18306.08	1398423.80	16547.21	-5.40	-5.07	0.60	1.31	1.18	0.00000
20 presto/tpch: q21	266374833.84	196.59	263132815.45	710.37	266369466.77	1171.73	-1.22	-0.00	0.00	0.00	0.00	0.00000

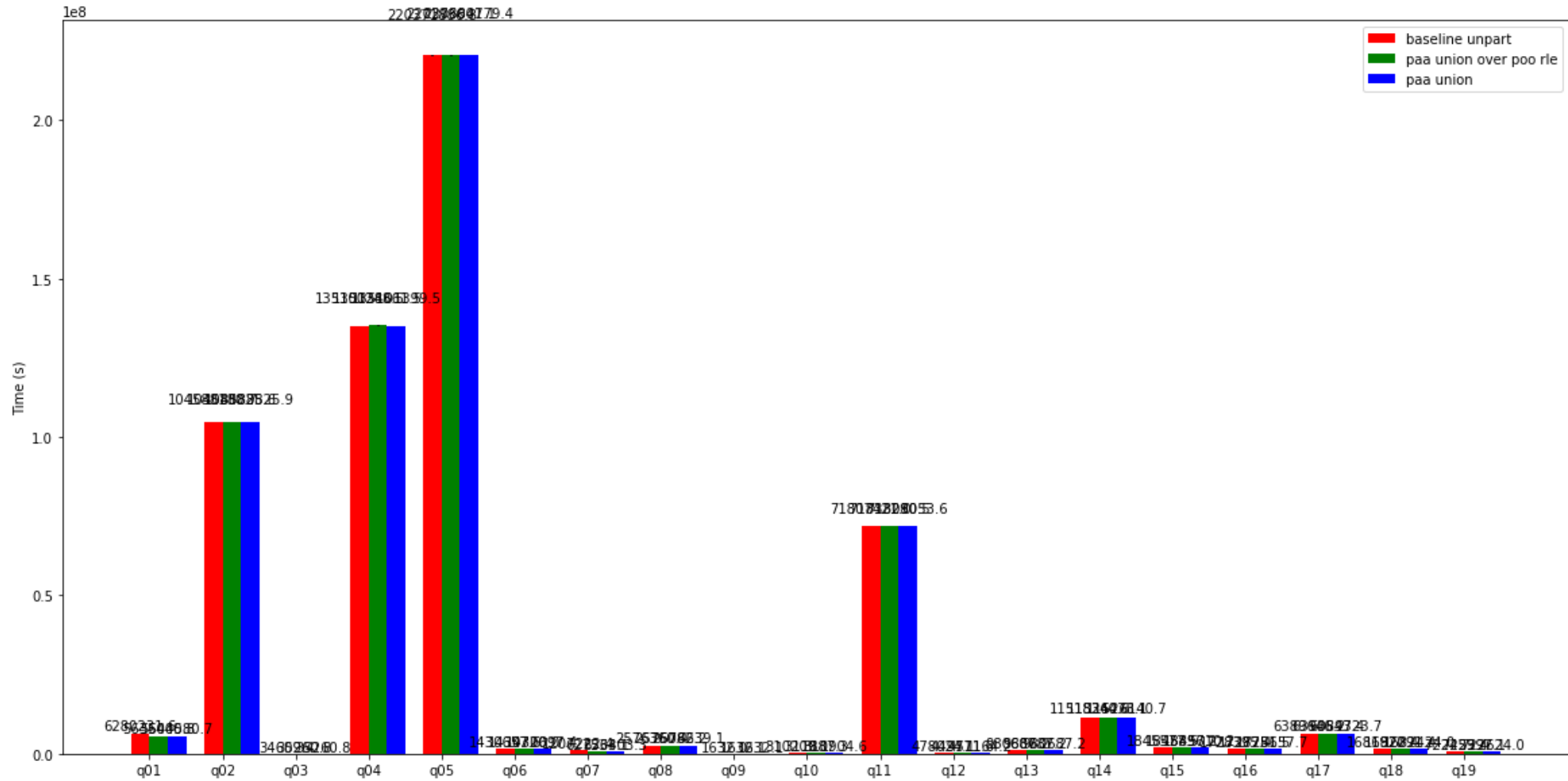


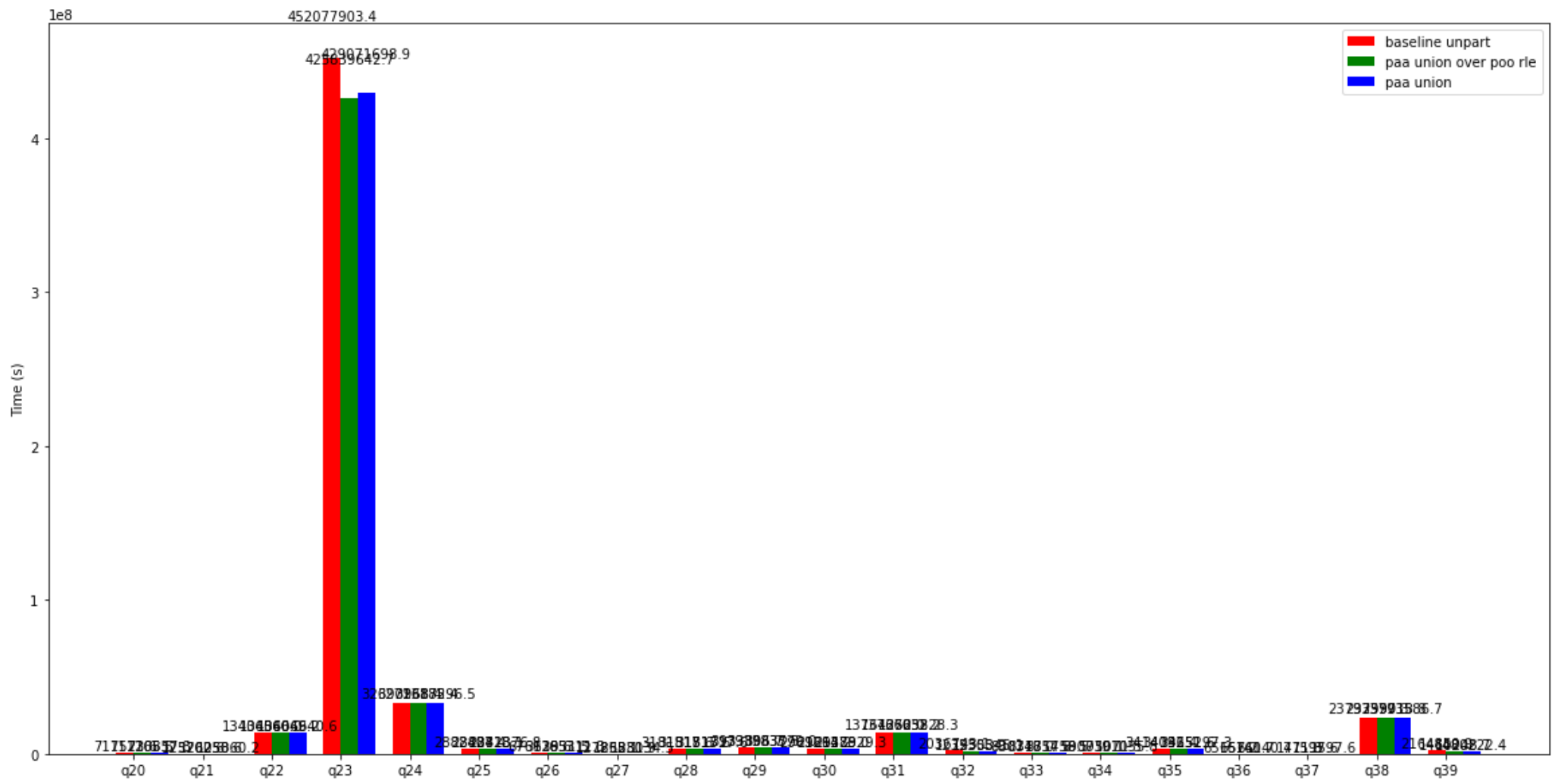
```

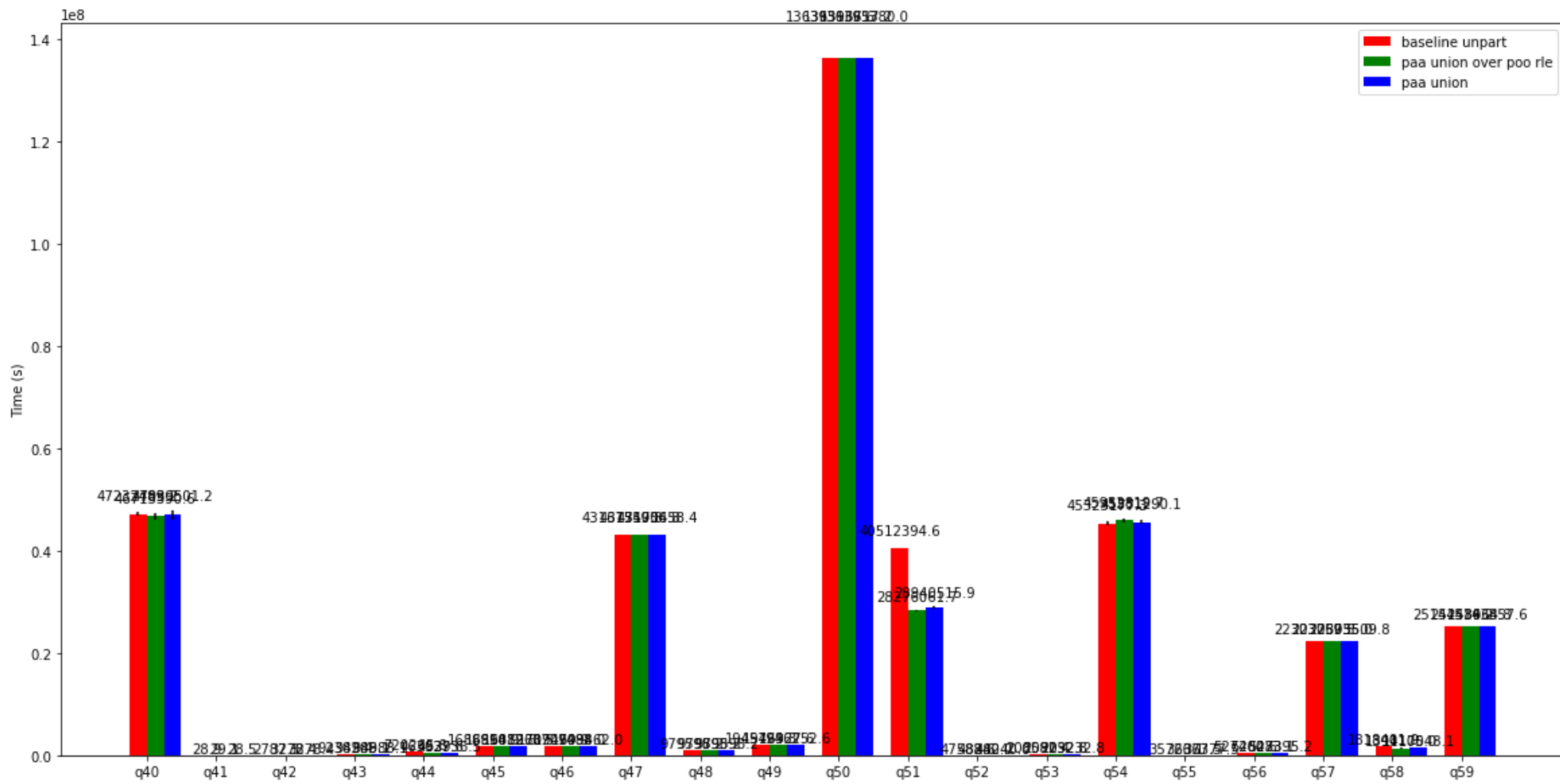
50%      0
75%      0
max       34
Name: % change, dtype: float64
count    22
mean     -3
std      15
min     -49
25%      0
50%      0
75%      0
max       34
Name: % change base -> paa union, dtype: float64

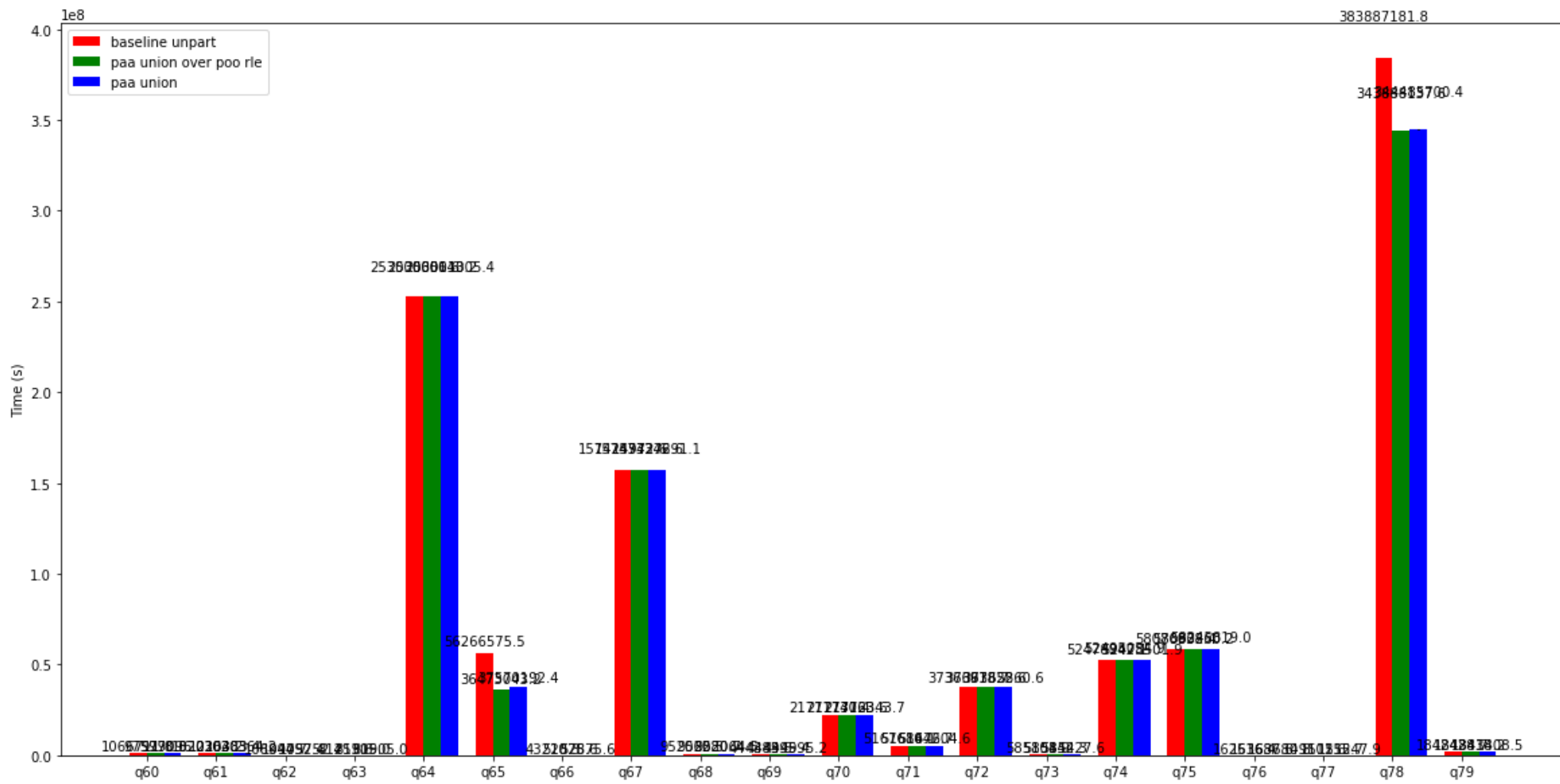
```

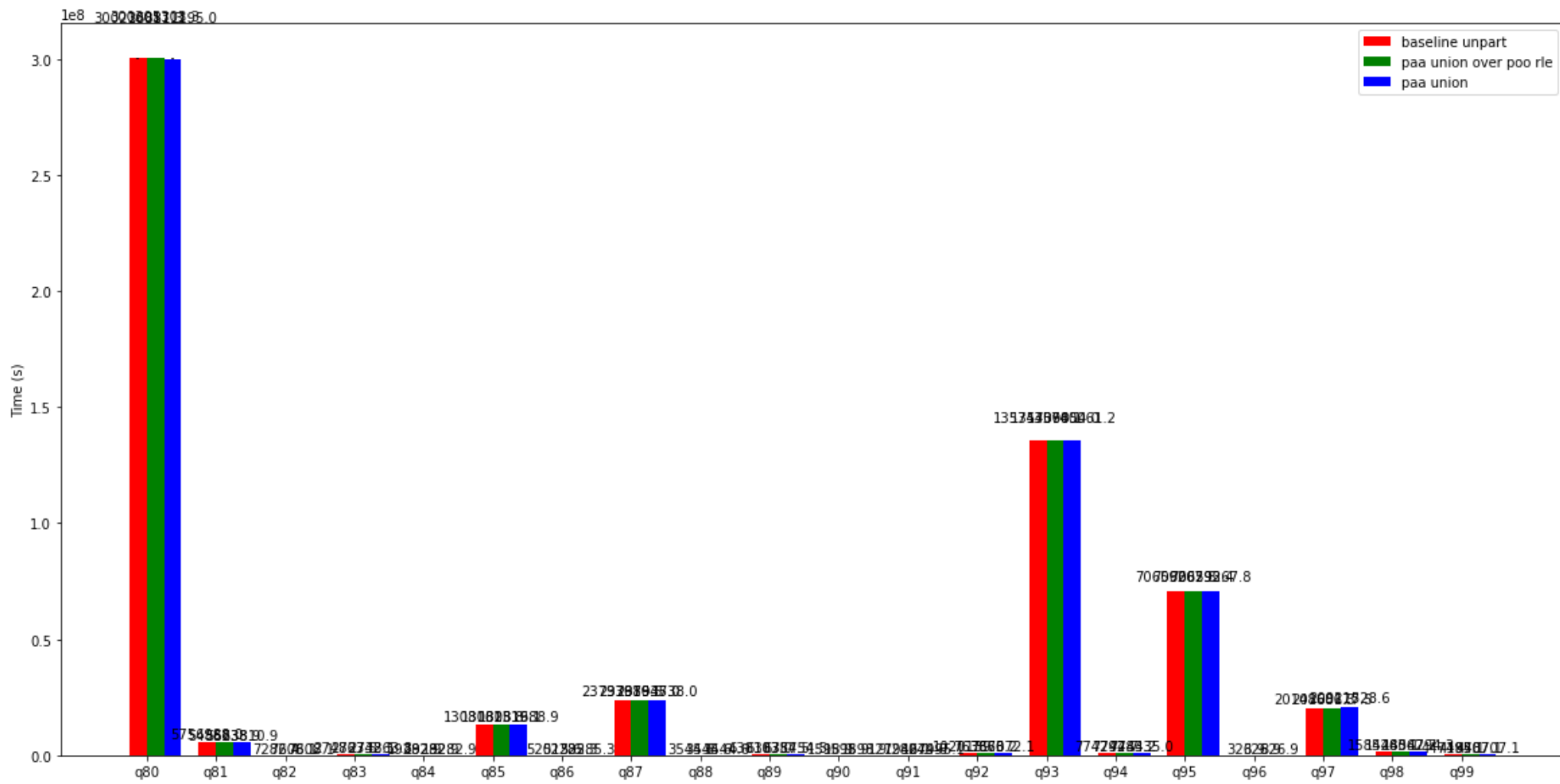
## TPC-DS Comparison (Network)











query	baseline unpart mean	baseline unpart 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 unpart std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
6 presto/tpcds: q07	1207222.43	185.13	627534.06	6538.99	636303.29	8059.73	-48.02	-47.29	0.02	1.04	1.27	0.00000
25 presto/tpcds: q26	676128.60	15.66	361931.54	495.78	365311.28	299.86	-46.47	-45.97	0.00	0.14	0.08	0.00000
31 presto/tpcds: q32	2036743.06	5012.63	1235505.85	4896.52	1235345.13	5056.73	-39.34	-39.35	0.25	0.40	0.41	0.00000
43 presto/tpcds: q44	720265.75	13.26	463927.58	117.65	463936.51	210.45	-35.59	-35.59	0.00	0.03	0.05	0.00000
64 presto/tpcds: q65	56266575.55	493.43	36473043.22	3224.31	37570192.41	131604.56	-35.18	-33.23	0.00	0.01	0.35	0.00000

	query	baseline unpart mean	baseline unpart 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 unpart std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
38	presto/tpcds:q39	2164850.90	154.71	1460248.68	9767.50	1480222.43	7980.10	-32.55	-31.62	0.01	0.67	0.54	0.00000
50	presto/tpcds:q51	40512394.63	1079.99	28276061.71	113230.85	28940515.87	210788.40	-30.20	-28.56	0.00	0.40	0.73	0.00000
91	presto/tpcds:q92	1020139.34	1390.78	763866.16	3214.45	767072.11	2574.88	-25.12	-24.81	0.14	0.42	0.34	0.00000
57	presto/tpcds:q58	1818401.86	7279.38	1391105.03	15995.65	1417048.06	8280.16	-23.50	-22.07	0.40	1.15	0.58	0.00000
77	presto/tpcds:q78	383887181.82	104895.44	343888137.65	112146.67	344485700.44	332239.21	-10.42	-10.26	0.03	0.03	0.10	0.00000
0	presto/tpcds:q01	6280231.58	324.20	5635000.83	15889.79	5644580.74	8715.29	-10.27	-10.12	0.01	0.28	0.15	0.00000
97	presto/tpcds:q98	1585263.11	307.46	1448062.75	514.18	1454794.29	505.39	-8.65	-8.23	0.02	0.04	0.03	0.00000
59	presto/tpcds:q60	1066711.82	893.62	975970.30	1136.95	979096.22	1484.08	-8.51	-8.21	0.08	0.12	0.15	0.00000
11	presto/tpcds:q12	478024.09	118.77	449771.58	109.38	451164.22	132.82	-5.91	-5.62	0.02	0.02	0.03	0.00000
22	presto/tpcds:q23	452077903.39	70.35	425839642.69	7521.79	429071698.91	5480.20	-5.80	-5.09	0.00	0.00	0.00	0.00000
80	presto/tpcds:q81	5756988.02	2455.18	5486238.88	67280.52	5563810.90	94165.53	-4.70	-3.36	0.04	1.23	1.69	0.00000
39	presto/tpcds:q40	47232489.22	469055.79	46713590.63	728633.47	47039501.17	867922.42	-1.10	-0.41	0.99	1.56	1.85	0.17317
26	presto/tpcds:q27	127855.06	3887.28	126830.89	3824.57	128134.54	3161.34	-0.80	0.22	3.04	3.02	2.47	0.65533
82	presto/tpcds:q83	274863.46	6062.04	272742.46	2358.99	273863.82	3230.06	-0.77	-0.36	2.21	0.86	1.18	0.44303
19	presto/tpcds:q20	711523.61	933.75	711265.55	697.41	710857.80	335.31	-0.04	-0.09	0.13	0.10	0.05	0.59943
34	presto/tpcds:q35	3414092.36	827.36	3413651.59	2056.45	3415297.35	826.67	-0.01	0.04	0.02	0.06	0.02	0.63671
7	presto/tpcds:q08	2576360.38	385.81	2576082.17	694.95	2576639.11	105.17	-0.01	0.01	0.01	0.03	0.00	0.41133
18	presto/tpcds:q19	722459.37	139.36	722397.13	447.49	722624.05	38.23	-0.01	0.02	0.02	0.06	0.01	0.75170
92	presto/tpcds:q93	135744060.12	177.83	135739854.04	1688.83	135740061.15	1908.23	-0.00	-0.00	0.00	0.00	0.00	0.00012



	query	baseline unpart mean	baseline unpart 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 unpart std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
83	presto/tpcds:q84	19282.89	462.12	19282.87	462.13	19282.89	462.12	-0.00	0.00	2.40	2.40	2.40	0.99994
47	presto/tpcds:q48	979598.17	0.00	979598.17	0.00	979598.17	0.00	0.00	0.00	0.00	0.00	0.00	nan
89	presto/tpcds:q90	1598.93	0.00	1598.93	0.00	1598.93	0.00	0.00	0.00	0.00	0.00	0.00	nan
87	presto/tpcds:q88	3544.58	0.00	3544.58	0.00	3544.58	0.00	0.00	0.00	0.00	0.00	0.00	nan
27	presto/tpcds:q28	3181517.65	0.00	3181517.65	0.00	3181517.65	0.00	0.00	0.00	0.00	0.00	0.00	nan
12	presto/tpcds:q13	980687.21	0.00	980687.21	0.00	980687.21	0.00	0.00	0.00	0.00	0.00	0.00	nan
95	presto/tpcds:q96	326.92	0.00	326.92	0.00	326.92	0.00	0.00	0.00	0.00	0.00	0.00	nan
24	presto/tpcds:q25	2882407.39	80.78	2882418.11	48.66	2882376.80	99.15	0.00	-0.00	0.00	0.00	0.00	0.78632
29	presto/tpcds:q30	2961264.22	59.57	2961278.00	217.62	2958929.25	2800.14	0.00	-0.08	0.00	0.01	0.09	0.88411
1	presto/tpcds:q02	104588180.73	0.42	104588825.56	0.58	104588825.92	0.45	0.00	0.00	0.00	0.00	0.00	0.00000
21	presto/tpcds:q22	13406559.97	0.00	13406649.25	0.00	13406640.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00000
28	presto/tpcds:q29	3933806.69	53.09	3933835.48	69.22	3933779.04	35.52	0.00	-0.00	0.00	0.00	0.00	0.43764
8	presto/tpcds:q09	1632.04	0.03	1632.06	0.00	1632.06	0.00	0.00	0.00	0.00	0.00	0.00	0.34089
45	presto/tpcds:q46	1709469.86	93.42	1709487.98	103.73	1709462.01	104.59	0.00	-0.00	0.01	0.01	0.01	0.75706
71	presto/tpcds:q72	37366918.67	1190.79	37367322.57	1195.84	37365860.62	2333.74	0.00	-0.00	0.00	0.00	0.01	0.57071
49	presto/tpcds:q50	136395136.60	2.03	136396717.24	2.01	136395380.03	1.01	0.00	0.00	0.00	0.00	0.00	0.00000
94	presto/tpcds:q95	70659267.76	0.00	70660293.44	0.00	70659267.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00000
63	presto/tpcds:q64	253000606.62	21849.78	253005140.15	24060.44	253001305.43	21151.27	0.00	0.00	0.01	0.01	0.01	0.73967
4	presto/tpcds:q05	220371886.79	71302.26	220376001.09	119041.28	220384779.41	59390.34	0.00	0.01	0.03	0.05	0.03	0.94353

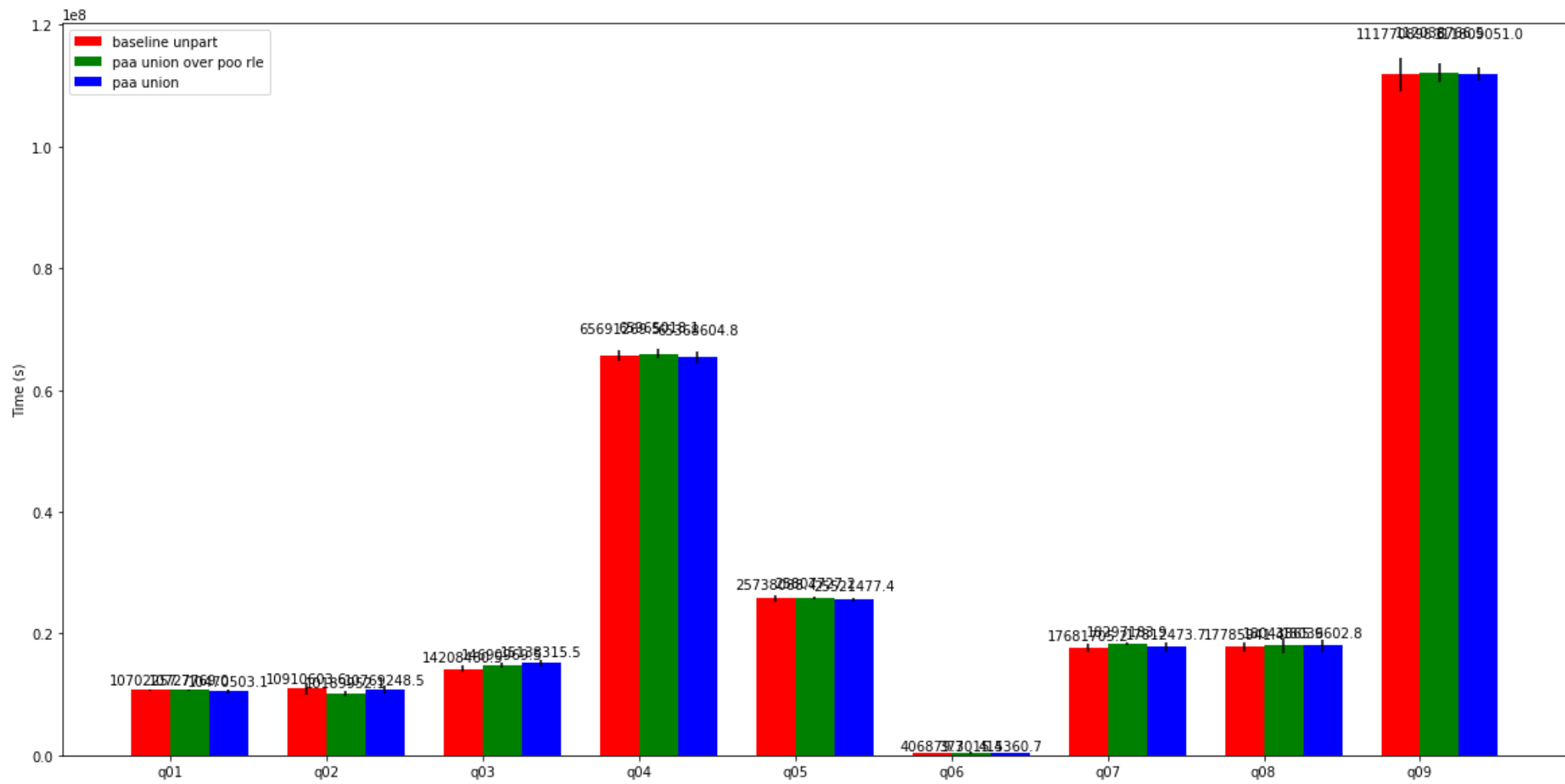
	query	baseline unpart mean	baseline unpart std.dev	paa union over poo rle mean	paa union over poo rle std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline unpart std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
60	presto/tpcds:q61	1020364.23	0.00	1020383.39	0.00	1020364.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00000
67	presto/tpcds:q68	952062.54	40.83	952080.67	80.48	952064.52	24.75	0.00	0.00	0.00	0.01	0.00	0.63322
5	presto/tpcds:q06	1430657.58	2.01	1430720.00	4.11	1430697.45	2.98	0.00	0.00	0.00	0.00	0.00	0.00000
66	presto/tpcds:q67	157424972.56	11035.31	157433346.56	1808.28	157427291.10	4033.06	0.01	0.00	0.01	0.00	0.00	0.09649
84	presto/tpcds:q85	13081615.79	56.56	13082319.09	56.70	13081688.95	71.55	0.01	0.00	0.00	0.00	0.00	0.00000
74	presto/tpcds:q75	58076938.44	37.57	58080260.20	38.21	58245819.03	41.36	0.01	0.29	0.00	0.00	0.00	0.00000
44	presto/tpcds:q45	1688914.91	10.27	1689012.47	14.84	1688968.52	13.19	0.01	0.00	0.00	0.00	0.00	0.00000
69	presto/tpcds:q70	21771740.36	0.00	21773163.59	0.00	21772343.69	0.00	0.01	0.00	0.00	0.00	0.00	0.00000
30	presto/tpcds:q31	13764251.99	1449.58	13766032.21	1163.75	13765828.31	1295.33	0.01	0.01	0.01	0.01	0.01	0.04093
56	presto/tpcds:q57	22303759.54	0.00	22306734.99	0.00	22305509.85	0.00	0.01	0.01	0.00	0.00	0.00	0.00000
16	presto/tpcds:q17	6389646.16	3.13	6390543.45	5.95	6389723.67	2.55	0.01	0.00	0.00	0.00	0.00	0.00000
46	presto/tpcds:q47	43167559.76	0.00	43174056.77	0.00	43170458.35	0.00	0.02	0.01	0.00	0.00	0.00	0.00000
70	presto/tpcds:q71	5167610.09	762.88	5168442.74	687.53	5167604.60	855.80	0.02	-0.00	0.01	0.01	0.02	0.07512
14	presto/tpcds:q15	1845577.52	53.39	1845896.17	79.06	1845710.24	82.33	0.02	0.01	0.00	0.00	0.00	0.00001
15	presto/tpcds:q16	1728395.40	0.31	1728751.51	0.27	1728657.74	0.30	0.02	0.02	0.00	0.00	0.00	0.00000
17	presto/tpcds:q18	1681920.40	153.84	1682291.45	159.39	1682424.04	103.19	0.02	0.03	0.01	0.01	0.01	0.00213
86	presto/tpcds:q87	23793616.54	170.88	23798945.02	114.18	23793738.01	280.51	0.02	0.00	0.00	0.00	0.00	0.00000
37	presto/tpcds:q38	23793557.33	137.82	23799013.78	220.57	23793586.73	179.66	0.02	0.00	0.00	0.00	0.00	0.00000
93	presto/tpcds:q94	774292.68	0.11	774483.25	1.44	774434.98	0.15	0.02	0.02	0.00	0.00	0.00	0.00000

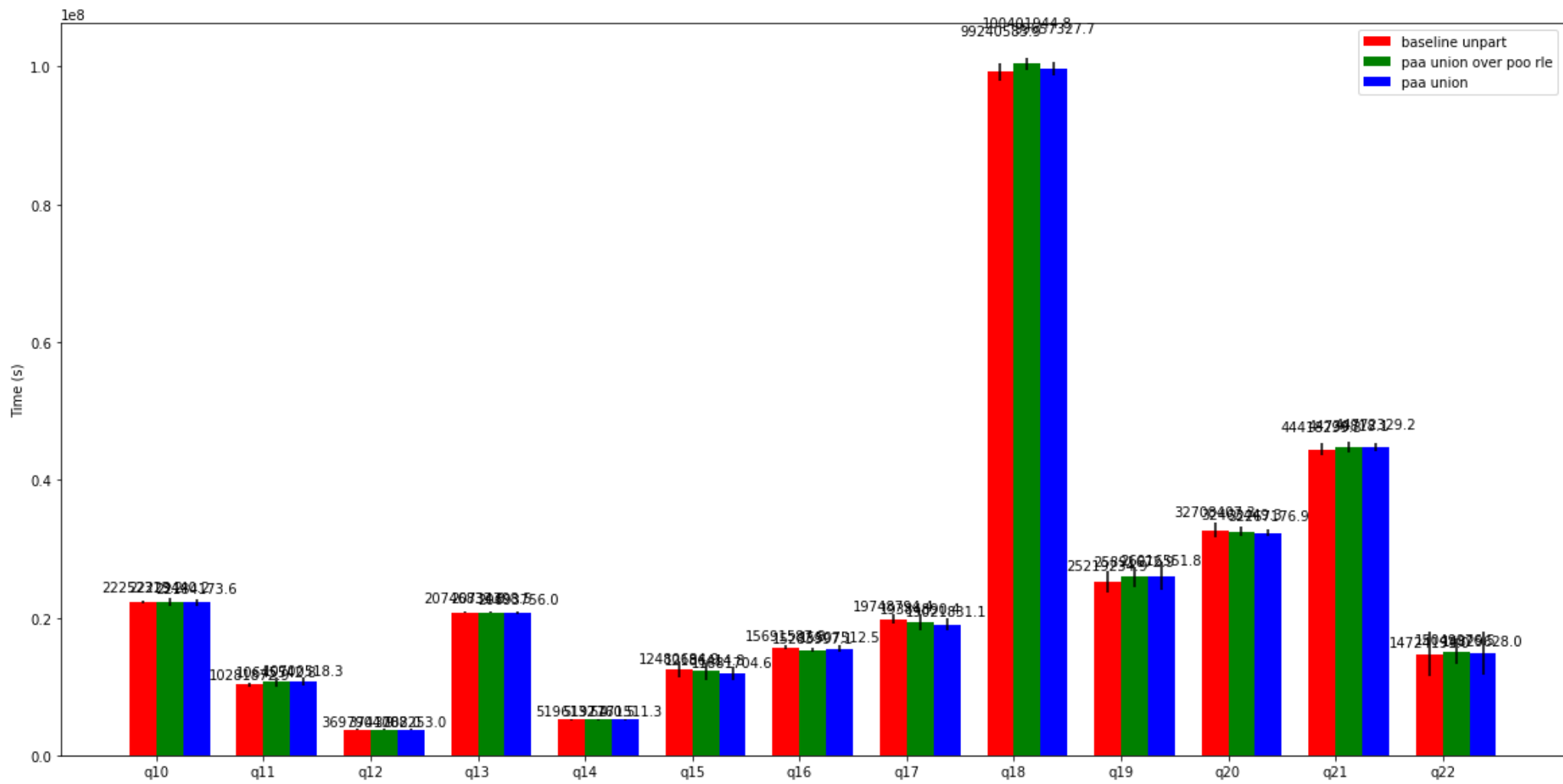
	query	baseline unpart mean	baseline unpart std.dev	paa union over poo rle mean	paa union over poo rle std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline unpart std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
3	presto/tpcds:q04	135100248.49	724.02	135138661.50	577.80	135101399.48	514.53	0.03	0.00	0.00	0.00	0.00	0.00000
79	presto/tpcds:q80	300216881.27	98825.39	300305303.28	108231.06	300171195.02	141086.70	0.03	-0.02	0.03	0.04	0.05	0.17025
73	presto/tpcds:q74	52478942.13	729.52	52495054.92	837.47	52478501.94	934.25	0.03	-0.00	0.00	0.00	0.00	0.00000
48	presto/tpcds:q49	1945729.27	30.38	1946327.57	48.88	1946252.57	68.64	0.03	0.03	0.00	0.00	0.00	0.00000
10	presto/tpcds:q11	71807421.01	600.06	71833290.53	393.79	71808053.61	497.44	0.04	0.00	0.00	0.00	0.00	0.00000
78	presto/tpcds:q79	1842428.72	6.02	1843418.15	0.42	1843408.54	0.27	0.05	0.05	0.00	0.00	0.00	0.00000
58	presto/tpcds:q59	25144436.18	19.09	25158964.83	15.43	25143857.63	9.69	0.06	-0.00	0.00	0.00	0.00	0.00000
33	presto/tpcds:q34	590730.13	0.00	591071.50	0.00	591055.84	0.00	0.06	0.06	0.00	0.00	0.00	0.00000
72	presto/tpcds:q73	585101.91	0.01	585442.29	0.01	585427.63	0.01	0.06	0.06	0.00	0.00	0.00	0.00000
23	presto/tpcds:q24	32690968.40	47468.50	32713185.44	20890.76	32687296.49	77046.49	0.07	-0.01	0.15	0.06	0.24	0.31873
13	presto/tpcds:q14	11518340.64	13.22	11526478.10	21.77	11526140.71	16.54	0.07	0.07	0.00	0.00	0.00	0.00000
90	presto/tpcds:q91	127946.13	14.89	128044.55	3.89	127995.11	12.66	0.08	0.04	0.01	0.00	0.01	0.00000
96	presto/tpcds:q97	20148606.29	173.06	20168177.47	4730.36	20921528.63	9005.03	0.10	3.84	0.00	0.02	0.04	0.00000
88	presto/tpcds:q89	638103.05	0.00	638754.47	0.00	638754.47	0.00	0.10	0.10	0.00	0.00	0.00	0.00000
32	presto/tpcds:q33	830746.05	9.09	831754.81	12.20	831758.53	11.50	0.12	0.12	0.00	0.00	0.00	0.00000
68	presto/tpcds:q69	444383.50	0.00	444995.44	2.48	444995.23	0.00	0.14	0.14	0.00	0.00	0.00	0.00000
55	presto/tpcds:q56	527460.62	261.37	528473.13	125.25	528395.17	164.83	0.19	0.18	0.05	0.02	0.03	0.00001
20	presto/tpcds:q21	125702.55	0.00	126050.56	0.00	125860.22	0.00	0.28	0.13	0.00	0.00	0.00	0.00000
52	presto/tpcds:q53	208581.40	0.00	209232.82	0.00	209232.82	0.00	0.31	0.31	0.00	0.00	0.00	0.00000



```
std      11
min     -48
25%     -0
50%      0
75%      0
max      22
Name: % change, dtype: float64
count    99
mean     -3
std      11
min     -47
25%     -0
50%      0
75%      0
max      22
Name: % change base -> paa union, dtype: float64
```

## TPC-H Comparison (Peak memory)





	query	baseline unpart mean	baseline unpart 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 unpart std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
5	presto/tpch: q06	406879.65	89072.18	373015.44	141402.63	415360.70	80756.74	-8.32	2.08	21.89	37.91	19.44	0.63037
1	presto/tpch: q02	10910603.59	1002689.90	10189952.09	394187.74	10769248.47	695356.55	-6.61	-1.30	9.19	3.87	6.46	0.13237
15	presto/tpch: q16	15691587.80	300296.53	15283997.10	326879.68	15507512.54	508063.20	-2.60	-1.17	1.91	2.14	3.28	0.04824
14	presto/tpch: q15	12480684.94	1108095.00	12186414.83	1199984.61	11881704.62	996578.31	-2.36	-4.80	8.88	9.85	8.39	0.66838
16	presto/tpch: q17	19748794.40	672592.15	19384890.43	1206878.77	19021831.11	952643.41	-1.84	-3.68	3.41	6.23	5.01	0.53335



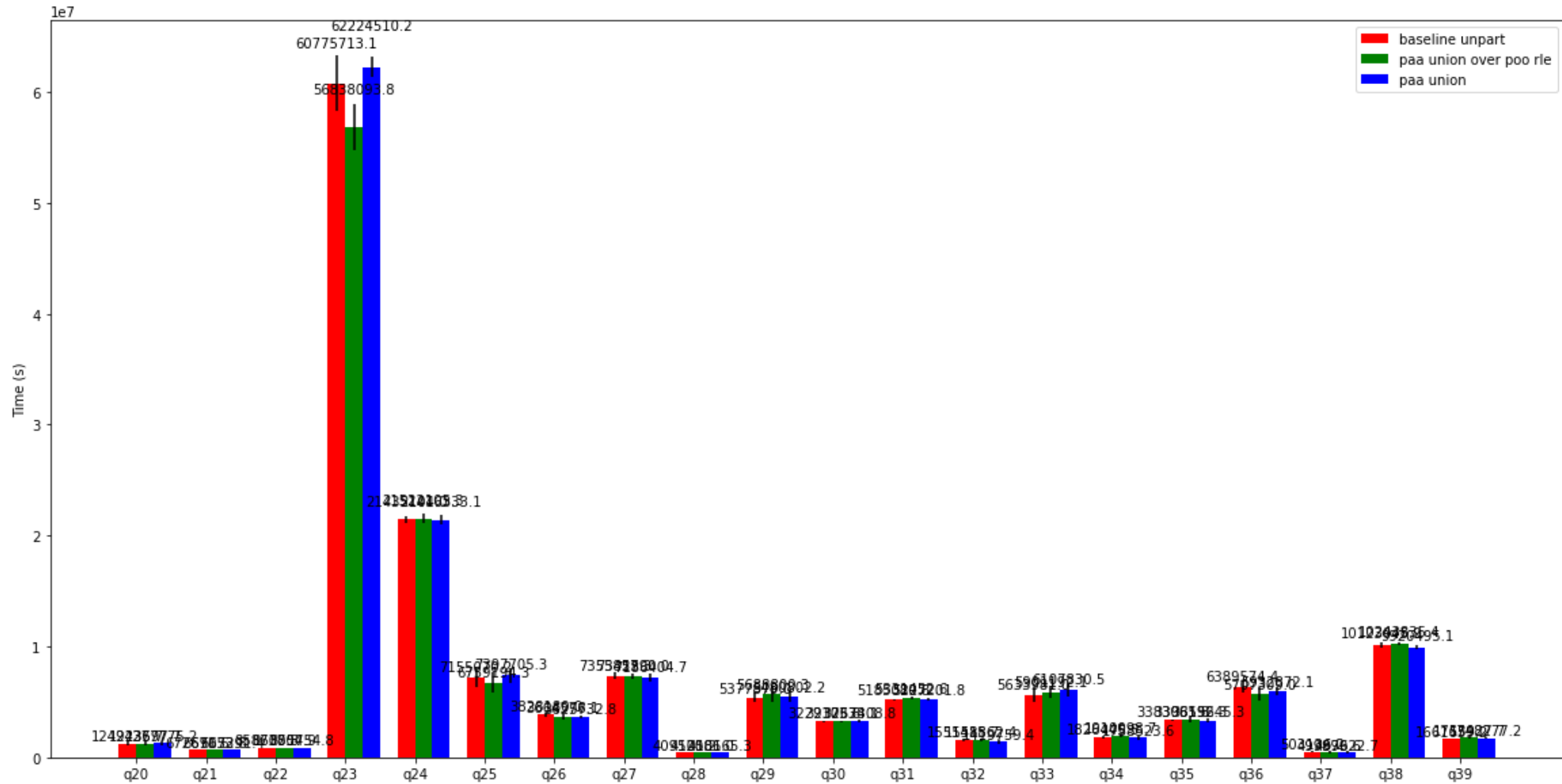


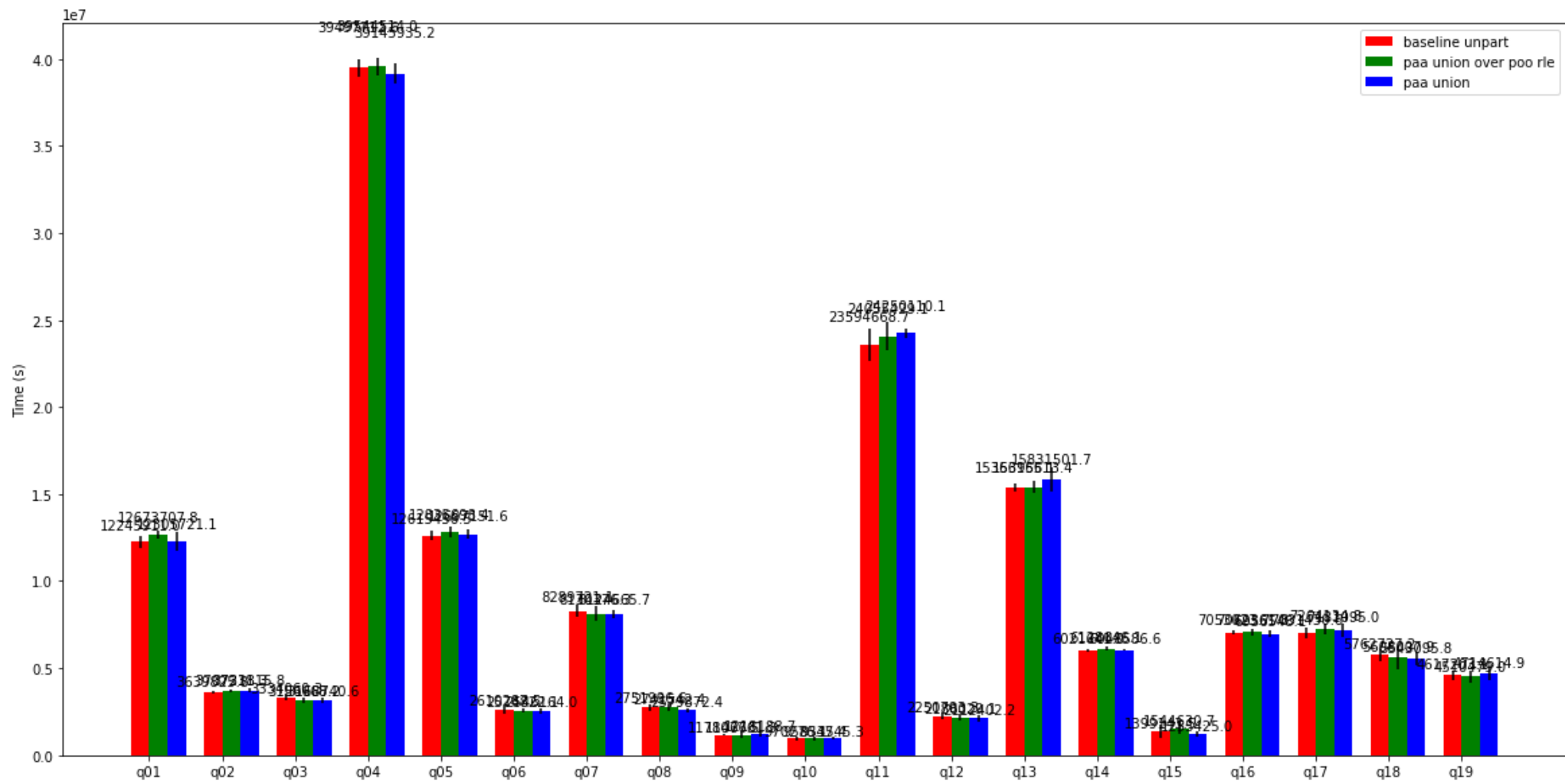
```

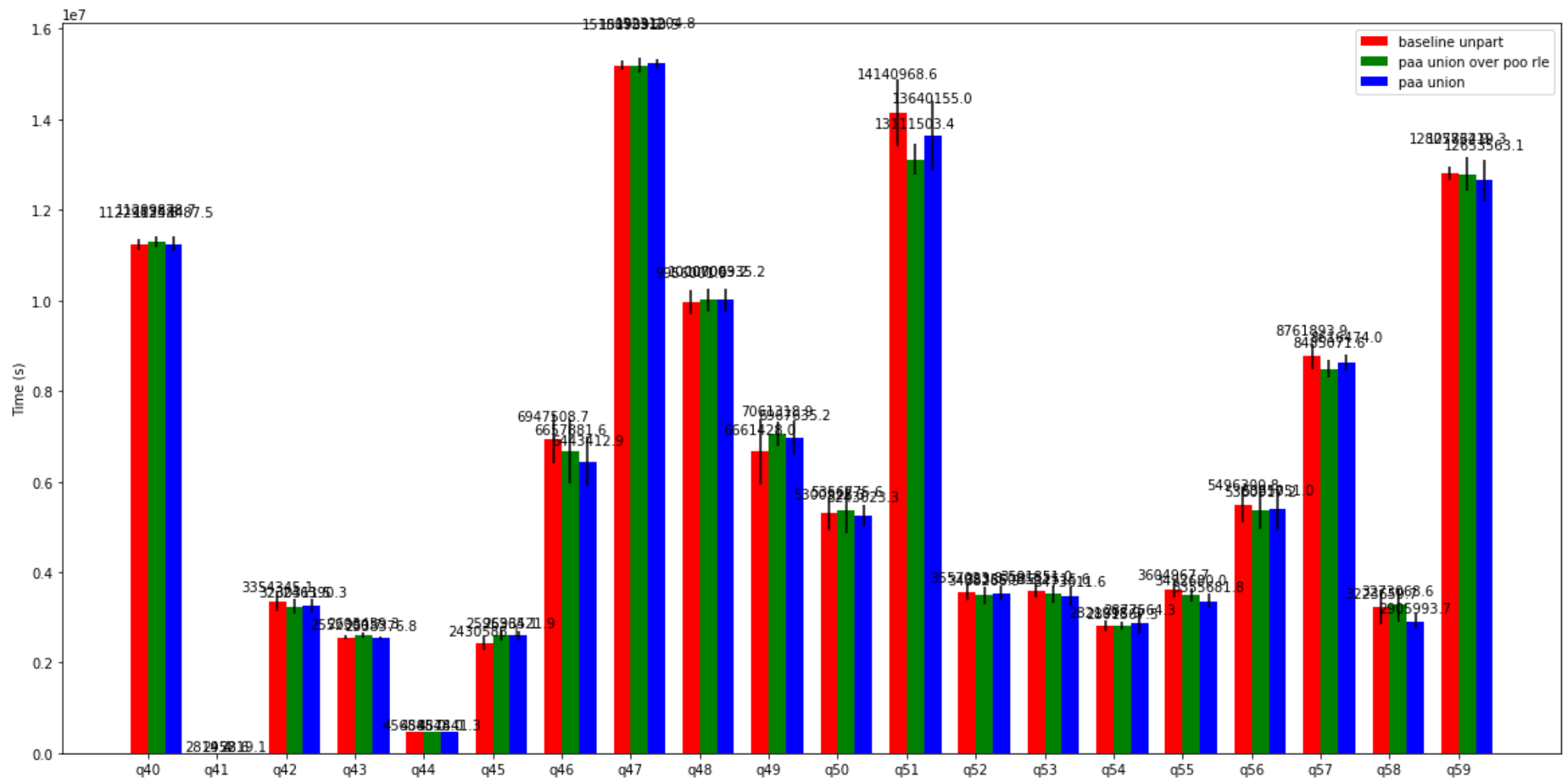
50%      0
75%      1
max       4
Name: % change, dtype: float64
count    22
mean     0
std      2
min     -5
25%     -1
50%     -0
75%      1
max       7
Name: % change base -> paa union, dtype: float64

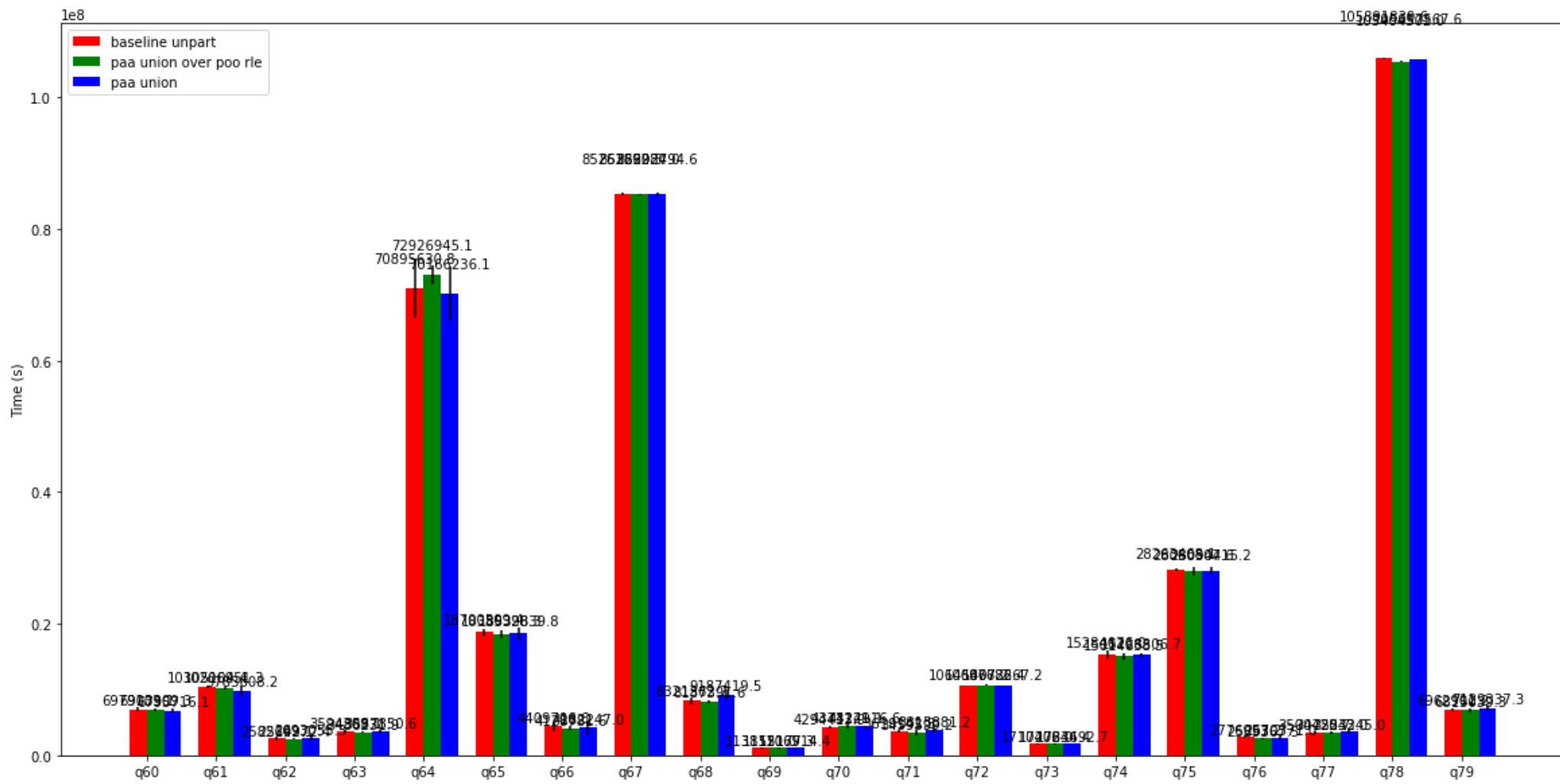
```

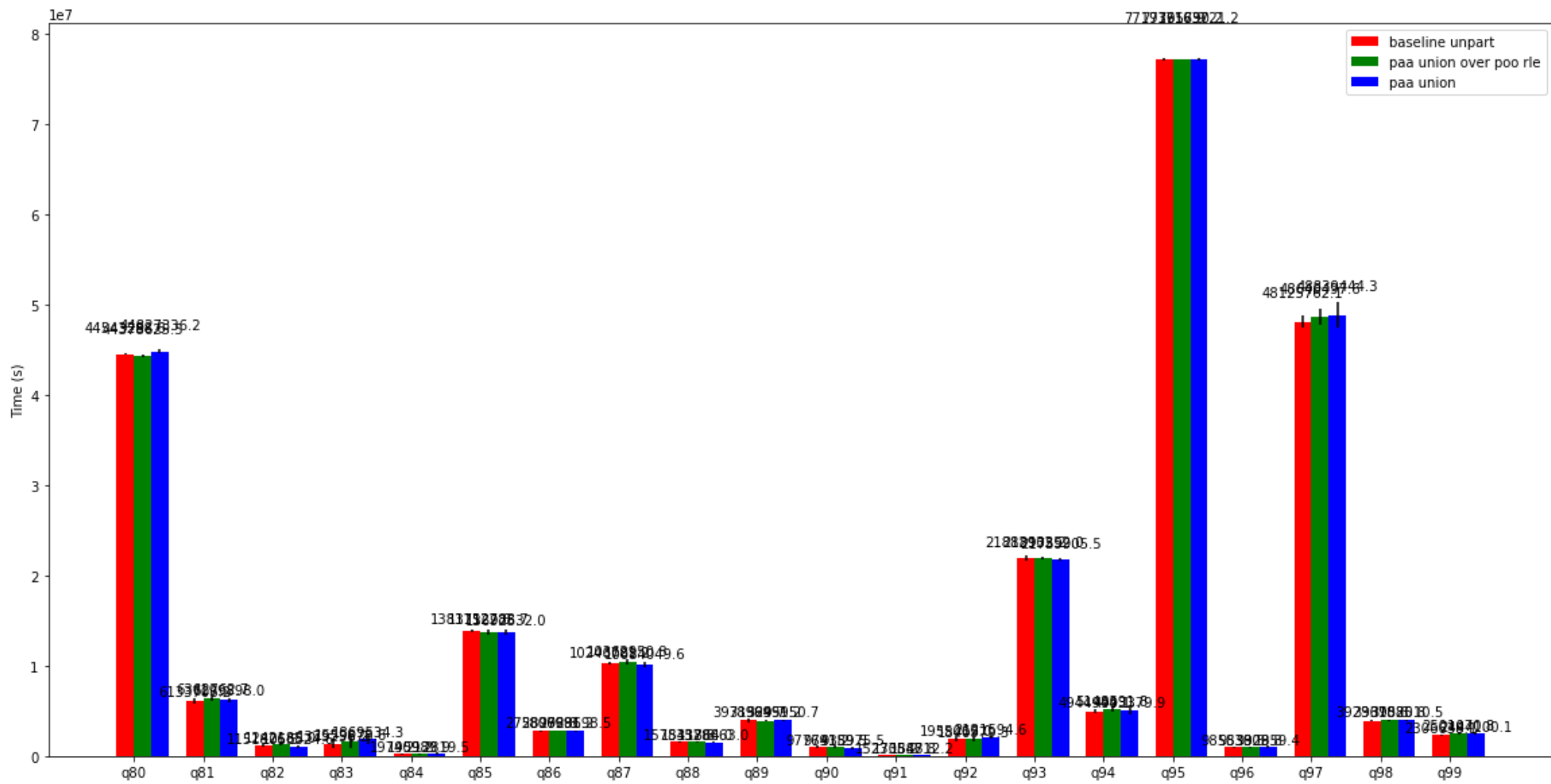
## TPC-DS Comparison (Peak memory)

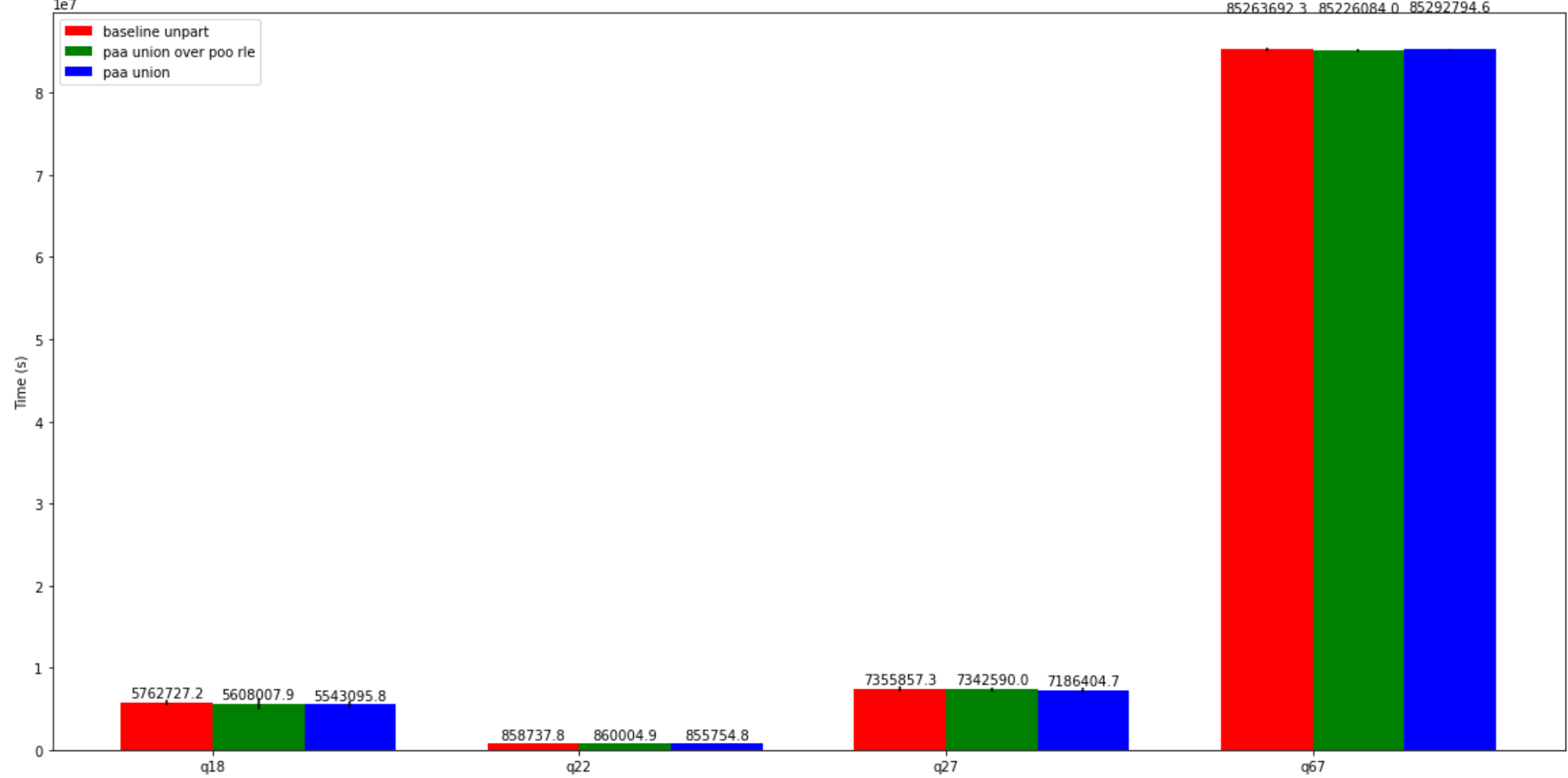












query	baseline unpart mean	baseline unpart std.dev	paa union over poo rle mean	paa union over poo rle std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline unpart std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
35 presto/tpcds: q36	6389574.37	573700.43	5707309.05	591424.14	5932872.06	374546.73	-10.68	-7.15	8.98	10.36	6.31	0.07001
75 presto/tpcds: q76	2776953.18	220783.48	2569367.49	143700.38	2670371.02	333365.53	-7.48	-3.84	7.95	5.59	12.48	0.08240
50 presto/tpcds: q51	14140968.63	746570.52	13111503.37	338785.78	13640155.04	761959.78	-7.28	-3.54	5.28	2.58	5.59	0.01172
22 presto/tpcds: q23	60775713.12	2525573.95	56838093.78	2113538.47	62224510.19	917434.29	-6.48	2.38	4.16	3.72	1.47	0.01507
65 presto/tpcds: q66	4409706.55	700679.64	4128781.58	242321.13	4182246.96	1141366.70	-6.37	-5.16	15.89	5.87	27.29	0.37519

	query	baseline unpart mean	baseline unpart 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 unpart std.dev %	paa union over poole std.dev %	paa union std.dev %	p-value
91	presto/tpcds:q92	1955065.02	273689.03	1840979.29	220208.65	2121594.64	221919.04	-5.84	8.52	14.00	11.96	10.46	0.44478
24	presto/tpcds:q25	7155070.21	840006.93	6759194.29	934469.08	7397705.35	658051.00	-5.53	3.39	11.74	13.83	8.90	0.45812
2	presto/tpcds:q03	3334060.33	171380.64	3156668.15	169600.93	3168740.65	153579.58	-5.32	-4.96	5.14	5.37	4.85	0.10170
70	presto/tpcds:q71	3619142.47	201229.71	3459599.21	413829.99	3815881.22	432370.01	-4.41	5.44	5.56	11.96	11.33	0.41560
25	presto/tpcds:q26	3828180.05	137791.87	3664576.11	284584.08	3625732.80	162387.03	-4.27	-5.29	3.60	7.77	4.48	0.23372
45	presto/tpcds:q46	6947508.65	540360.56	6657881.57	711909.44	6443412.88	537888.21	-4.17	-7.26	7.78	10.69	8.35	0.44576
41	presto/tpcds:q42	3354345.07	229951.67	3230311.46	160753.51	3246390.30	147234.60	-3.70	-3.22	6.86	4.98	4.54	0.30429
95	presto/tpcds:q96	985838.52	92225.31	953309.78	43514.95	992859.37	124968.59	-3.30	0.71	9.36	4.56	12.59	0.45270
56	presto/tpcds:q57	8761893.87	279706.76	8485071.55	194772.05	8616474.03	179771.79	-3.16	-1.66	3.19	2.30	2.09	0.07469
54	presto/tpcds:q55	3604967.72	180130.41	3492680.05	147595.65	3355681.80	160442.98	-3.11	-6.92	5.00	4.23	4.78	0.26490
62	presto/tpcds:q63	3594309.07	230782.20	3486231.85	136216.28	3587850.62	202396.00	-3.01	-0.18	6.42	3.91	5.64	0.34651
11	presto/tpcds:q12	2250793.32	194975.60	2186029.13	221842.46	2112402.20	217450.07	-2.88	-6.15	8.66	10.15	10.29	0.60292
17	presto/tpcds:q18	5762727.18	338244.30	5608007.86	644750.36	5543095.76	401225.76	-2.68	-3.81	5.87	11.50	7.24	0.61403
8	presto/tpcds:q09	1178077.45	66276.43	1146661.35	137582.71	1218188.66	115586.40	-2.67	3.40	5.63	12.00	9.49	0.62524
61	presto/tpcds:q62	2582692.08	297367.15	2514972.35	157117.52	2693055.33	392540.45	-2.62	4.27	11.51	6.25	14.58	0.63251
55	presto/tpcds:q56	5496300.79	386465.84	5360917.17	416936.12	5385051.03	461227.17	-2.46	-2.02	7.03	7.78	8.56	0.57259
18	presto/tpcds:q19	4617203.11	277945.70	4510479.00	322944.24	4714614.95	397271.99	-2.31	2.11	6.02	7.16	8.43	0.55322
87	presto/tpcds:q88	1578337.81	84950.70	1541864.05	20498.27	1528663.01	19484.56	-2.31	-3.15	5.38	1.33	1.27	0.33071
52	presto/tpcds:q53	3591851.03	159665.76	3512515.57	184913.05	3473611.60	203050.50	-2.21	-3.29	4.45	5.26	5.85	0.44483

	query	baseline unpart mean	baseline unpart 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 unpart std.dev %	paa union over poole std.dev %	paa union std.dev %	p-value
78	presto/tpcds:q79	6962901.16	215327.90	6815039.33	233123.35	7129337.34	372399.66	-2.12	2.39	3.09	3.42	5.22	0.28035
19	presto/tpcds:q20	1249436.73	176776.56	1223597.70	204884.26	1277775.25	163249.53	-2.07	2.27	14.15	16.74	12.78	0.81979
51	presto/tpcds:q52	3557023.80	174337.63	3488266.94	195988.08	3535508.27	157852.49	-1.93	-0.60	4.90	5.62	4.46	0.53527
6	presto/tpcds:q07	8289721.06	321738.25	8130376.27	420159.10	8124665.69	234052.52	-1.92	-1.99	3.88	5.17	2.88	0.47773
88	presto/tpcds:q89	3971529.68	221970.59	3896991.21	117734.60	3945950.75	101581.31	-1.88	-0.64	5.59	3.02	2.57	0.48410
73	presto/tpcds:q74	15284076.00	660815.76	15014658.47	461551.19	15228306.67	314078.06	-1.76	-0.36	4.32	3.07	2.06	0.43202
64	presto/tpcds:q65	18700509.37	592754.20	18389328.31	571995.21	18539839.84	955009.44	-1.66	-0.86	3.17	3.11	5.15	0.37658
67	presto/tpcds:q68	8321362.71	514032.43	8187391.58	168847.11	9187419.48	732520.12	-1.61	10.41	6.18	2.06	7.97	0.55769
5	presto/tpcds:q06	2610287.47	211418.58	2574822.09	127793.98	2546163.99	173093.06	-1.36	-2.46	8.10	4.96	6.80	0.73240
9	presto/tpcds:q10	970276.12	106920.20	958347.36	110077.44	953545.31	75063.46	-1.23	-1.72	11.02	11.49	7.87	0.85280
59	presto/tpcds:q60	6979103.05	356990.08	6903909.30	278908.49	6795716.08	255867.48	-1.08	-2.63	5.12	4.04	3.77	0.69289
60	presto/tpcds:q61	10305104.39	215346.22	10206951.34	245101.36	9783608.25	842274.11	-0.95	-5.06	2.09	2.40	8.61	0.47811
76	presto/tpcds:q77	3500420.68	168674.65	3472243.01	187382.79	3553244.97	256028.59	-0.80	1.51	4.82	5.40	7.21	0.78984
74	presto/tpcds:q75	28263468.14	199249.54	28050507.61	612901.59	28094415.18	438425.65	-0.75	-0.60	0.70	2.18	1.56	0.43711
53	presto/tpcds:q54	2821998.93	120712.97	2801567.48	92012.77	2877564.25	253077.97	-0.72	1.97	4.28	3.28	8.79	0.74841
83	presto/tpcds:q84	197409.18	119245.99	195989.92	74632.32	212819.49	135049.76	-0.72	7.81	60.41	38.08	63.46	0.98077
84	presto/tpcds:q85	13811522.62	152866.10	13712788.70	312275.75	13692531.98	264184.16	-0.71	-0.86	1.11	2.28	1.93	0.50253
36	presto/tpcds:q37	503136.23	74416.47	499999.55	121382.53	487622.71	101982.29	-0.62	-3.08	14.79	24.28	20.91	0.95803
20	presto/tpcds:q21	672671.50	12619.35	669053.85	11671.35	667291.41	12164.57	-0.54	-0.80	1.88	1.74	1.82	0.61739



	query	baseline unpart mean	baseline unpart 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 unpart std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
77	presto/tpcds:q78	105891839.61	51160.22	105404501.95	89392.23	105657567.59	165137.13	-0.46	-0.22	0.05	0.08	0.16	0.00000
7	presto/tpcds:q08	2751996.60	194736.57	2741542.42	205582.46	2579872.45	95277.45	-0.38	-6.25	7.08	7.50	3.69	0.92973
79	presto/tpcds:q80	44543288.59	136586.68	44378625.48	164922.37	44827336.24	177751.55	-0.37	0.64	0.31	0.37	0.40	0.08900
89	presto/tpcds:q90	977691.17	167271.98	974159.46	129902.87	938975.49	148339.63	-0.36	-3.96	17.11	13.33	15.80	0.96822
26	presto/tpcds:q27	7355857.29	323136.14	7342589.99	267650.95	7186404.68	308998.61	-0.18	-2.30	4.39	3.65	4.30	0.93979
58	presto/tpcds:q59	12805732.86	156762.18	12786419.34	364246.58	12653563.11	457689.03	-0.15	-1.19	1.22	2.85	3.62	0.90740
66	presto/tpcds:q67	85263692.33	220192.32	85226083.97	161547.78	85292794.57	116456.06	-0.04	0.03	0.26	0.19	0.14	0.74285
94	presto/tpcds:q95	77193616.88	122045.18	77195790.16	55631.42	77163721.19	101690.81	0.00	-0.04	0.16	0.07	0.13	0.96912
92	presto/tpcds:q93	21882932.23	264778.08	21890352.01	190453.28	21759905.52	145317.41	0.03	-0.56	1.21	0.87	0.67	0.95666
46	presto/tpcds:q47	15188753.20	99394.50	15193913.50	163030.23	15231204.79	111850.49	0.03	0.28	0.65	1.07	0.73	0.94852
3	presto/tpcds:q04	39497712.55	504125.36	39544514.02	493035.23	39145935.23	590950.84	0.12	-0.89	1.28	1.25	1.51	0.87409
15	presto/tpcds:q16	7053023.71	86501.03	7062361.80	160322.76	6956548.05	198519.19	0.13	-1.37	1.23	2.27	2.85	0.90257
21	presto/tpcds:q22	858737.75	9363.66	860004.91	7911.97	855754.83	7126.80	0.15	-0.35	1.09	0.92	0.83	0.80525
97	presto/tpcds:q98	3923678.58	76020.56	3931085.83	60841.28	3952010.49	106686.03	0.19	0.72	1.94	1.55	2.70	0.85590
12	presto/tpcds:q13	15366165.12	235463.04	15395613.39	332894.94	15831501.66	686276.64	0.19	3.03	1.53	2.16	4.33	0.86311
27	presto/tpcds:q28	409520.20	3989.46	410586.02	2832.28	410165.26	1367.21	0.26	0.16	0.97	0.69	0.33	0.60527
29	presto/tpcds:q30	3229103.78	87627.29	3237534.11	62472.19	3267308.79	115131.99	0.26	1.18	2.71	1.93	3.52	0.85167
71	presto/tpcds:q72	10645407.17	49311.32	10687686.35	24479.17	10672267.17	21967.00	0.40	0.25	0.46	0.23	0.21	0.08936
34	presto/tpcds:q35	3383061.81	67636.78	3396592.30	273665.40	3315645.35	188160.27	0.40	-1.99	2.00	8.06	5.67	0.90874

	query	baseline unpart mean	baseline unpart 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 unpart std.dev %	paa union over poole std.dev %	paa union std.dev %	p-value
23	presto/tpcds:q24	21435104.01	257735.03	21522105.25	416848.77	21416333.11	407849.17	0.41	-0.09	1.20	1.94	1.90	0.67292
43	presto/tpcds:q44	456845.00	901.08	458848.02	163.09	457441.27	2495.65	0.44	0.13	0.20	0.04	0.55	0.00032
31	presto/tpcds:q32	1551415.72	130862.80	1558862.40	163523.58	1419759.42	201856.02	0.48	-8.49	8.44	10.49	14.22	0.93232
47	presto/tpcds:q48	9956001.90	268860.41	10007003.19	253303.24	10006935.16	261203.89	0.51	0.51	2.70	2.53	2.61	0.74221
39	presto/tpcds:q40	11229635.82	116224.45	11299878.70	124960.33	11248487.49	159660.48	0.63	0.17	1.03	1.11	1.42	0.33712
72	presto/tpcds:q73	1710406.04	93907.32	1727244.42	44715.89	1783692.71	76184.20	0.98	4.28	5.49	2.59	4.27	0.70003
49	presto/tpcds:q50	5300928.35	370428.72	5356775.57	512686.44	5243023.30	229473.25	1.05	-1.09	6.99	9.57	4.38	0.83312
96	presto/tpcds:q97	48125762.07	613024.00	48640497.60	839300.53	48839444.29	1419367.40	1.07	1.48	1.27	1.73	2.91	0.25296
86	presto/tpcds:q87	10246781.20	195735.91	10362950.76	303712.11	10084049.62	294347.91	1.13	-1.59	1.91	2.93	2.92	0.44923
37	presto/tpcds:q38	10123045.88	302041.09	10243835.45	162112.80	9920495.13	164759.28	1.19	-2.00	2.98	1.58	1.66	0.40830
68	presto/tpcds:q69	1138120.97	136739.94	1155177.25	88239.16	1106914.40	149553.42	1.50	-2.74	12.01	7.64	13.51	0.80260
57	presto/tpcds:q58	3223659.74	395226.19	3273068.64	359807.47	2905993.74	159974.25	1.53	-9.85	12.26	10.99	5.50	0.82542
85	presto/tpcds:q86	2758992.75	90035.68	2806991.16	46761.61	2768698.49	51232.04	1.74	0.35	3.26	1.67	1.85	0.27344
4	presto/tpcds:q05	12615456.46	264090.67	12835698.40	333234.67	12697151.61	243428.79	1.75	0.65	2.09	2.60	1.92	0.23325
13	presto/tpcds:q14	6021640.98	77069.16	6128646.09	109231.12	6048586.59	34200.55	1.78	0.45	1.28	1.78	0.57	0.07835
69	presto/tpcds:q70	4294413.92	197750.89	4373121.07	251490.60	4424916.58	132376.12	1.83	3.04	4.60	5.75	2.99	0.56018
1	presto/tpcds:q02	3639825.84	87357.12	3707211.30	79423.95	3733815.81	106874.59	1.85	2.58	2.40	2.14	2.86	0.19234
10	presto/tpcds:q11	23594668.73	920858.86	24055429.12	804608.17	24250110.10	254409.66	1.95	2.78	3.90	3.34	1.05	0.37777
42	presto/tpcds:q43	2552300.68	45841.41	2603459.28	51686.76	2538376.79	47437.94	2.00	-0.55	1.80	1.99	1.87	0.09977



```
std      4
min     -11
25%     -2
50%     -0
75%      2
max      13
Name: % change, dtype: float64
count    99
mean     -0
std       5
min     -10
25%     -2
50%     -0
75%      2
max      36
Name: % change base -> paa union, dtype: float64
```