

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

```
Out[4]: [('paa-union-baseline-oss-379-S-da1858e95b-hive_sf1000_orc_part-r263',  
        'baseline part ',  
        'r'),  
        ('paa-union-over-poo-rle-oss-379-S-b3b339f165-hive_sf1000_orc_part-r261',  
        'paa union over poo rle',  
        'g'),  
        ('paa-union-oss-379-S-c5b8233c12-hive_sf1000_orc_part-r262',  
        '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 part	593	1,055	67,117	121,056	2,290	1,890	1,284,748,311	1,099,367,725	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	paa union over poo rle	549	1,032	62,918	118,721	1,972	1,816	1,279,361,540	1,095,302,978	-7.38	-2.17	-6.26	-1.93	-13.90	-3.88	-0.42	-0.37
2	paa union	545	1,040	63,923	119,431	2,004	1,831	1,285,692,808	1,099,383,371	-8.04	-1.44	-4.76	-1.34	-12.50	-3.10	0.07	0.00

FAILED QUERIES

baseline part

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

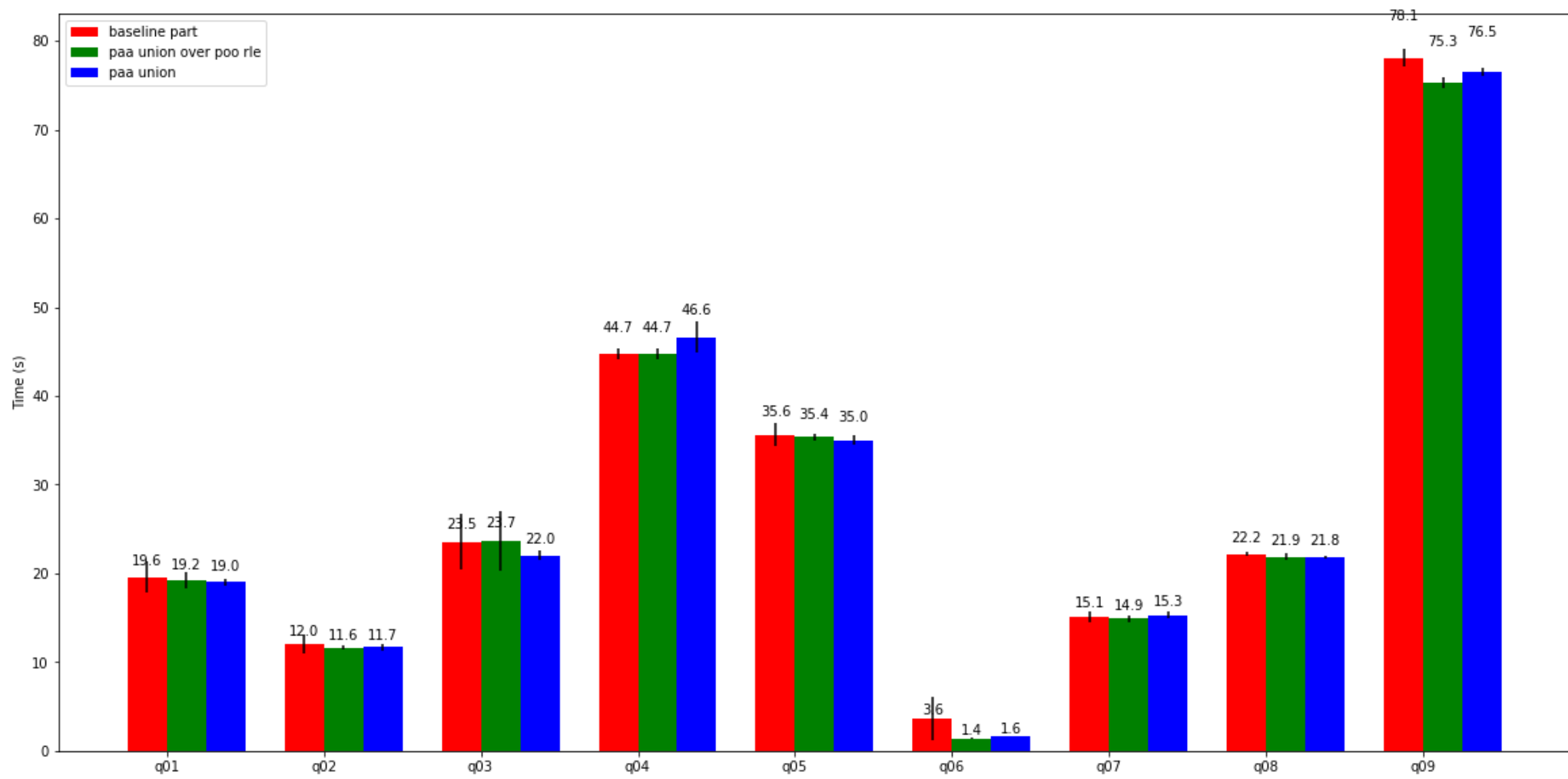
paa union over poo rle

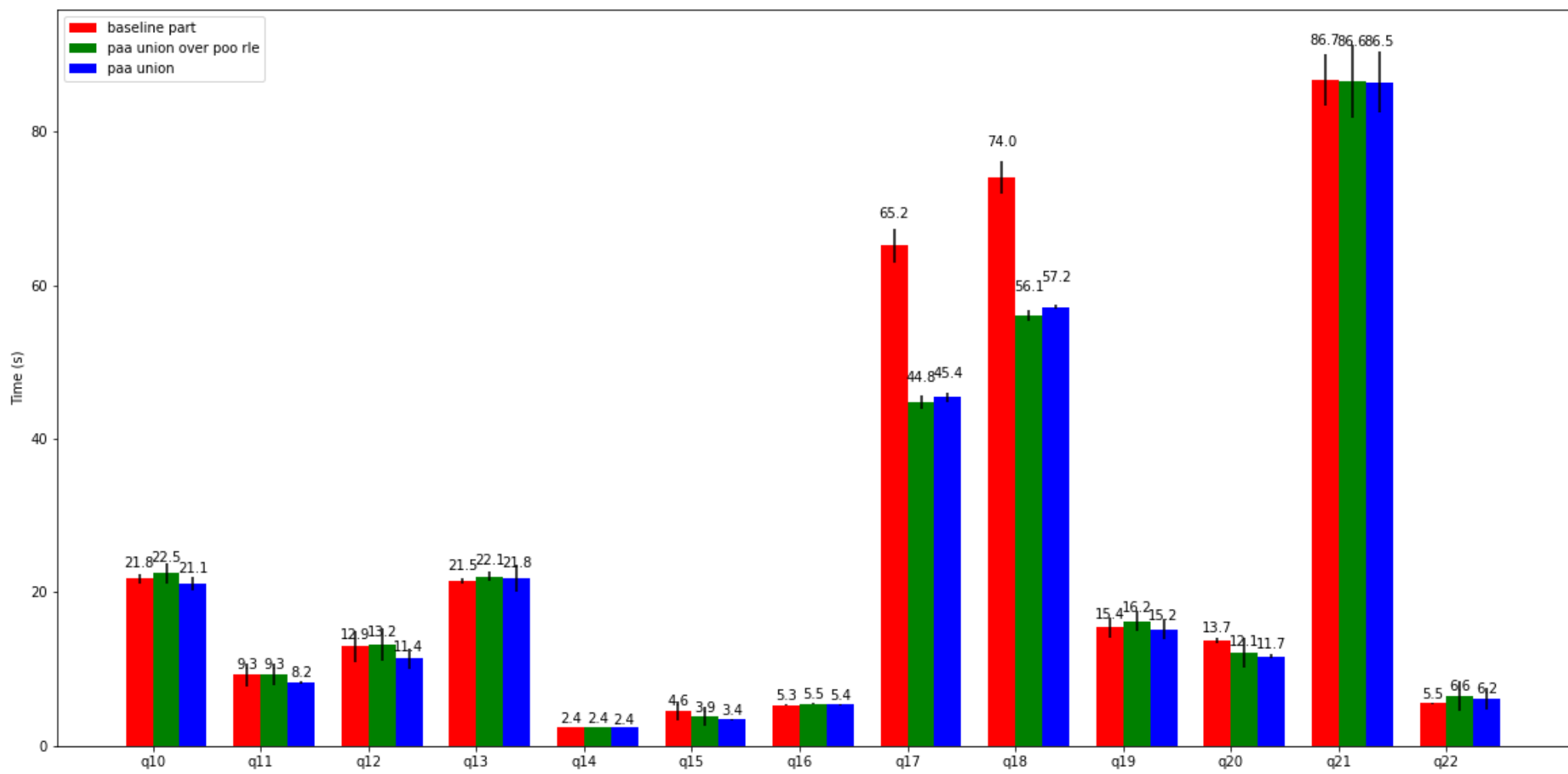
benchmark	query	mean_duration	std_dev
-----------	-------	---------------	---------

paa union

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

TPC-H Comparison (DURATION)





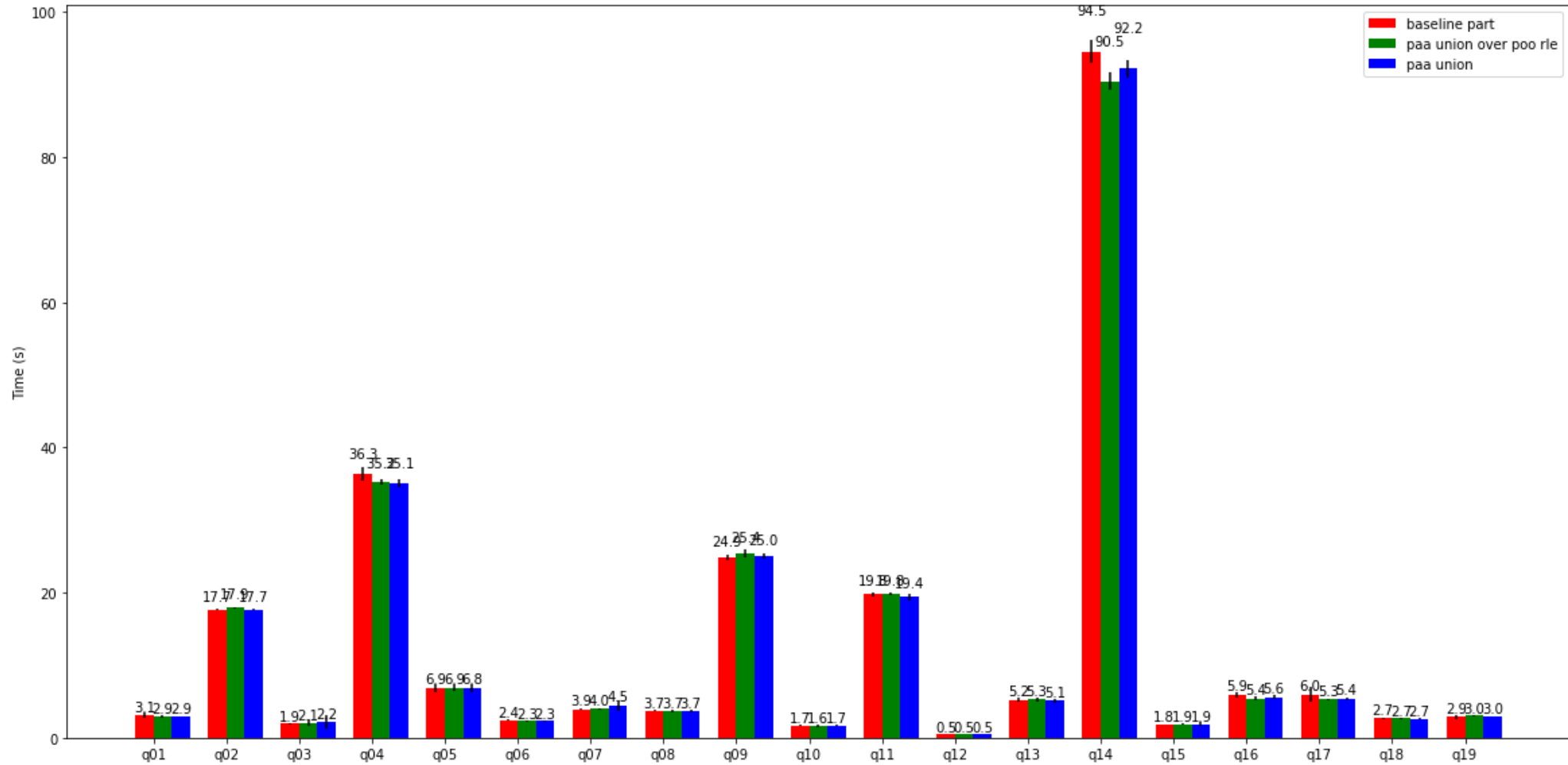
query	baseline part mean	baseline part std.dev	paa union over poo rle mean	paa union over poo rle std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline part std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
5 presto/tpch: q06	3.62	2.40	1.40	0.05	1.63	0.04	-61.43	-55.01	66.45	3.29	2.25	0.04702
16 presto/tpch: q17	65.23	2.22	44.78	0.87	45.41	0.62	-31.35	-30.38	3.41	1.95	1.37	0.00000
17 presto/tpch: q18	74.03	2.15	56.06	0.72	57.23	0.28	-24.28	-22.70	2.91	1.29	0.49	0.00000
14 presto/tpch: q15	4.64	1.23	3.87	1.23	3.42	0.14	-16.44	-26.25	26.58	31.73	4.01	0.30876
19 presto/tpch: q20	13.74	0.27	12.10	1.91	11.65	0.30	-11.91	-15.18	2.00	15.75	2.55	0.06416

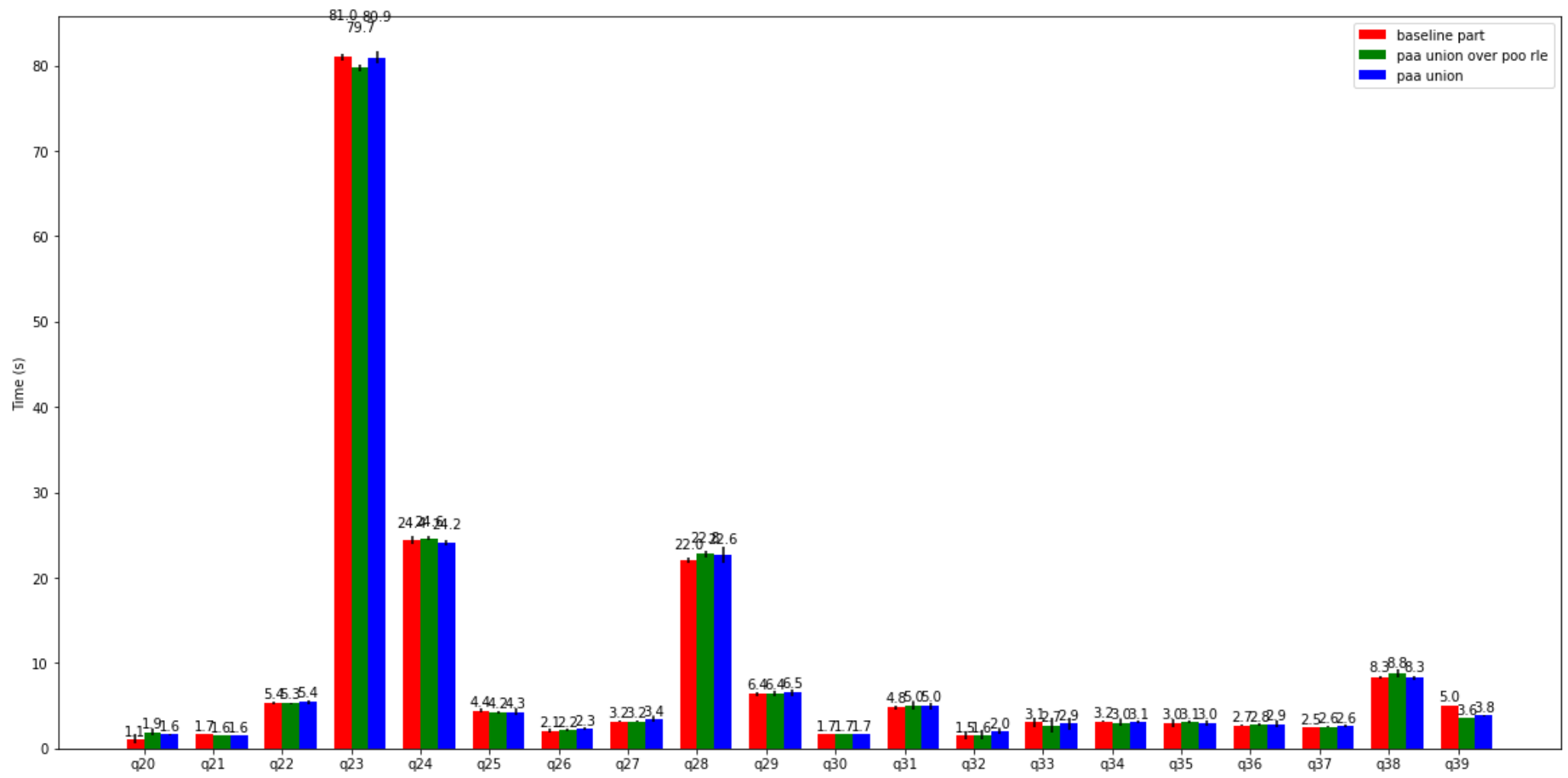

```

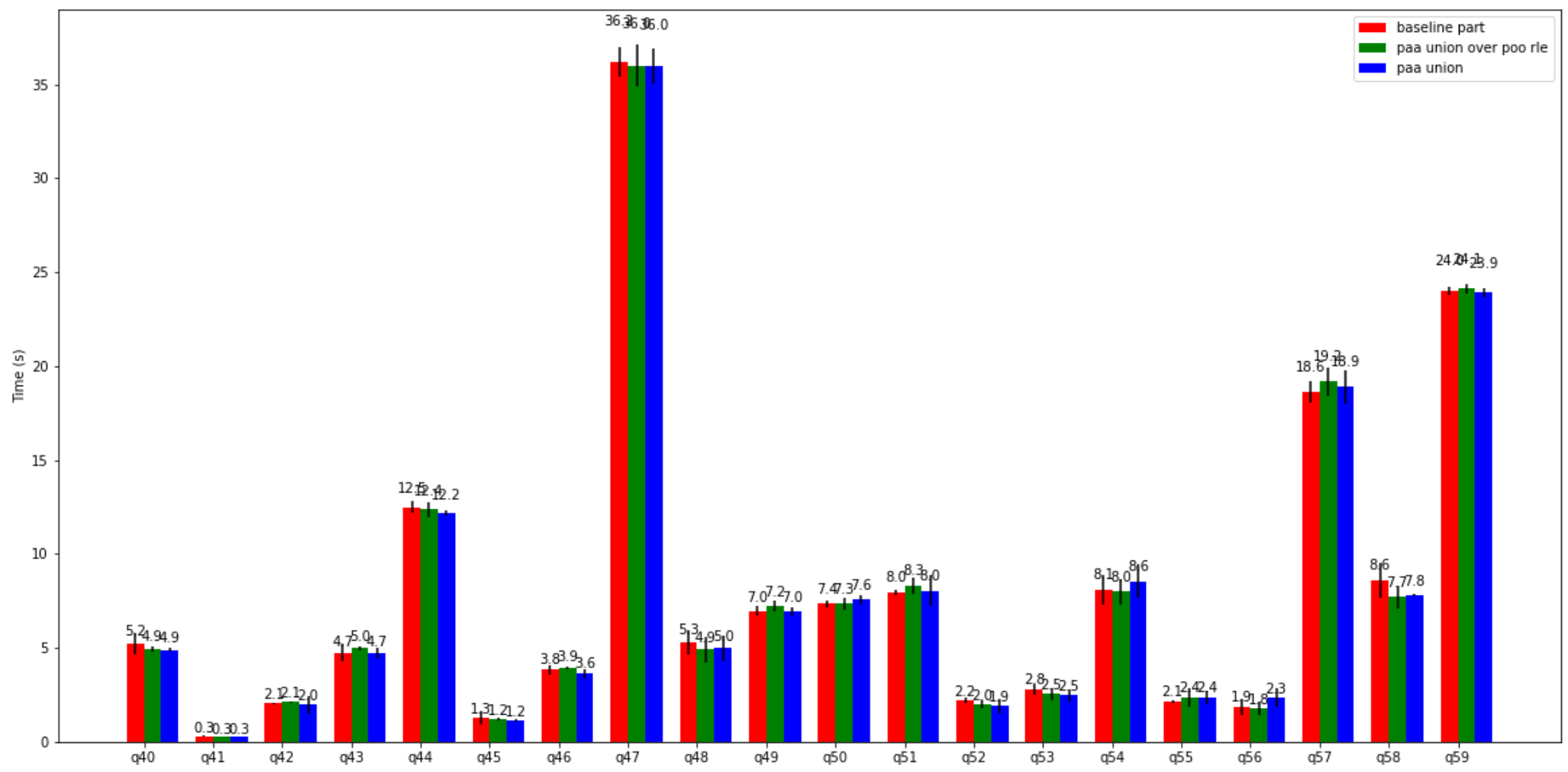
75%      2
max       18
Name: % change, dtype: float64
count     22
mean      -8
std       15
min      -55
25%     -12
50%      -3
75%      -0
max       12
Name: % change base -> paa union, dtype: float64

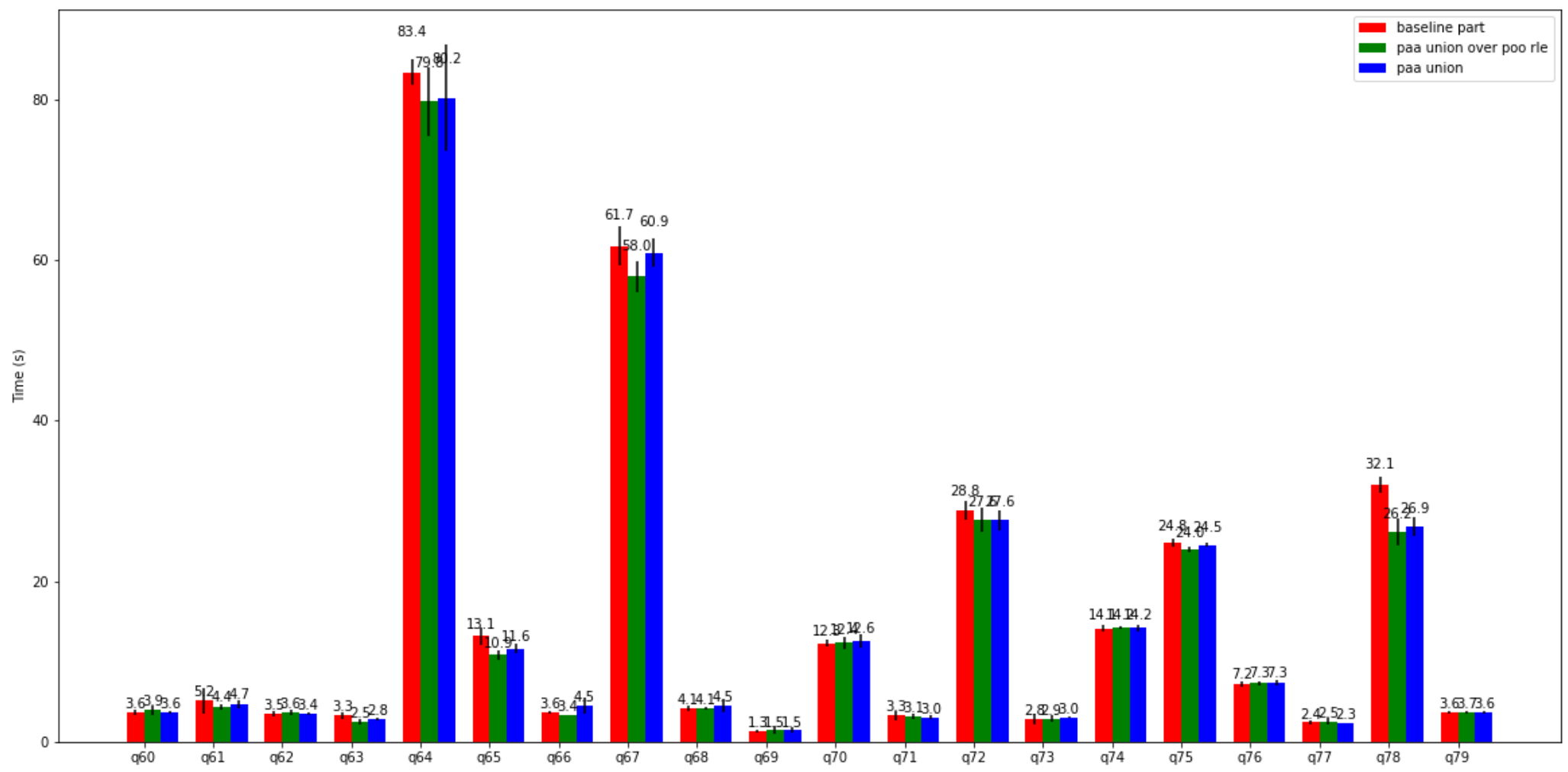
```

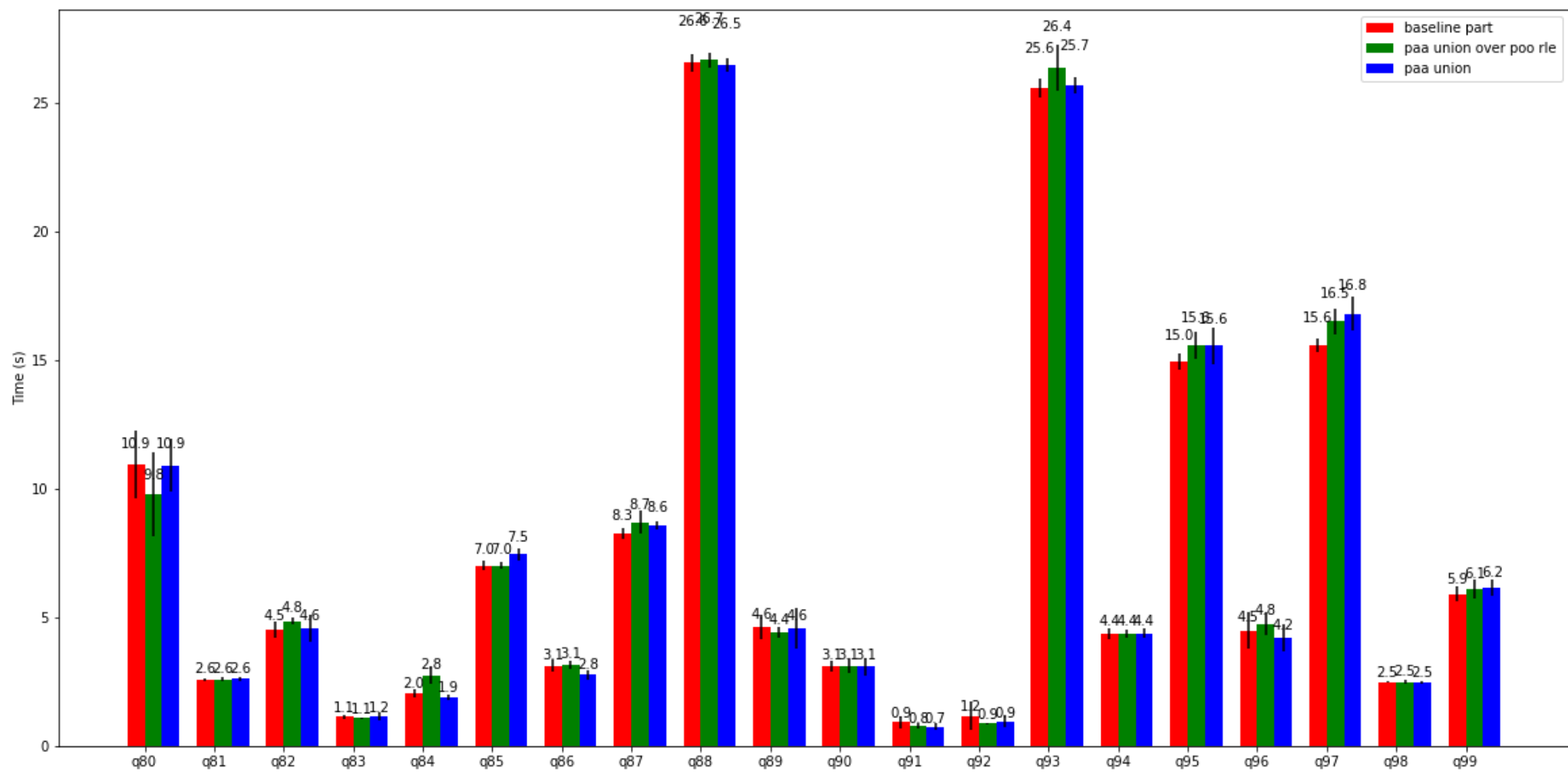
TPC-DS Comparison (DURATION)

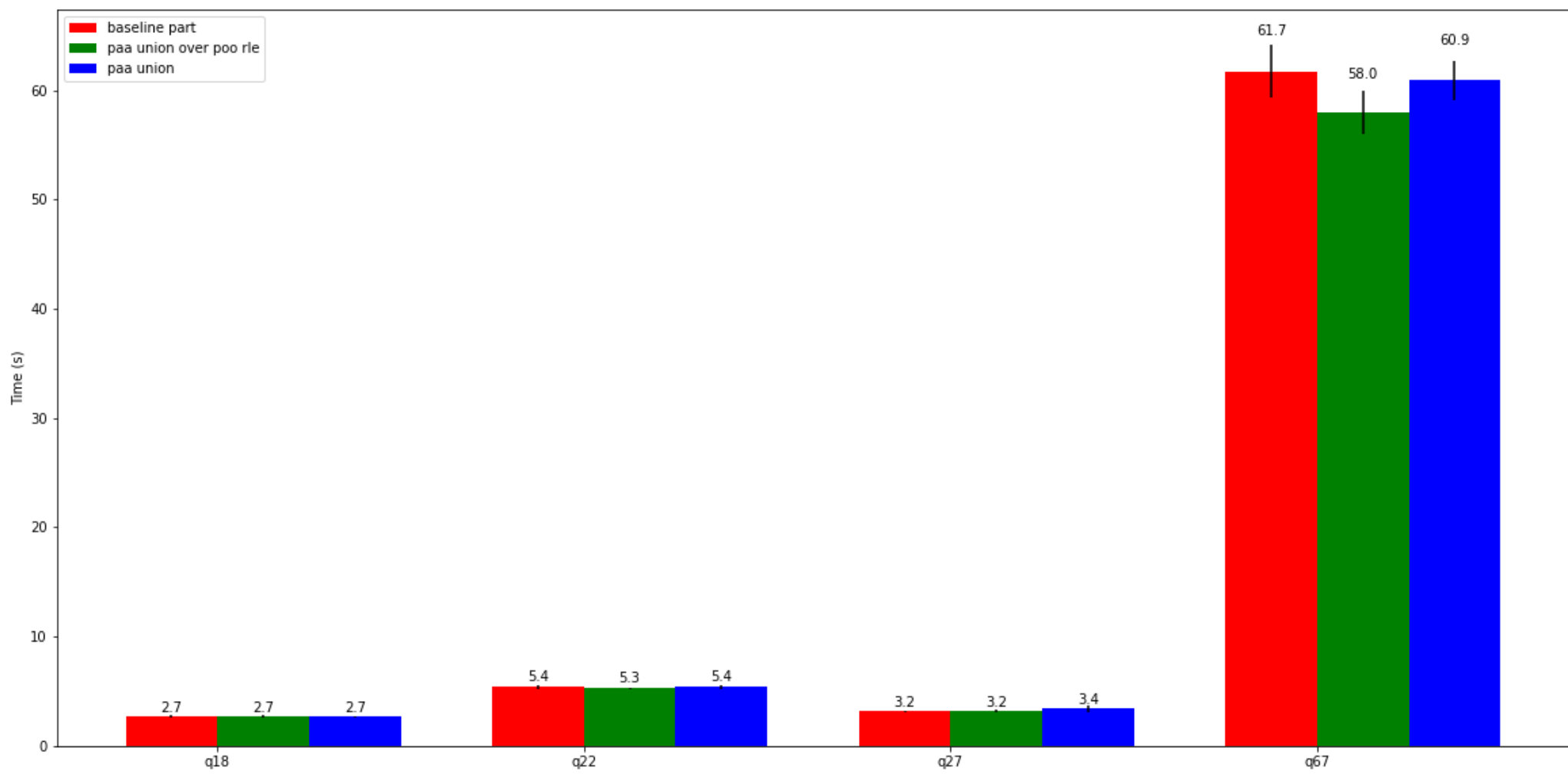












	query	baseline part mean	baseline part std.dev	paa union over poo rle mean	paa union over poo rle std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline part std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
38	presto/tpcds: q39	5.00	0.04	3.57	0.05	3.84	0.04	-28.49	-23.18	0.85	1.28	1.05	0.00000
91	presto/tpcds: q92	1.17	0.55	0.88	0.02	0.95	0.23	-25.40	-19.04	46.89	1.95	23.99	0.21419
62	presto/tpcds: q63	3.25	0.44	2.49	0.30	2.80	0.14	-23.40	-14.05	13.55	11.84	5.06	0.00559
77	presto/tpcds: q78	32.05	1.05	26.15	1.61	26.85	1.18	-18.41	-16.22	3.26	6.15	4.40	0.00002
90	presto/tpcds: q91	0.93	0.24	0.76	0.10	0.74	0.14	-18.03	-19.97	25.59	13.16	19.17	0.14282

	query	baseline part mean	baseline part 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 part std.dev %	paa union over pooler std.dev %	paa union std.dev %	p-value
64	presto/tpcds:q65	13.14	1.05	10.86	0.59	11.59	0.60	-17.38	-11.78	7.98	5.42	5.17	0.00091
60	presto/tpcds:q61	5.15	1.61	4.39	0.34	4.68	0.47	-14.69	-9.07	31.17	7.74	10.10	0.28514
32	presto/tpcds:q33	3.06	0.51	2.70	0.88	2.89	0.75	-11.58	-5.47	16.79	32.43	26.06	0.41330
16	presto/tpcds:q17	5.98	1.02	5.30	0.11	5.38	0.14	-11.35	-10.05	17.00	2.15	2.53	0.13516
79	presto/tpcds:q80	10.94	1.32	9.78	1.64	10.93	1.04	-10.57	-0.12	12.09	16.78	9.48	0.20879
57	presto/tpcds:q58	8.58	0.93	7.71	0.61	7.80	0.08	-10.17	-9.05	10.85	7.89	1.01	0.08353
51	presto/tpcds:q52	2.20	0.17	1.98	0.24	1.89	0.39	-9.89	-14.35	7.50	11.91	20.67	0.09384
52	presto/tpcds:q53	2.80	0.29	2.54	0.34	2.47	0.30	-9.17	-11.87	10.23	13.27	12.14	0.18554
20	presto/tpcds:q21	1.73	0.02	1.58	0.02	1.56	0.03	-8.55	-9.72	1.16	1.07	2.05	0.00000
15	presto/tpcds:q16	5.90	0.41	5.42	0.27	5.55	0.26	-8.16	-5.81	6.90	5.03	4.70	0.03689
65	presto/tpcds:q66	3.63	0.20	3.35	0.05	4.50	1.01	-7.72	23.75	5.38	1.42	22.38	0.00663
44	presto/tpcds:q45	1.29	0.35	1.19	0.08	1.16	0.07	-7.41	-9.70	27.15	6.90	5.83	0.53003
47	presto/tpcds:q48	5.29	0.65	4.92	0.67	4.98	0.70	-7.04	-5.83	12.35	13.68	14.01	0.35359
66	presto/tpcds:q67	61.73	2.43	57.96	1.96	60.93	1.78	-6.11	-1.29	3.94	3.38	2.92	0.01443
39	presto/tpcds:q40	5.23	0.56	4.94	0.12	4.88	0.12	-5.66	-6.76	10.64	2.42	2.45	0.23144
82	presto/tpcds:q83	1.14	0.09	1.07	0.02	1.15	0.15	-5.58	1.60	7.51	1.69	12.73	0.10528
70	presto/tpcds:q71	3.29	0.57	3.11	0.33	3.04	0.29	-5.39	-7.54	17.43	10.55	9.66	0.52548
0	presto/tpcds:q01	3.10	0.33	2.94	0.16	2.93	0.08	-5.18	-5.69	10.59	5.55	2.77	0.30849
55	presto/tpcds:q56	1.87	0.42	1.77	0.36	2.34	0.51	-5.06	25.37	22.37	20.20	21.89	0.68280

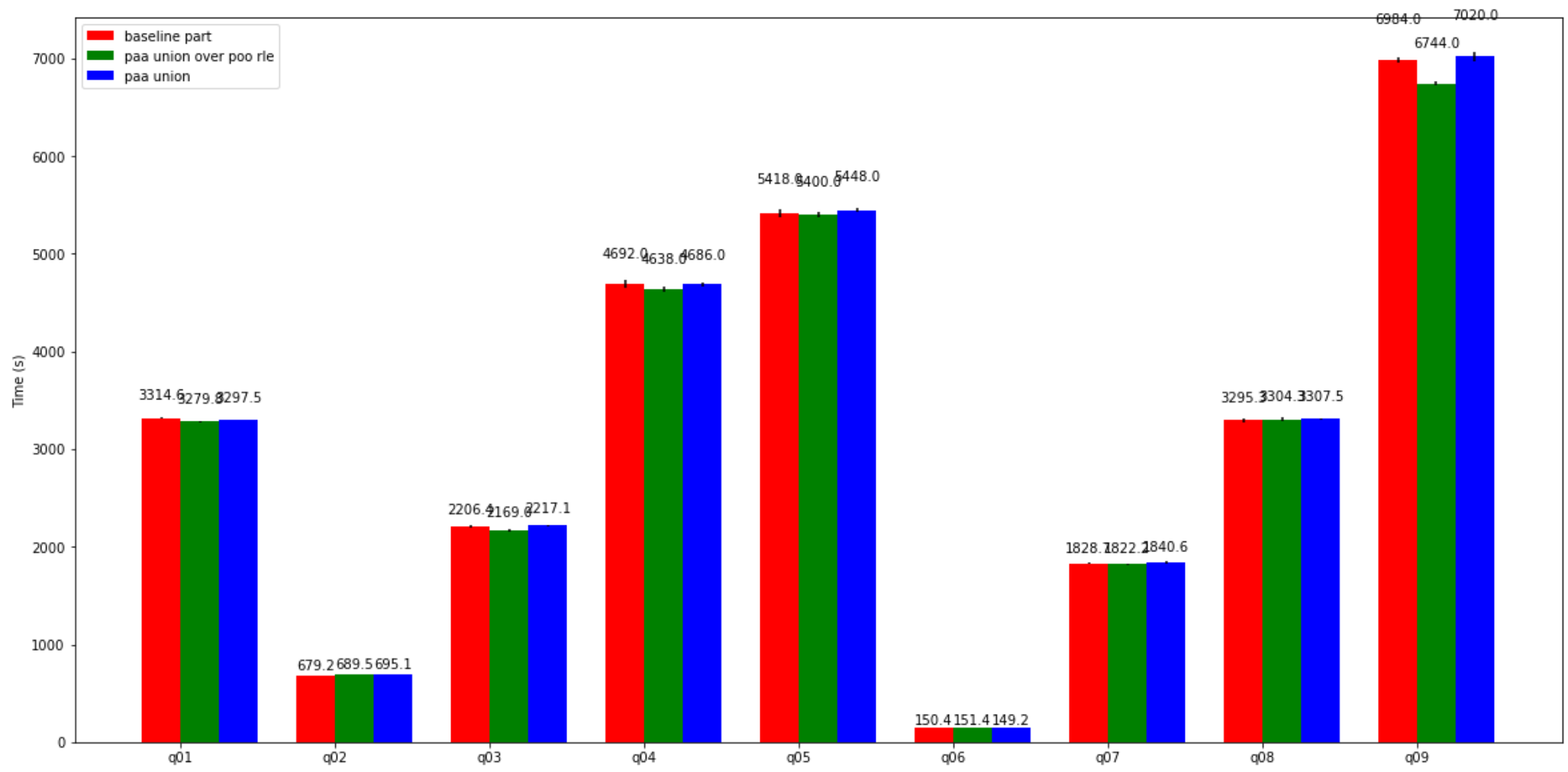
	query	baseline part mean	baseline part std.dev	paa union over poo rle mean	paa union over poo rle std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline part std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
40	presto/tpcds:q41	0.30	0.02	0.28	0.01	0.28	0.01	-4.90	-7.96	7.38	4.15	3.72	0.18199
88	presto/tpcds:q89	4.63	0.50	4.42	0.22	4.56	0.79	-4.52	-1.41	10.74	5.07	17.37	0.36901
63	presto/tpcds:q64	83.41	1.62	79.78	4.25	80.22	6.65	-4.36	-3.82	1.94	5.33	8.29	0.07885
24	presto/tpcds:q25	4.41	0.24	4.22	0.13	4.26	0.38	-4.30	-3.32	5.38	3.09	8.92	0.11694
13	presto/tpcds:q14	94.54	1.61	90.49	1.19	92.20	1.21	-4.28	-2.47	1.70	1.32	1.31	0.00058
33	presto/tpcds:q34	3.17	0.12	3.03	0.35	3.11	0.14	-4.16	-1.79	3.84	11.62	4.44	0.40745
71	presto/tpcds:q72	28.82	1.18	27.65	1.46	27.59	1.24	-4.06	-4.27	4.08	5.27	4.48	0.15645
11	presto/tpcds:q12	0.53	0.04	0.51	0.03	0.51	0.02	-3.93	-3.21	6.99	6.30	4.84	0.32184
9	presto/tpcds:q10	1.69	0.07	1.63	0.12	1.66	0.08	-3.63	-2.22	4.23	7.06	4.63	0.29329
5	presto/tpcds:q06	2.42	0.11	2.33	0.09	2.32	0.04	-3.44	-4.08	4.59	3.79	1.69	0.18149
3	presto/tpcds:q04	36.31	0.93	35.18	0.39	35.07	0.54	-3.13	-3.44	2.56	1.11	1.55	0.02018
74	presto/tpcds:q75	24.75	0.51	23.99	0.35	24.54	0.25	-3.09	-0.84	2.07	1.47	1.00	0.01314
21	presto/tpcds:q22	5.37	0.19	5.26	0.05	5.42	0.19	-2.02	1.04	3.46	1.04	3.51	0.20093
22	presto/tpcds:q23	80.98	0.42	79.72	0.42	80.92	0.73	-1.56	-0.08	0.52	0.52	0.91	0.00039
53	presto/tpcds:q54	8.12	0.78	7.99	0.68	8.55	0.88	-1.54	5.38	9.65	8.53	10.34	0.77347
29	presto/tpcds:q30	1.69	0.06	1.68	0.04	1.69	0.03	-0.88	-0.25	3.59	2.31	1.84	0.62552
17	presto/tpcds:q18	2.70	0.08	2.68	0.09	2.65	0.08	-0.83	-1.95	2.91	3.22	3.14	0.64983
43	presto/tpcds:q44	12.46	0.32	12.37	0.41	12.16	0.16	-0.78	-2.43	2.57	3.32	1.30	0.65655
26	presto/tpcds:q27	3.19	0.06	3.17	0.09	3.39	0.34	-0.71	6.17	1.88	2.93	9.95	0.62676

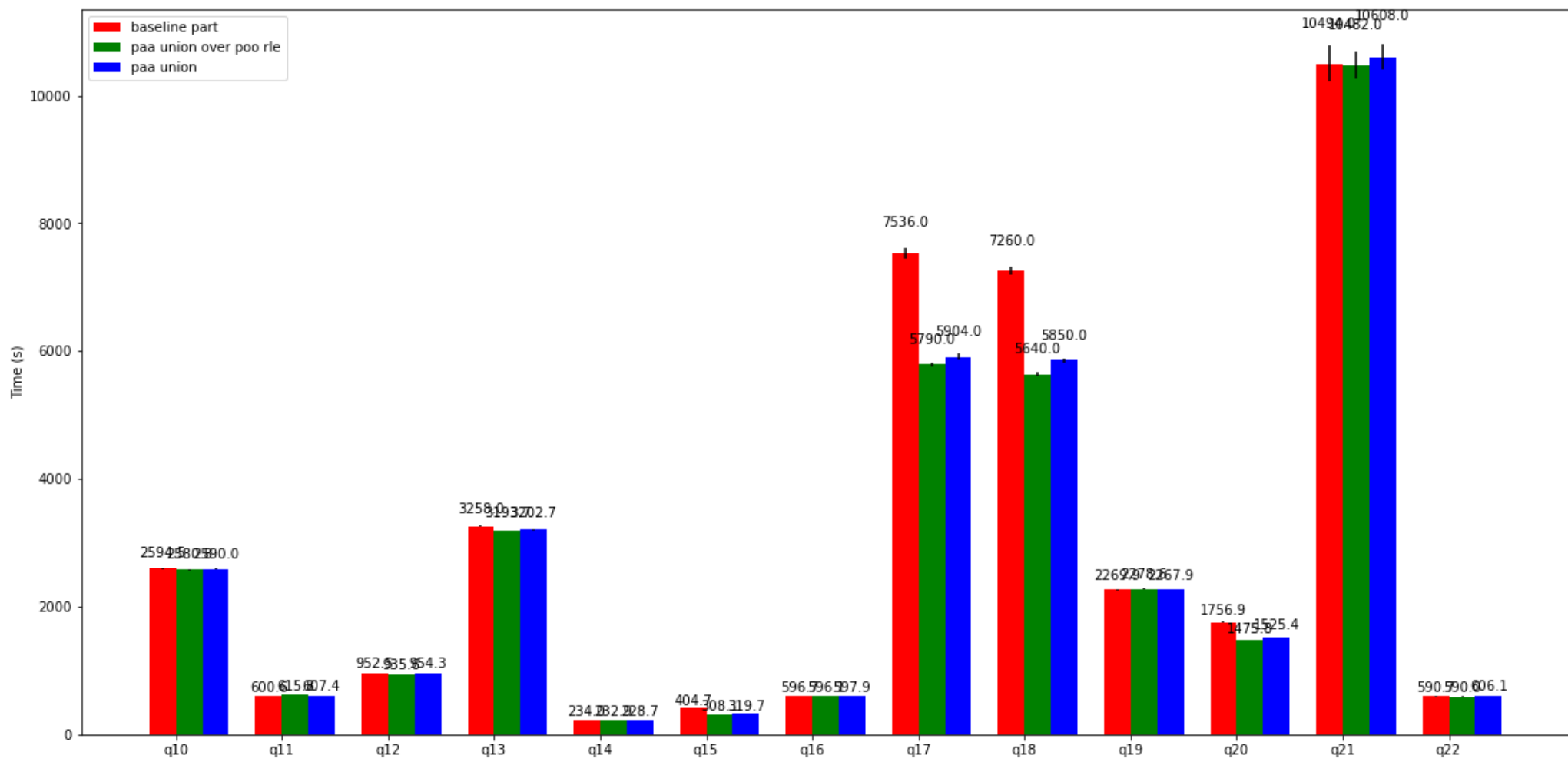
	query	baseline part mean	baseline part std.dev	paa union over poo rle mean	paa union over poo rle std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline part std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
46	presto/tpcds:q47	36.21	0.81	36.01	1.11	35.97	0.94	-0.55	-0.66	2.23	3.09	2.62	0.72863
49	presto/tpcds:q50	7.37	0.18	7.33	0.35	7.56	0.26	-0.43	2.66	2.44	4.78	3.39	0.84854
7	presto/tpcds:q08	3.71	0.07	3.69	0.11	3.68	0.24	-0.43	-0.73	1.90	2.90	6.50	0.76826
93	presto/tpcds:q94	4.38	0.22	4.37	0.16	4.38	0.18	-0.23	0.14	5.11	3.75	4.20	0.93014
84	presto/tpcds:q85	7.02	0.19	7.02	0.13	7.46	0.24	0.04	6.27	2.73	1.80	3.28	0.97646
10	presto/tpcds:q11	19.80	0.25	19.81	0.26	19.40	0.42	0.06	-2.02	1.26	1.29	2.16	0.93957
67	presto/tpcds:q68	4.14	0.34	4.15	0.12	4.47	0.83	0.11	7.82	8.09	2.88	18.57	0.97500
89	presto/tpcds:q90	3.11	0.22	3.11	0.28	3.09	0.34	0.12	-0.63	7.16	8.97	11.08	0.98042
28	presto/tpcds:q29	6.39	0.21	6.41	0.34	6.52	0.44	0.34	2.09	3.21	5.34	6.81	0.89757
4	presto/tpcds:q05	6.89	0.58	6.91	0.41	6.85	0.53	0.35	-0.55	8.39	5.91	7.79	0.93544
97	presto/tpcds:q98	2.47	0.03	2.48	0.06	2.46	0.05	0.39	-0.49	1.08	2.61	2.04	0.74286
73	presto/tpcds:q74	14.12	0.39	14.18	0.17	14.20	0.45	0.40	0.54	2.73	1.18	3.17	0.74625
87	presto/tpcds:q88	26.59	0.34	26.70	0.30	26.50	0.26	0.41	-0.34	1.29	1.11	1.00	0.57076
6	presto/tpcds:q07	3.95	0.13	3.97	0.15	4.47	0.76	0.50	13.25	3.19	3.74	16.92	0.80959
58	presto/tpcds:q59	24.00	0.20	24.12	0.24	23.91	0.24	0.51	-0.38	0.85	1.00	1.01	0.36124
23	presto/tpcds:q24	24.45	0.43	24.60	0.23	24.17	0.31	0.61	-1.14	1.78	0.94	1.28	0.47240
80	presto/tpcds:q81	2.58	0.05	2.60	0.07	2.61	0.08	0.63	1.24	1.84	2.66	3.12	0.64716
69	presto/tpcds:q70	12.25	0.38	12.36	0.77	12.55	0.88	0.86	2.45	3.13	6.23	7.00	0.76992
85	presto/tpcds:q86	3.11	0.24	3.14	0.15	2.77	0.17	1.13	-10.96	7.62	4.66	6.27	0.76356

	query	baseline part mean	baseline part 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 part std.dev %	paa union over pooler std.dev %	paa union std.dev %	p-value
78	presto/tpcds:q79	3.61	0.18	3.65	0.18	3.60	0.19	1.14	-0.20	4.86	5.00	5.14	0.69778
75	presto/tpcds:q76	7.19	0.39	7.27	0.32	7.32	0.31	1.16	1.84	5.47	4.45	4.30	0.69709
1	presto/tpcds:q02	17.69	0.08	17.93	0.08	17.65	0.05	1.35	-0.24	0.42	0.42	0.28	0.00027
12	presto/tpcds:q13	5.25	0.20	5.34	0.28	5.10	0.32	1.68	-2.79	3.78	5.20	6.30	0.54091
8	presto/tpcds:q09	24.86	0.42	25.40	0.64	25.04	0.36	2.18	0.74	1.69	2.51	1.42	0.11275
36	presto/tpcds:q37	2.50	0.05	2.55	0.05	2.63	0.12	2.21	5.46	1.81	2.06	4.40	0.07943
56	presto/tpcds:q57	18.65	0.57	19.18	0.75	18.89	0.91	2.83	1.32	3.05	3.93	4.80	0.20039
45	presto/tpcds:q46	3.82	0.22	3.93	0.09	3.63	0.24	2.90	-4.92	5.84	2.26	6.69	0.28406
41	presto/tpcds:q42	2.06	0.03	2.12	0.05	1.96	0.43	3.05	-4.76	1.70	2.15	22.16	0.02320
92	presto/tpcds:q93	25.59	0.36	26.39	0.90	25.70	0.32	3.13	0.42	1.42	3.40	1.25	0.07010
98	presto/tpcds:q99	5.91	0.28	6.10	0.37	6.16	0.30	3.21	4.25	4.77	6.12	4.93	0.34331
72	presto/tpcds:q73	2.80	0.63	2.89	0.40	3.00	0.08	3.31	7.13	22.46	13.77	2.71	0.76677
35	presto/tpcds:q36	2.71	0.07	2.80	0.10	2.88	0.38	3.38	6.35	2.45	3.65	13.17	0.09579
27	presto/tpcds:q28	22.05	0.32	22.80	0.36	22.64	0.95	3.39	2.68	1.43	1.60	4.19	0.00350
14	presto/tpcds:q15	1.83	0.07	1.89	0.09	1.90	0.34	3.58	4.32	3.78	4.94	18.06	0.19840
25	presto/tpcds:q26	2.09	0.22	2.17	0.21	2.34	0.21	3.74	11.91	10.52	9.67	8.80	0.54298
48	presto/tpcds:q49	6.97	0.25	7.24	0.26	6.97	0.22	3.79	-0.07	3.62	3.63	3.09	0.10538
94	presto/tpcds:q95	14.96	0.33	15.58	0.53	15.56	0.71	4.12	4.03	2.23	3.37	4.57	0.03580
76	presto/tpcds:q77	2.42	0.21	2.52	0.42	2.31	0.05	4.22	-4.57	8.51	16.75	2.35	0.60611


```
min      -28
25%     -5
50%      0
75%      3
max      68
Name: % change, dtype: float64
count    99
mean     -0
std       9
min     -23
25%     -5
50%     -1
75%      3
max      43
Name: % change base -> paa union, dtype: float64
```

TPC-H Comparison (CPU)





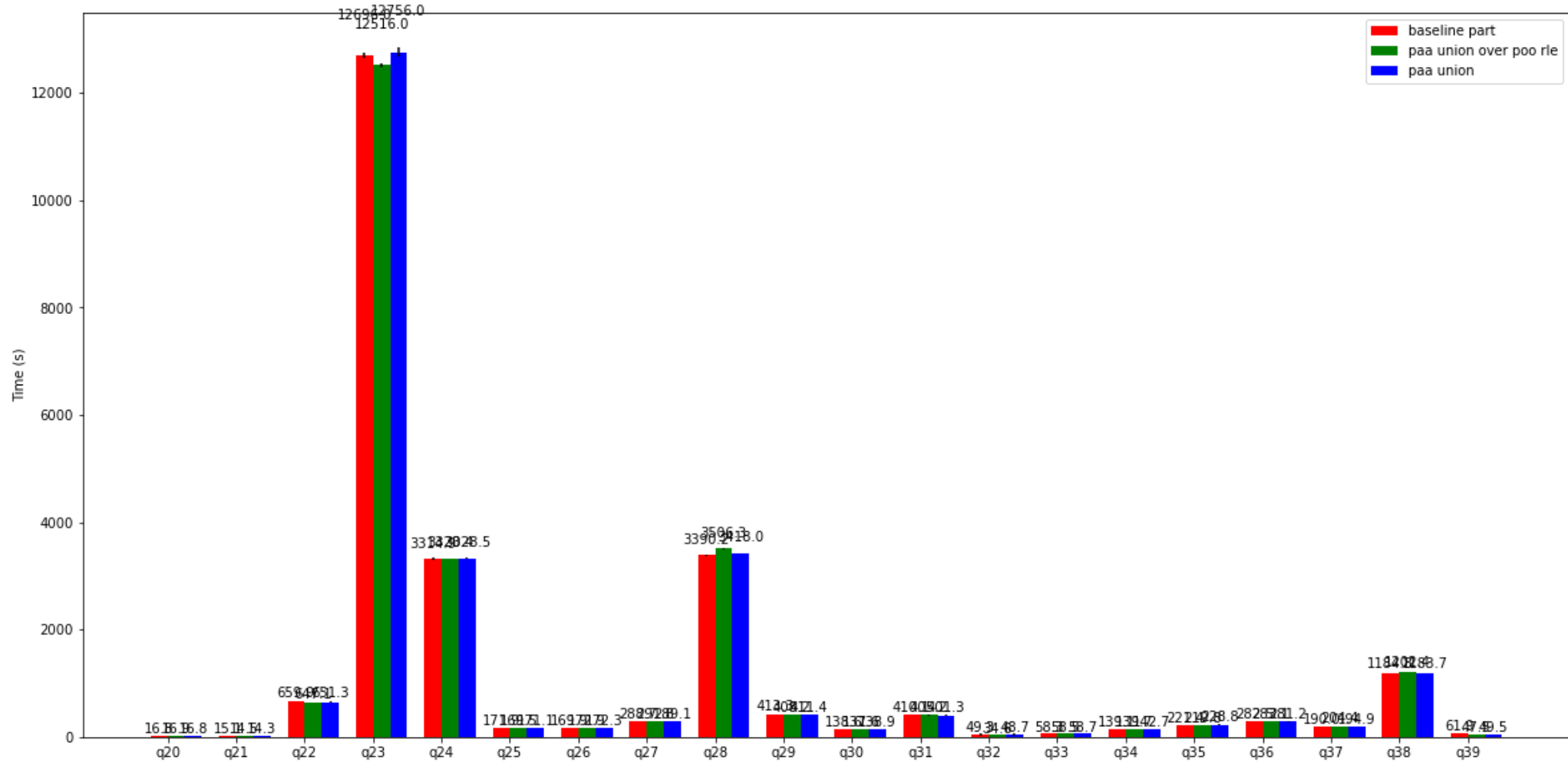
query	baseline part mean	baseline part std.dev	paa union over poo rle mean	paa union over poo rle std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline part std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
14 presto/tpch: q15	404.70	1.35	308.10	1.46	319.70	0.24	-23.87	-21.00	0.33	0.47	0.08	0.00000
16 presto/tpch: q17	7536.00	87.20	5790.00	35.39	5904.00	50.91	-23.17	-21.66	1.16	0.61	0.86	0.00000
17 presto/tpch: q18	7260.00	58.79	5640.00	29.39	5850.00	37.76	-22.31	-19.42	0.81	0.52	0.65	0.00000
19 presto/tpch: q20	1756.90	8.20	1475.80	4.90	1525.40	1.85	-16.00	-13.18	0.47	0.33	0.12	0.00000
8 presto/tpch: q09	6984.00	32.20	6744.00	18.59	7020.00	45.54	-3.44	0.52	0.46	0.28	0.65	0.00000

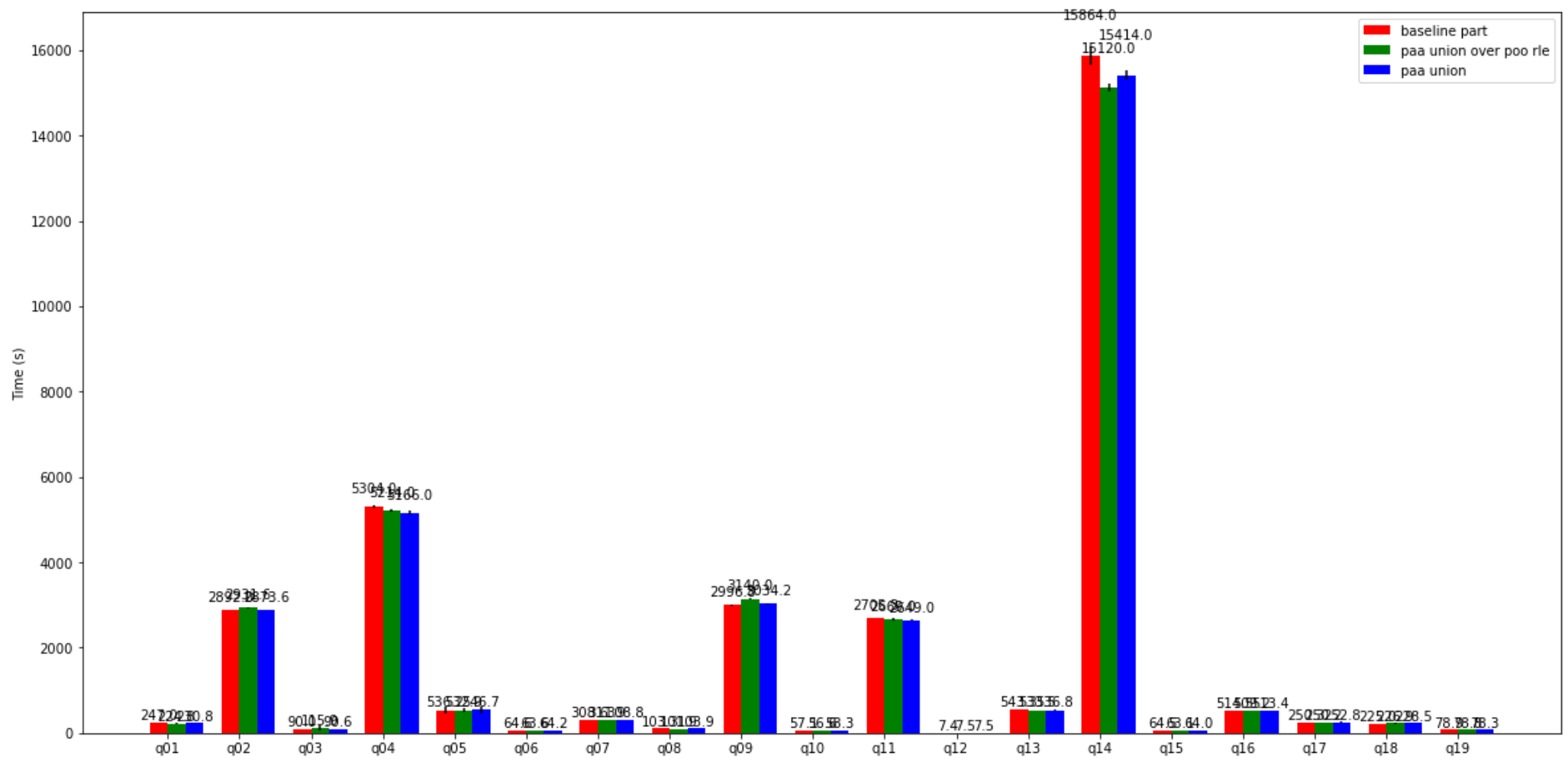

```

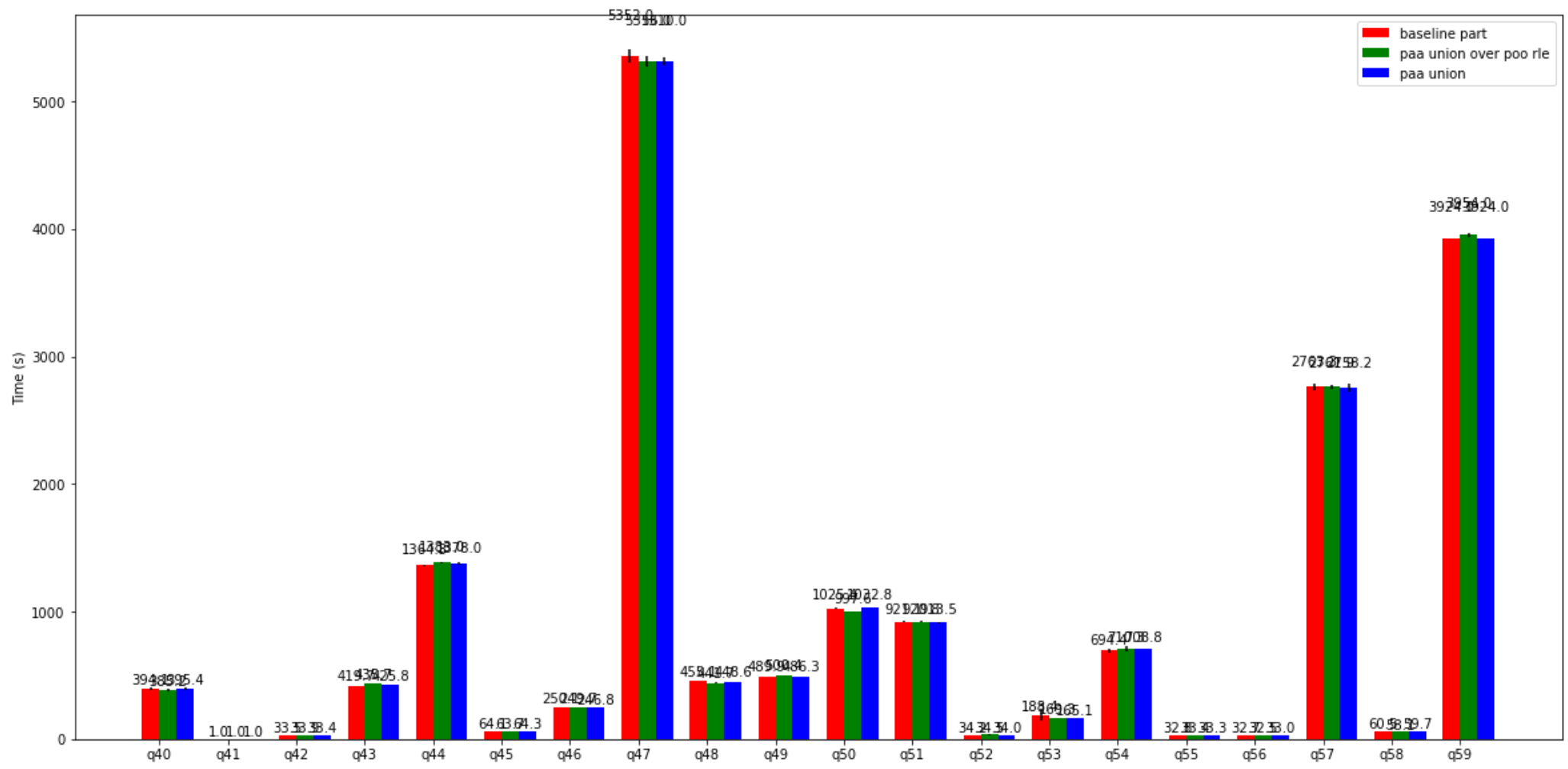
75%      -0
max       3
Name: % change, dtype: float64
count    22
mean     -3
std       8
min     -22
25%      -1
50%       0
75%       1
max       3
Name: % change base -> paa union, dtype: float64

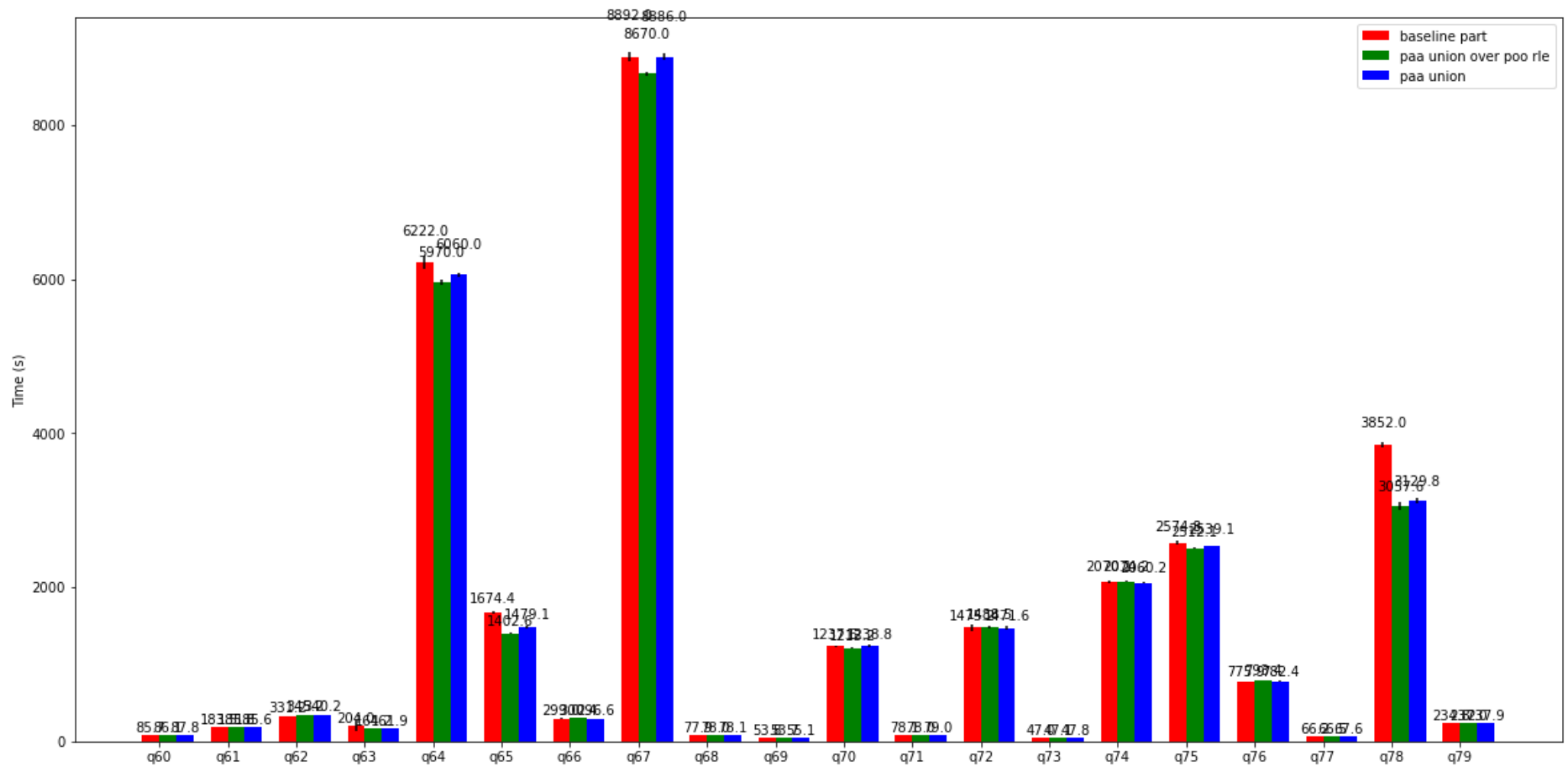
```

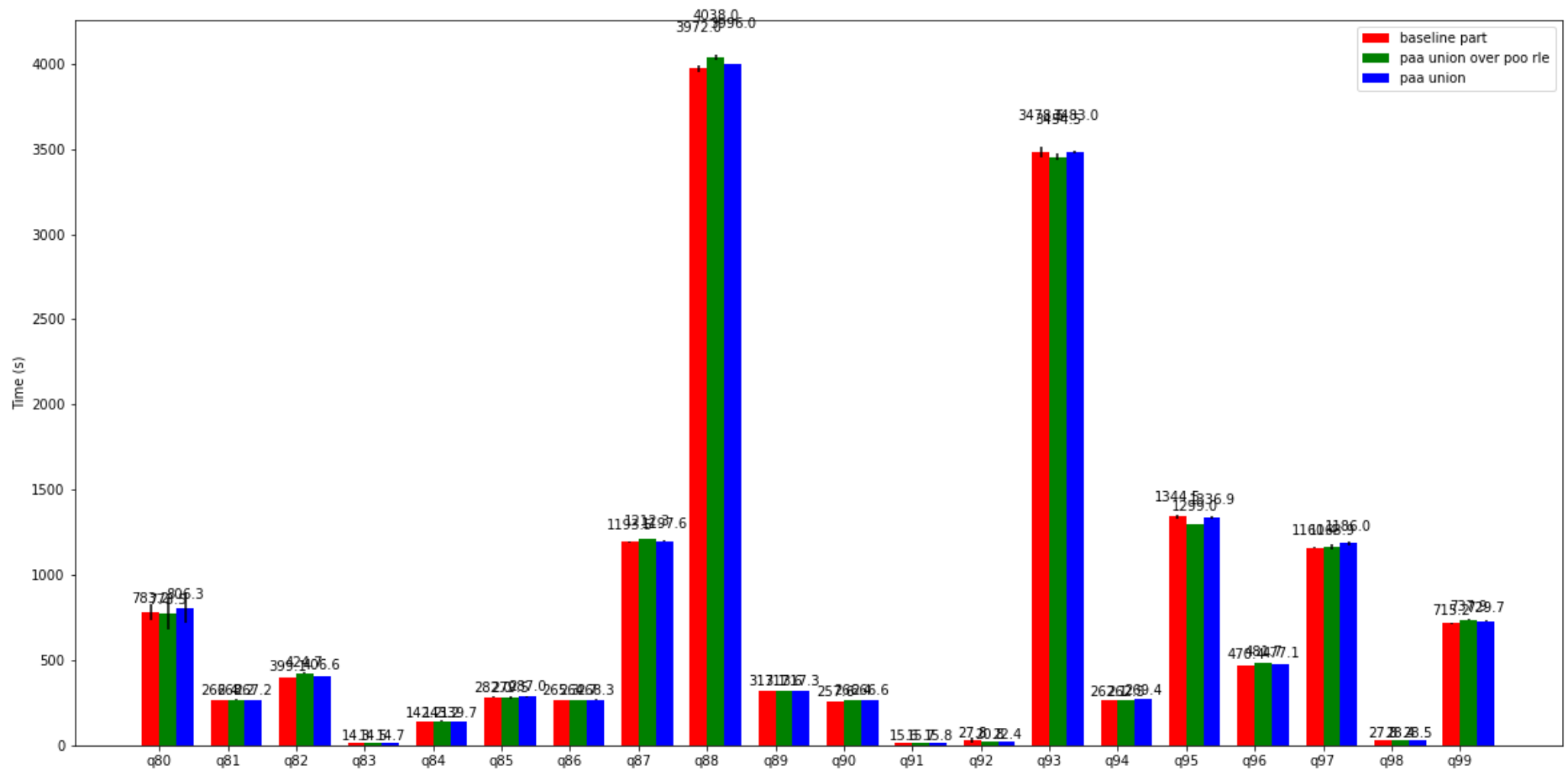
TPC-DS Comparison (CPU)

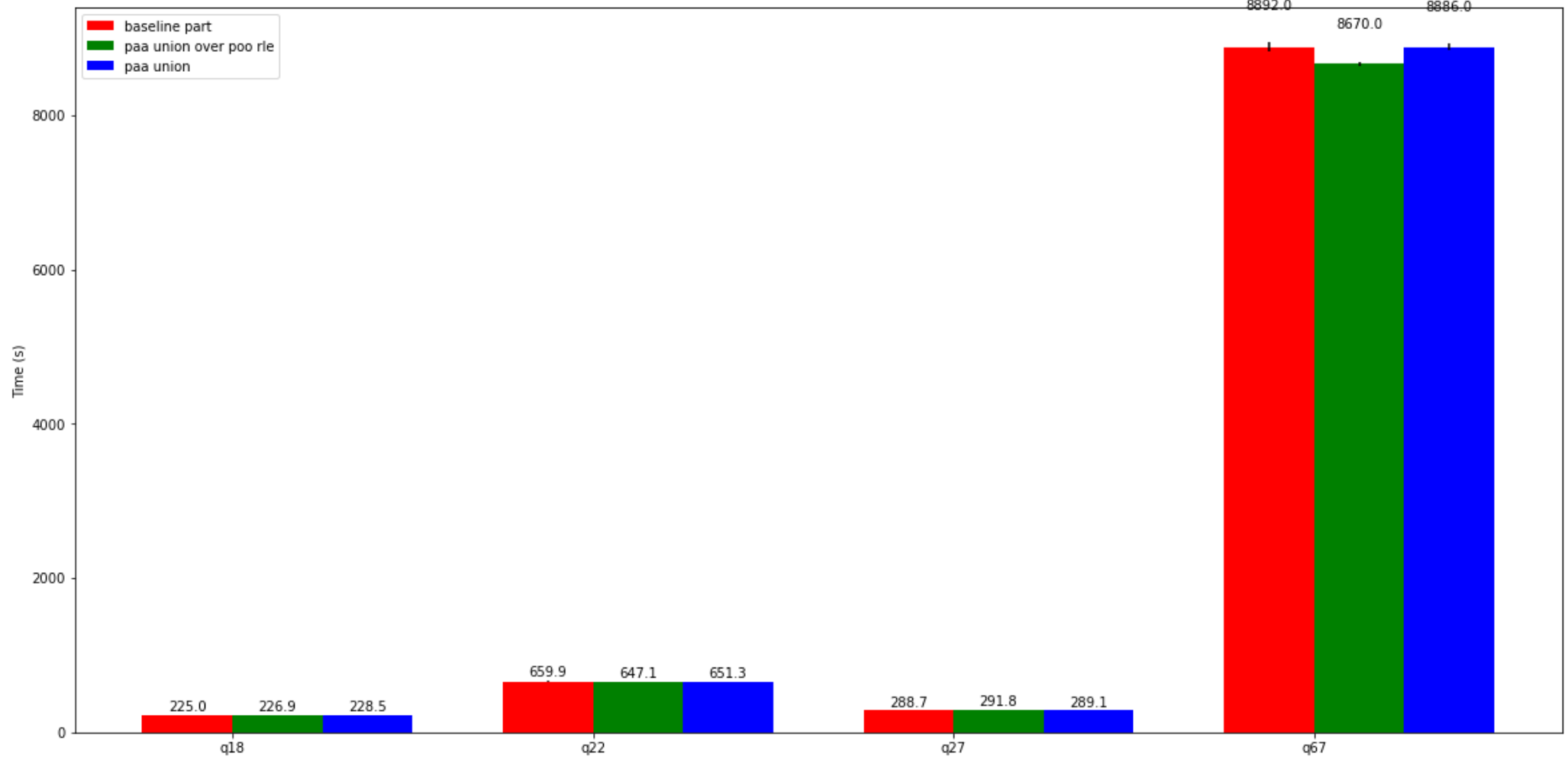












	query	baseline part mean	baseline part std.dev	paa union over poo rle mean	paa union over poo rle std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline part std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
31	presto/tpcds: q32	49.27	30.17	34.58	0.24	48.66	32.34	-29.80	-1.22	61.25	0.68	66.46	0.26084
91	presto/tpcds: q92	27.78	17.02	20.79	0.25	22.43	2.85	-25.18	-19.28	61.28	1.19	12.71	0.33798
38	presto/tpcds: q39	61.90	0.88	47.53	0.26	49.52	0.35	-23.21	-19.99	1.43	0.54	0.71	0.00000
77	presto/tpcds: q78	3852.00	32.20	3057.60	44.56	3129.80	32.96	-20.62	-18.75	0.84	1.46	1.05	0.00000
62	presto/tpcds: q63	204.00	71.90	164.20	0.31	161.90	0.80	-19.51	-20.64	35.24	0.19	0.49	0.20495

	query	baseline part mean	baseline part 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 part std.dev %	paa union over pooler std.dev %	paa union std.dev %	p-value
64	presto/tpcds:q65	1674.40	12.17	1402.60	13.99	1479.10	19.57	-16.23	-11.66	0.73	1.00	1.32	0.00000
52	presto/tpcds:q53	188.40	47.32	169.30	0.88	165.10	1.16	-10.14	-12.37	25.12	0.52	0.71	0.34618
0	presto/tpcds:q01	247.00	3.26	224.80	3.99	230.80	3.03	-8.99	-6.56	1.32	1.78	1.31	0.00000
13	presto/tpcds:q14	15864.00	221.53	15120.00	96.60	15414.00	105.37	-4.69	-2.84	1.40	0.64	0.68	0.00002
20	presto/tpcds:q21	15.11	0.17	14.46	0.08	14.28	0.07	-4.34	-5.54	1.11	0.55	0.51	0.00001
63	presto/tpcds:q64	6222.00	83.40	5970.00	35.39	6060.00	29.39	-4.05	-2.60	1.34	0.59	0.49	0.00005
57	presto/tpcds:q58	60.55	0.73	58.12	0.86	59.72	0.46	-4.01	-1.37	1.20	1.49	0.77	0.00036
94	presto/tpcds:q95	1344.50	11.89	1299.00	1.42	1336.90	8.25	-3.38	-0.57	0.88	0.11	0.62	0.00000
47	presto/tpcds:q48	455.10	1.69	441.70	0.88	448.60	0.62	-2.94	-1.43	0.37	0.20	0.14	0.00000
49	presto/tpcds:q50	1025.40	4.23	997.60	0.90	1032.80	2.93	-2.71	0.72	0.41	0.09	0.28	0.00000
66	presto/tpcds:q67	8892.00	60.24	8670.00	27.10	8886.00	42.09	-2.50	-0.07	0.68	0.31	0.47	0.00001
74	presto/tpcds:q75	2574.80	26.23	2512.10	13.69	2539.10	5.60	-2.44	-1.39	1.02	0.55	0.22	0.00041
39	presto/tpcds:q40	394.10	13.08	385.20	6.26	395.40	6.12	-2.26	0.33	3.32	1.62	1.55	0.16354
14	presto/tpcds:q15	64.50	0.50	63.10	0.96	64.00	0.49	-2.17	-0.78	0.78	1.52	0.77	0.01012
69	presto/tpcds:q70	1237.60	9.83	1213.20	10.57	1238.80	14.06	-1.97	0.10	0.79	0.87	1.14	0.00201
21	presto/tpcds:q22	659.90	4.54	647.10	1.51	651.30	2.51	-1.94	-1.30	0.69	0.23	0.39	0.00006
12	presto/tpcds:q13	543.30	1.81	533.50	1.03	536.80	1.35	-1.80	-1.20	0.33	0.19	0.25	0.00000
3	presto/tpcds:q04	5304.00	37.18	5214.00	27.10	5166.00	44.09	-1.70	-2.60	0.70	0.52	0.85	0.00073
5	presto/tpcds:q06	64.60	0.62	63.60	0.66	64.20	0.38	-1.55	-0.62	0.96	1.03	0.59	0.02187

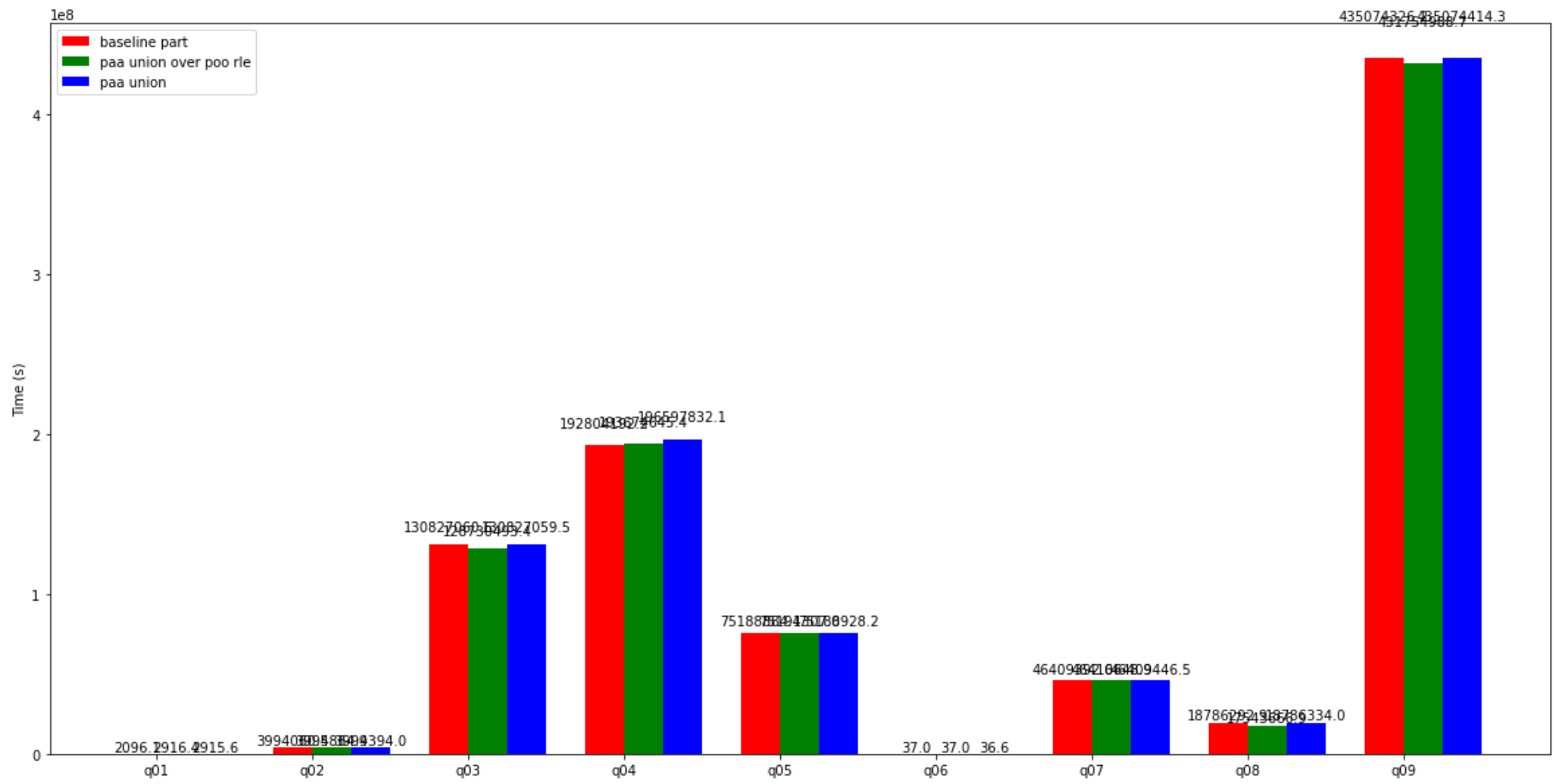
	query	baseline part mean	baseline part std.dev	paa union over pooler mean	paa union over pooler std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline part std.dev %	paa union over pooler std.dev %	paa union std.dev %	p-value
40	presto/tpcds:q41	1.04	0.01	1.02	0.01	1.05	0.01	-1.44	0.64	0.86	1.02	1.16	0.02367
22	presto/tpcds:q23	12696.00	49.19	12516.00	37.18	12756.00	90.12	-1.42	0.47	0.39	0.30	0.71	0.00003
24	presto/tpcds:q25	171.90	5.16	169.50	4.47	171.10	6.74	-1.40	-0.47	3.00	2.64	3.94	0.40924
7	presto/tpcds:q08	103.30	0.24	101.90	0.24	103.90	0.45	-1.36	0.58	0.24	0.24	0.43	0.00000
10	presto/tpcds:q11	2705.30	3.95	2669.00	19.02	2649.00	2.49	-1.34	-2.08	0.15	0.71	0.09	0.00101
79	presto/tpcds:q80	783.20	48.39	773.50	97.48	806.30	88.67	-1.24	2.95	6.18	12.60	11.00	0.83158
28	presto/tpcds:q29	413.30	1.10	408.20	0.62	411.40	0.62	-1.23	-0.46	0.27	0.15	0.15	0.00000
30	presto/tpcds:q31	410.10	2.76	405.20	5.62	401.30	7.61	-1.19	-2.15	0.67	1.39	1.90	0.08432
15	presto/tpcds:q16	514.50	0.99	509.20	2.17	513.40	1.35	-1.03	-0.21	0.19	0.43	0.26	0.00028
9	presto/tpcds:q10	57.12	0.46	56.60	0.57	58.30	0.96	-0.90	2.07	0.81	1.01	1.64	0.11639
84	presto/tpcds:q85	282.00	5.42	279.50	6.02	287.00	4.72	-0.89	1.77	1.92	2.15	1.64	0.46698
34	presto/tpcds:q35	221.40	0.93	219.80	1.68	228.80	3.17	-0.72	3.34	0.42	0.77	1.38	0.06881
29	presto/tpcds:q30	138.60	0.54	137.60	0.82	138.90	0.33	-0.72	0.22	0.39	0.60	0.24	0.03145
55	presto/tpcds:q56	32.71	0.24	32.48	0.30	32.99	0.38	-0.69	0.86	0.75	0.92	1.15	0.18054
92	presto/tpcds:q93	3478.60	30.96	3454.50	17.78	3483.00	7.24	-0.69	0.13	0.89	0.51	0.21	0.12927
46	presto/tpcds:q47	5352.00	54.20	5316.00	43.60	5310.00	30.12	-0.67	-0.78	1.01	0.82	0.57	0.23362
44	presto/tpcds:q45	64.10	0.70	63.70	0.45	64.30	1.03	-0.62	0.31	1.09	0.71	1.61	0.26743
4	presto/tpcds:q05	536.20	68.96	532.90	44.75	546.70	76.33	-0.62	1.96	12.86	8.40	13.96	0.92362
85	presto/tpcds:q86	265.30	0.88	264.70	0.59	268.30	0.80	-0.23	1.13	0.33	0.22	0.30	0.19653

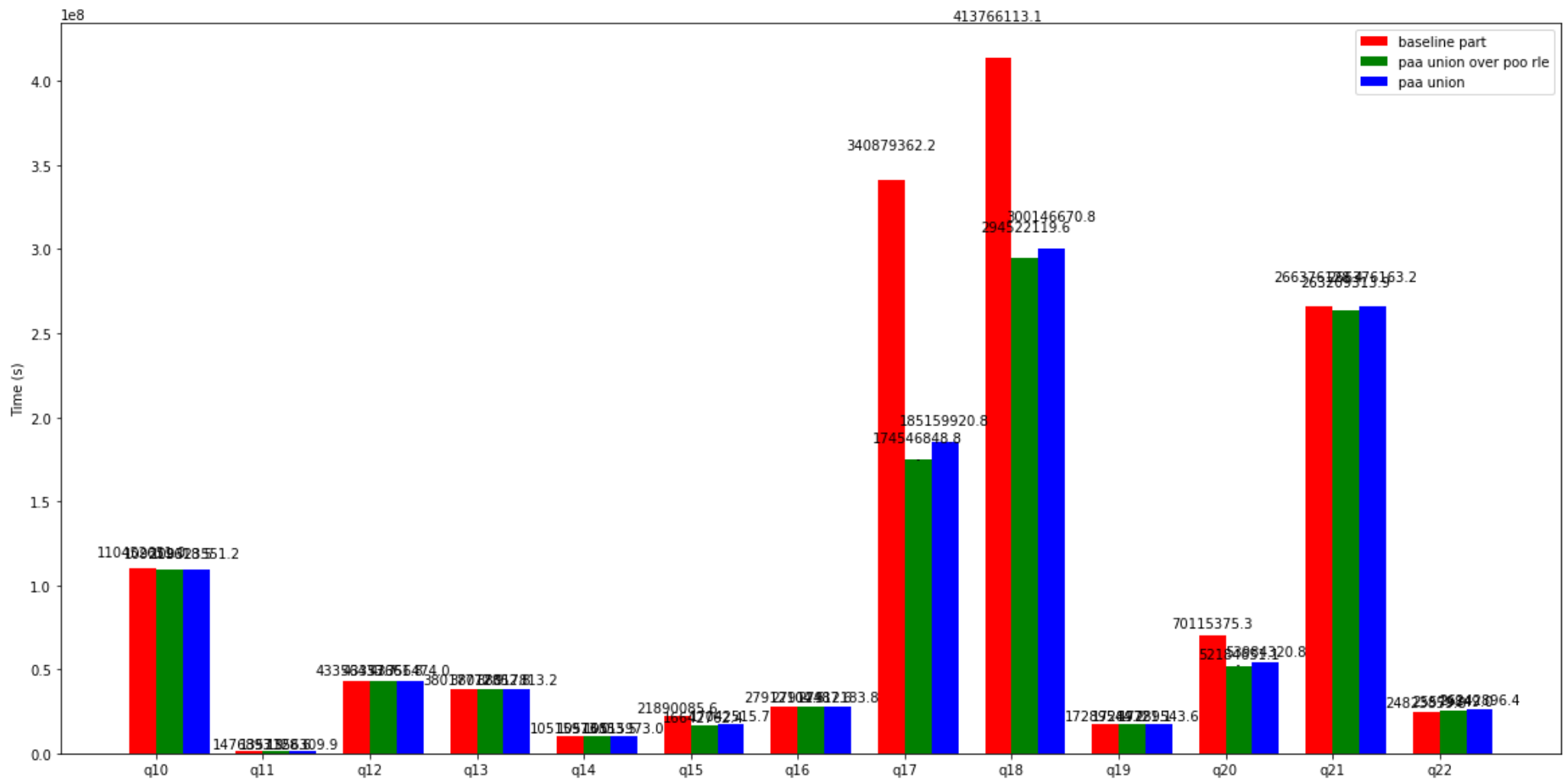
	query	baseline part mean	baseline part std.dev	paa union over pooler mean	paa union over pooler std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline part std.dev %	paa union over pooler std.dev %	paa union std.dev %	p-value
68	presto/tpcds:q69	53.84	0.34	53.74	0.23	55.08	0.41	-0.20	2.29	0.64	0.43	0.75	0.54815
45	presto/tpcds:q46	250.10	1.16	249.70	0.70	246.80	1.18	-0.16	-1.32	0.47	0.28	0.48	0.48757
70	presto/tpcds:q71	78.10	1.76	78.00	2.24	79.00	1.12	-0.13	1.15	2.25	2.88	1.41	0.93321
18	presto/tpcds:q19	78.90	1.06	78.80	0.73	78.30	0.63	-0.13	-0.76	1.34	0.92	0.80	0.85232
56	presto/tpcds:q57	2763.30	27.24	2761.90	18.75	2758.20	31.51	-0.05	-0.18	0.99	0.68	1.14	0.91946
16	presto/tpcds:q17	250.30	4.25	250.20	7.51	252.80	8.97	-0.04	1.00	1.70	3.00	3.55	0.97792
50	presto/tpcds:q51	921.10	4.06	920.80	4.50	913.50	5.13	-0.03	-0.83	0.44	0.49	0.56	0.90590
67	presto/tpcds:q68	77.90	0.70	78.00	0.66	78.10	0.45	0.13	0.26	0.90	0.84	0.58	0.80402
93	presto/tpcds:q94	262.10	1.03	262.50	0.83	269.40	0.38	0.15	2.79	0.39	0.32	0.14	0.47618
88	presto/tpcds:q89	317.10	0.73	317.60	0.73	317.30	0.45	0.16	0.06	0.23	0.23	0.14	0.26337
23	presto/tpcds:q24	3314.90	24.28	3320.40	11.18	3328.50	9.07	0.17	0.41	0.73	0.34	0.27	0.62513
73	presto/tpcds:q74	2070.10	18.11	2074.20	8.77	2060.20	9.44	0.20	-0.48	0.87	0.42	0.46	0.62848
35	presto/tpcds:q36	282.50	0.45	283.10	0.24	281.20	0.90	0.21	-0.46	0.16	0.09	0.32	0.01695
32	presto/tpcds:q33	58.35	0.56	58.51	0.34	58.69	0.10	0.29	0.58	0.97	0.57	0.17	0.54802
96	presto/tpcds:q97	1160.40	5.43	1163.90	16.82	1186.00	9.63	0.30	2.21	0.47	1.45	0.81	0.63809
72	presto/tpcds:q73	46.96	0.18	47.10	0.12	47.80	0.17	0.30	1.78	0.37	0.25	0.35	0.13068
33	presto/tpcds:q34	139.10	0.24	139.70	0.45	142.70	0.45	0.43	2.59	0.18	0.32	0.32	0.01695
76	presto/tpcds:q77	66.20	0.31	66.50	0.45	67.60	0.31	0.45	2.11	0.47	0.68	0.46	0.20938
59	presto/tpcds:q60	85.70	0.24	86.10	0.83	87.80	0.49	0.47	2.45	0.29	0.96	0.56	0.28248

	query	baseline part mean	baseline part 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 part std.dev %	paa union over pooler std.dev %	paa union std.dev %	p-value
65	presto/tpcds:q66	299.00	0.31	300.40	0.49	296.60	1.05	0.47	-0.80	0.10	0.16	0.35	0.00015
19	presto/tpcds:q20	16.79	0.19	16.87	0.36	16.79	0.16	0.48	0.04	1.13	2.14	0.97	0.64118
80	presto/tpcds:q81	266.40	0.54	268.20	1.20	267.20	0.49	0.68	0.30	0.20	0.45	0.18	0.00731
83	presto/tpcds:q84	142.20	0.85	143.20	0.49	139.70	1.39	0.70	-1.76	0.60	0.34	0.99	0.03145
58	presto/tpcds:q59	3924.00	0.00	3954.00	14.70	3924.00	0.00	0.76	0.00	0.00	0.37	0.00	0.00054
17	presto/tpcds:q18	225.00	0.66	226.90	1.03	228.50	0.70	0.84	1.56	0.29	0.46	0.31	0.00349
71	presto/tpcds:q72	1475.20	49.14	1488.50	17.33	1471.60	24.85	0.90	-0.24	3.33	1.16	1.69	0.54585
78	presto/tpcds:q79	234.80	0.90	237.00	0.66	237.90	0.50	0.94	1.32	0.38	0.28	0.21	0.00070
51	presto/tpcds:q52	34.19	0.05	34.51	0.13	34.03	0.09	0.94	-0.46	0.14	0.38	0.25	0.00020
41	presto/tpcds:q42	33.53	0.12	33.86	0.13	33.38	0.04	0.98	-0.44	0.36	0.38	0.13	0.00104
6	presto/tpcds:q07	308.60	0.73	311.90	0.70	308.80	1.55	1.07	0.06	0.24	0.22	0.50	0.00001
26	presto/tpcds:q27	288.70	0.45	291.80	0.62	289.10	0.24	1.07	0.14	0.16	0.21	0.08	0.00000
90	presto/tpcds:q91	15.57	1.21	15.74	1.59	15.84	1.27	1.10	1.70	7.79	10.08	8.03	0.83749
11	presto/tpcds:q12	7.38	0.04	7.46	0.04	7.51	0.03	1.11	1.74	0.59	0.57	0.35	0.00815
60	presto/tpcds:q61	183.50	1.16	185.80	0.90	185.60	0.62	1.25	1.14	0.63	0.49	0.33	0.00336
82	presto/tpcds:q83	14.31	0.39	14.49	0.33	14.73	0.46	1.29	2.95	2.73	2.30	3.13	0.39808
1	presto/tpcds:q02	2892.00	3.54	2931.60	3.79	2873.60	2.83	1.37	-0.64	0.12	0.13	0.10	0.00000
43	presto/tpcds:q44	1364.30	5.53	1383.00	4.69	1378.00	8.95	1.37	1.00	0.41	0.34	0.65	0.00009
37	presto/tpcds:q38	1184.80	1.96	1202.40	3.87	1183.70	4.91	1.49	-0.09	0.17	0.32	0.41	0.00000


```
min      -30
25%     -1
50%     -0
75%      1
max      29
Name: % change, dtype: float64
count    99
mean     -1
std       5
min     -21
25%     -1
50%      0
75%      1
max       3
Name: % change base -> paa union, dtype: float64
```

TPC-H Comparison (Network)





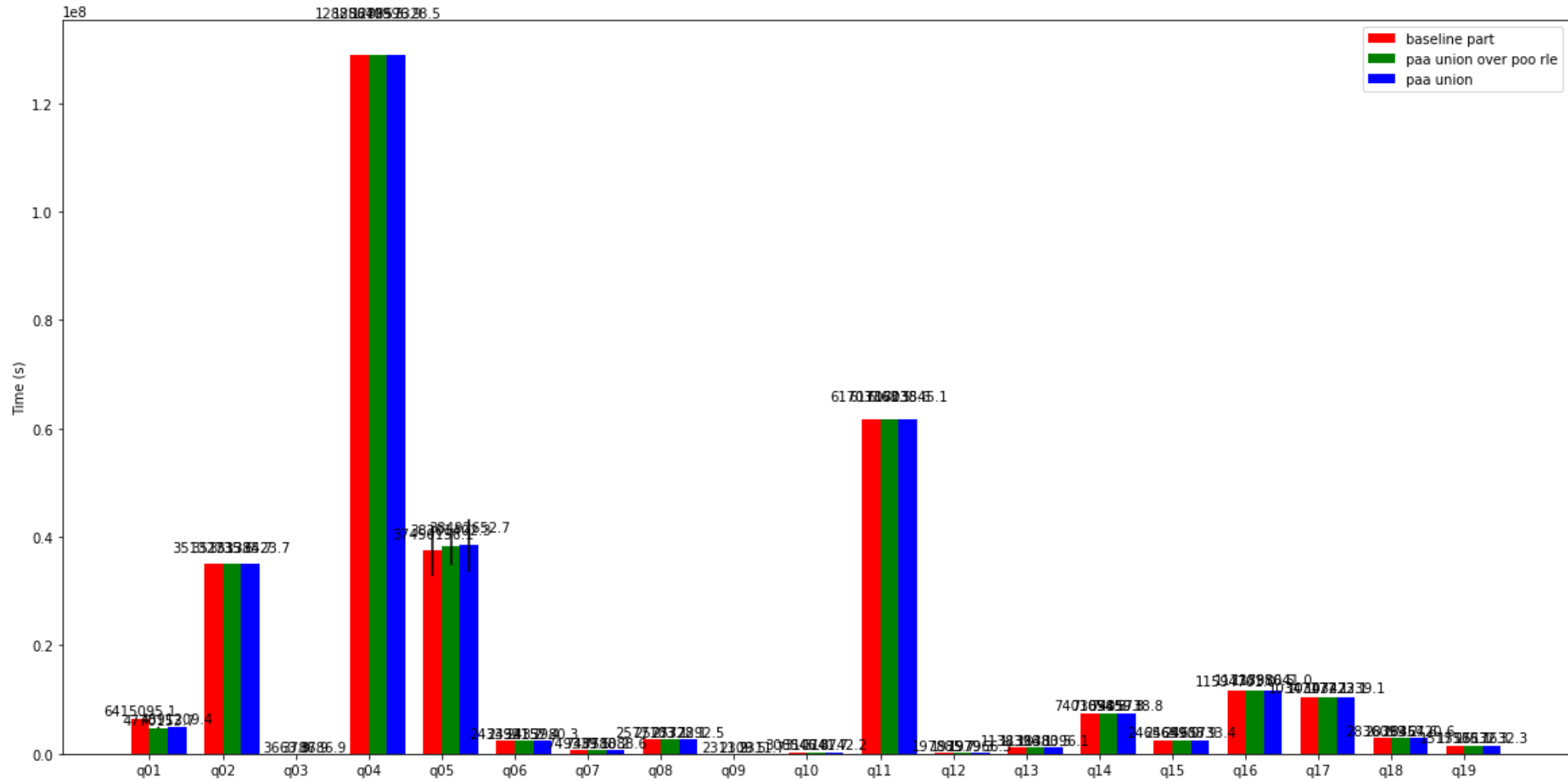
query	baseline part mean	baseline part std.dev	paa union over poo rle mean	paa union over poo rle std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline part std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
16 presto/tpch: q17	340879362.24	474.41	174546848.75	347532.27	185159920.83	114049.51	-48.80	-45.68	0.00	0.20	0.06	0.00000
17 presto/tpch: q18	413766113.09	7488.67	294522119.61	85355.90	300146670.84	191009.86	-28.82	-27.46	0.00	0.03	0.06	0.00000
19 presto/tpch: q20	70115375.32	34.57	52184651.14	74488.26	53984320.76	58496.81	-25.57	-23.01	0.00	0.14	0.11	0.00000
14 presto/tpch: q15	21890085.63	127.80	16642762.38	2672.90	17042515.71	5362.98	-23.97	-22.15	0.00	0.02	0.03	0.00000
10 presto/tpch: q11	1476893.94	12685.37	1357128.61	37938.75	1356309.94	22639.02	-8.11	-8.16	0.86	2.80	1.67	0.00003

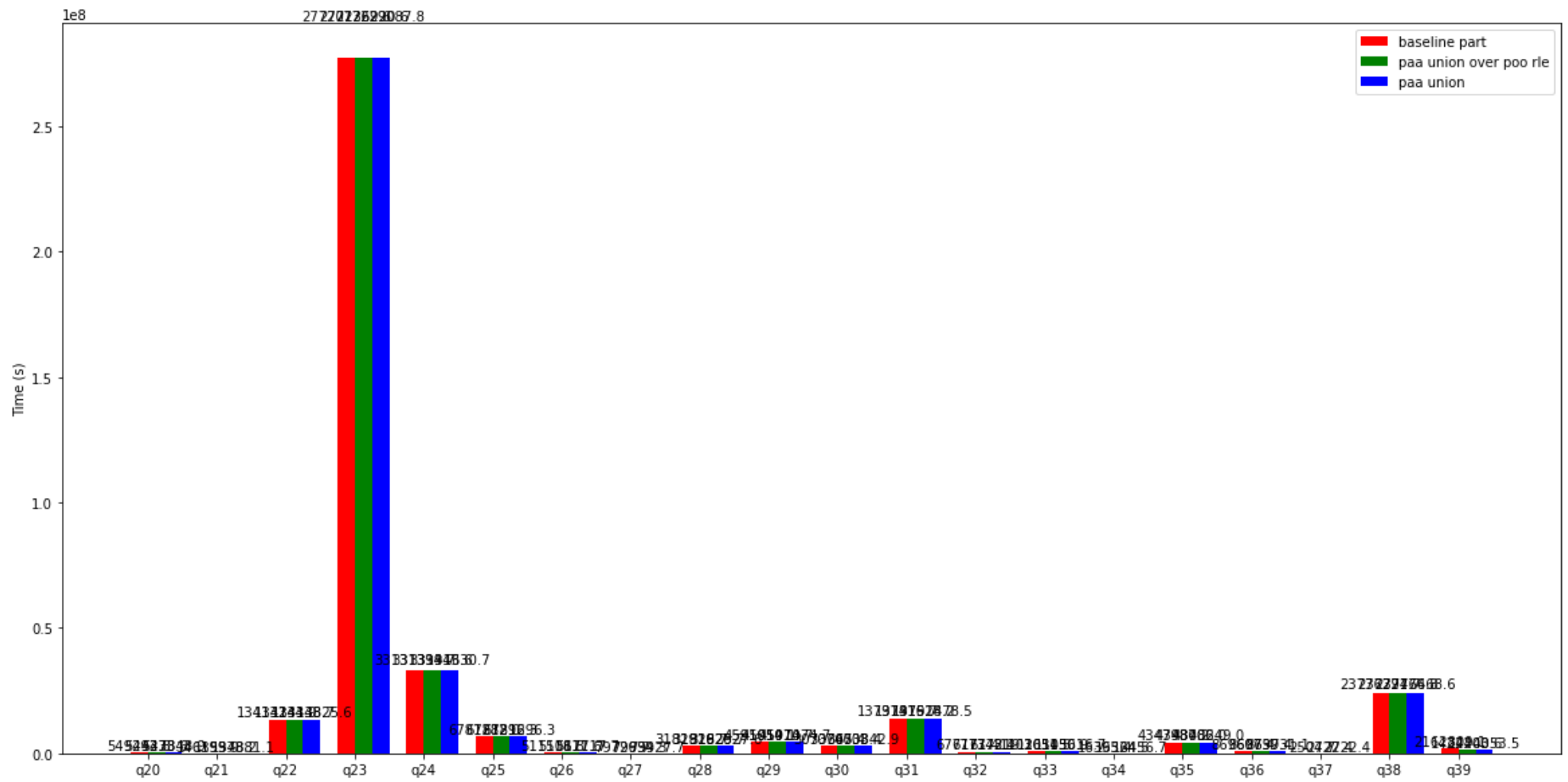

```

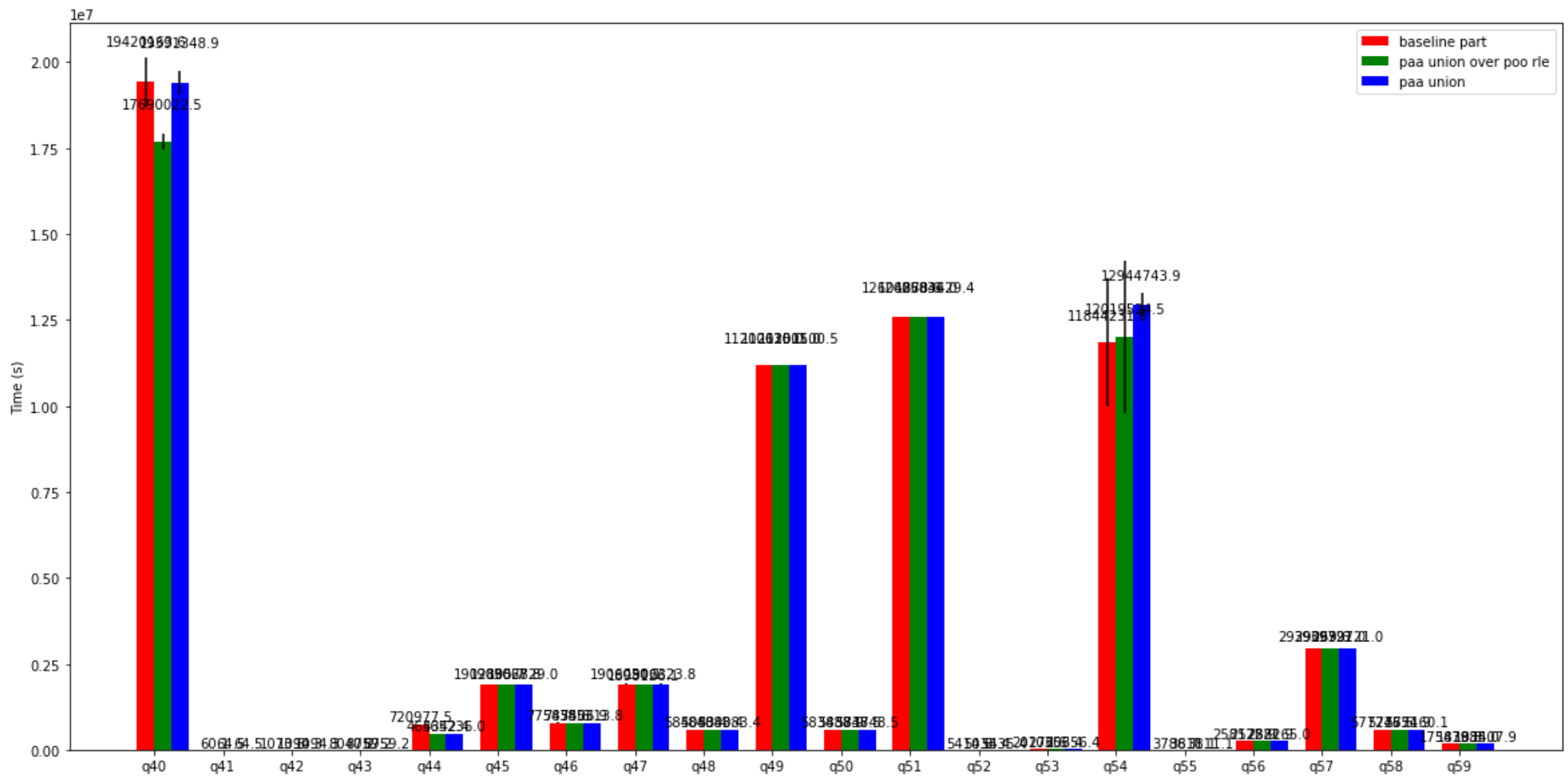
50%      -0
75%      0
max       39
Name: % change, dtype: float64
count    22
mean     -4
std      16
min     -46
25%     -1
50%      0
75%      0
max       39
Name: % change base -> paa union, dtype: float64

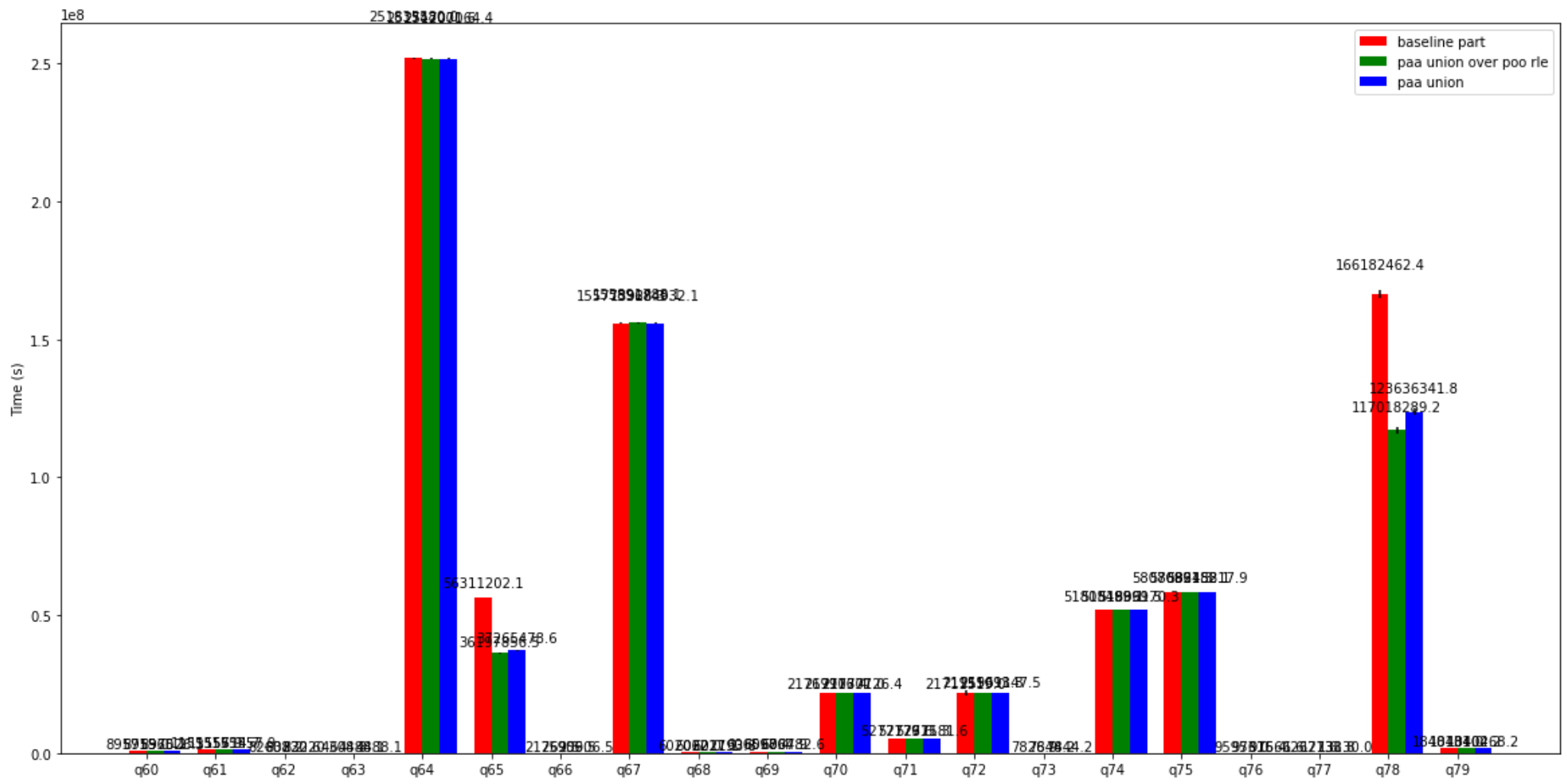
```

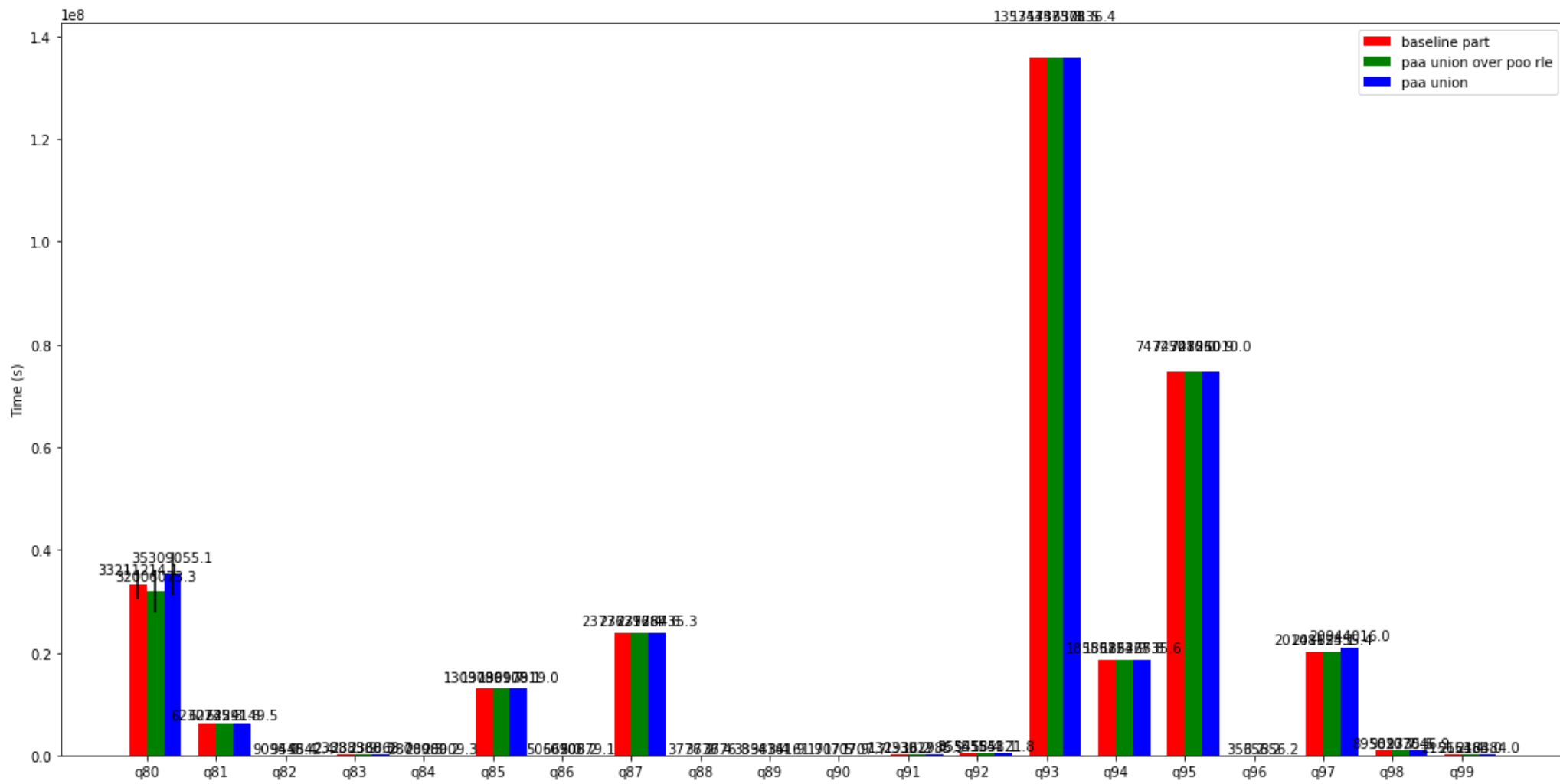
TPC-DS Comparison (Network)











query	baseline part mean	baseline part std.dev	paa union over poo rle mean	paa union over poo rle std.dev	paa union mean	paa union std.dev	% change	% base -> paa union	baseline part std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
64 presto/tpcds: q65	56311202.07	1254.60	36197856.48	305275.04	37265478.60	349778.10	-35.72	-33.82	0.00	0.84	0.94	0.00000
43 presto/tpcds: q44	720977.45	23.01	465342.40	155.61	465236.04	204.23	-35.46	-35.47	0.00	0.03	0.04	0.00000
38 presto/tpcds: q39	2162809.14	4.06	1422203.57	4.42	1444053.47	3.08	-34.24	-33.23	0.00	0.00	0.00	0.00000
77 presto/tpcds: q78	166182462.44	1434500.09	117018289.15	1224313.07	123636341.84	1301462.30	-29.58	-25.60	0.86	1.05	1.05	0.00000
0 presto/tpcds: q01	6415095.13	2789.20	4770153.69	108163.17	4891209.41	74216.58	-25.64	-23.75	0.04	2.27	1.52	0.00000

	query	baseline part mean	baseline part 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 part std.dev %	paa union over poole std.dev %	paa union std.dev %	p-value
39	presto/tpcds:q40	19420163.55	711729.26	17690022.46	225873.68	19391348.95	339798.32	-8.91	-0.15	3.66	1.28	1.75	0.00021
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
79	presto/tpcds:q80	33211214.09	2903126.66	32006073.27	4170336.74	35309055.14	4152174.40	-3.63	6.32	8.74	13.03	11.76	0.57414
19	presto/tpcds:q20	549293.79	10053.92	544273.64	23739.52	543848.95	5510.77	-0.91	-0.99	1.83	4.36	1.01	0.64363
57	presto/tpcds:q58	577245.46	1970.43	572654.91	2021.25	577160.10	2401.57	-0.80	-0.01	0.34	0.35	0.42	0.00259
33	presto/tpcds:q34	16395.37	0.00	16324.48	323.84	16456.69	0.00	-0.43	0.37	0.00	1.98	0.00	0.60355
46	presto/tpcds:q47	1906050.05	21014.45	1898126.14	0.00	1906323.83	20080.15	-0.42	0.01	1.10	0.00	1.05	0.37743
82	presto/tpcds:q83	233885.88	2888.90	233360.54	2381.98	238868.71	9987.88	-0.22	2.13	1.24	1.02	4.18	0.73821
25	presto/tpcds:q26	511518.76	8176.19	510611.61	7750.59	517717.66	8899.38	-0.18	1.21	1.60	1.52	1.72	0.84759
13	presto/tpcds:q14	7401054.79	8922.86	7389859.81	19694.45	7405738.78	12675.34	-0.15	0.06	0.12	0.27	0.17	0.23343
55	presto/tpcds:q56	258122.89	1300.71	257821.94	1362.77	258265.02	903.81	-0.12	0.06	0.50	0.53	0.35	0.70378
8	presto/tpcds:q09	2311.89	3.61	2309.45	3.30	2311.66	4.19	-0.11	-0.01	0.16	0.14	0.18	0.25042
80	presto/tpcds:q81	6230735.32	122.70	6224591.85	2576.76	6224149.46	2949.74	-0.10	-0.11	0.00	0.04	0.05	0.00017
6	presto/tpcds:q07	749339.50	18374.52	748788.19	15646.75	751088.63	14908.48	-0.07	0.23	2.45	2.09	1.98	0.95648
63	presto/tpcds:q64	251835580.00	117162.99	251742001.64	118887.47	251707064.41	106151.06	-0.04	-0.05	0.05	0.05	0.04	0.19968
95	presto/tpcds:q96	356.24	0.28	356.17	0.21	356.21	0.21	-0.02	-0.01	0.08	0.06	0.06	0.64981
32	presto/tpcds:q33	1103651.49	709.02	1103450.89	1299.07	1103616.74	505.24	-0.02	-0.00	0.06	0.12	0.05	0.74674
92	presto/tpcds:q93	135744435.82	184.57	135736301.48	3536.61	135737836.38	2804.49	-0.01	-0.00	0.00	0.00	0.00	0.00022
83	presto/tpcds:q84	28009.25	0.00	28009.21	0.06	28009.25	0.00	-0.00	0.00	0.00	0.00	0.00	0.14493

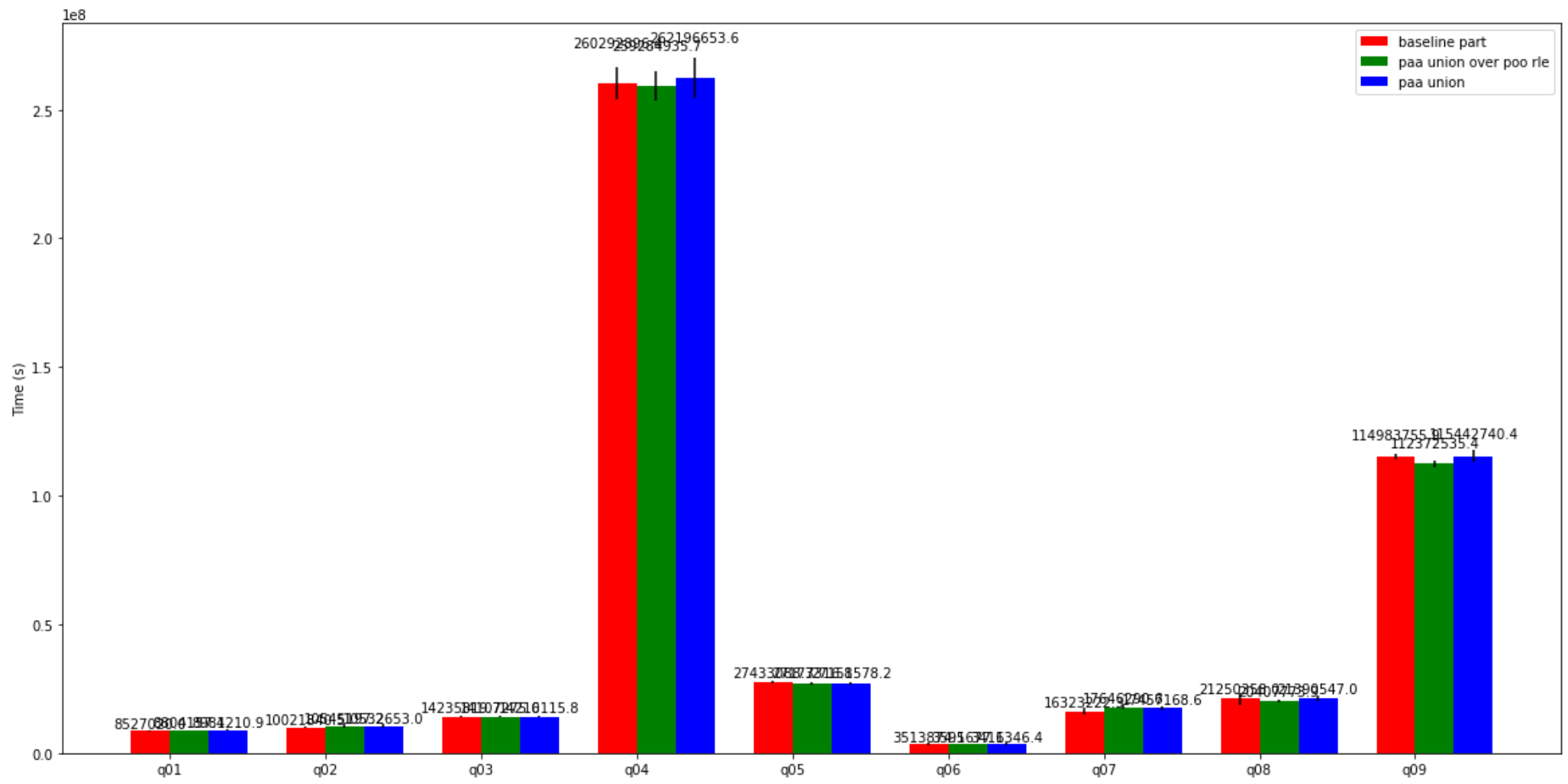
	query	baseline part mean	baseline part std.dev	paa union over pooler mean	paa union over pooler std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline part std.dev %	paa union over pooler std.dev %	paa union std.dev %	p-value
47	presto/tpcds:q48	584083.40	0.00	584083.40	0.00	584083.40	0.00	0.00	0.00	0.00	0.00	0.00	nan
24	presto/tpcds:q25	6781282.01	0.00	6781296.29	0.00	6781296.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00000
27	presto/tpcds:q28	3182916.67	8.91	3182926.72	11.49	3182927.55	8.94	0.00	0.00	0.00	0.00	0.00	0.12139
34	presto/tpcds:q35	4347987.23	239.74	4348005.96	504.86	4348249.03	601.56	0.00	0.01	0.01	0.01	0.01	0.93619
16	presto/tpcds:q17	10347177.14	19.37	10347223.09	42.34	10347239.07	43.19	0.00	0.00	0.00	0.00	0.00	0.03623
28	presto/tpcds:q29	4591054.11	11.35	4591074.67	0.00	4591074.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00126
21	presto/tpcds:q22	13413244.95	0.00	13413348.69	0.00	13413325.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00000
30	presto/tpcds:q31	13791416.73	1033.99	13791528.21	1805.55	13791478.46	1040.49	0.00	0.00	0.01	0.01	0.01	0.89819
1	presto/tpcds:q02	35132735.63	92.09	35133385.67	124.22	35133423.68	95.93	0.00	0.00	0.00	0.00	0.00	0.00000
69	presto/tpcds:q70	21769916.39	0.69	21770376.98	4.00	21770126.36	0.31	0.00	0.00	0.00	0.00	0.00	0.00000
18	presto/tpcds:q19	1517565.14	0.00	1517632.34	0.00	1517632.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00000
10	presto/tpcds:q11	61703368.46	28.27	61706238.58	25.49	61703545.10	22.04	0.00	0.00	0.00	0.00	0.00	0.00000
94	presto/tpcds:q95	74725010.00	0.00	74728560.92	0.00	74725010.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00000
60	presto/tpcds:q61	1155557.87	0.00	1155614.72	0.00	1155557.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00000
87	presto/tpcds:q88	3776.21	1.05	3776.44	1.24	3776.84	1.03	0.01	0.02	0.03	0.03	0.03	0.73825
12	presto/tpcds:q13	1138396.15	0.00	1138480.45	0.03	1138396.15	0.00	0.01	0.00	0.00	0.00	0.00	0.00000
50	presto/tpcds:q51	12604878.63	86.99	12605836.01	157.62	12604429.42	126.90	0.01	-0.00	0.00	0.00	0.00	0.00000
23	presto/tpcds:q24	33131394.72	22.91	33133943.57	31.78	33131630.70	35.60	0.01	0.00	0.00	0.00	0.00	0.00000
48	presto/tpcds:q49	11200630.03	0.72	11201500.98	0.00	11201500.52	1.15	0.01	0.01	0.00	0.00	0.00	0.00000

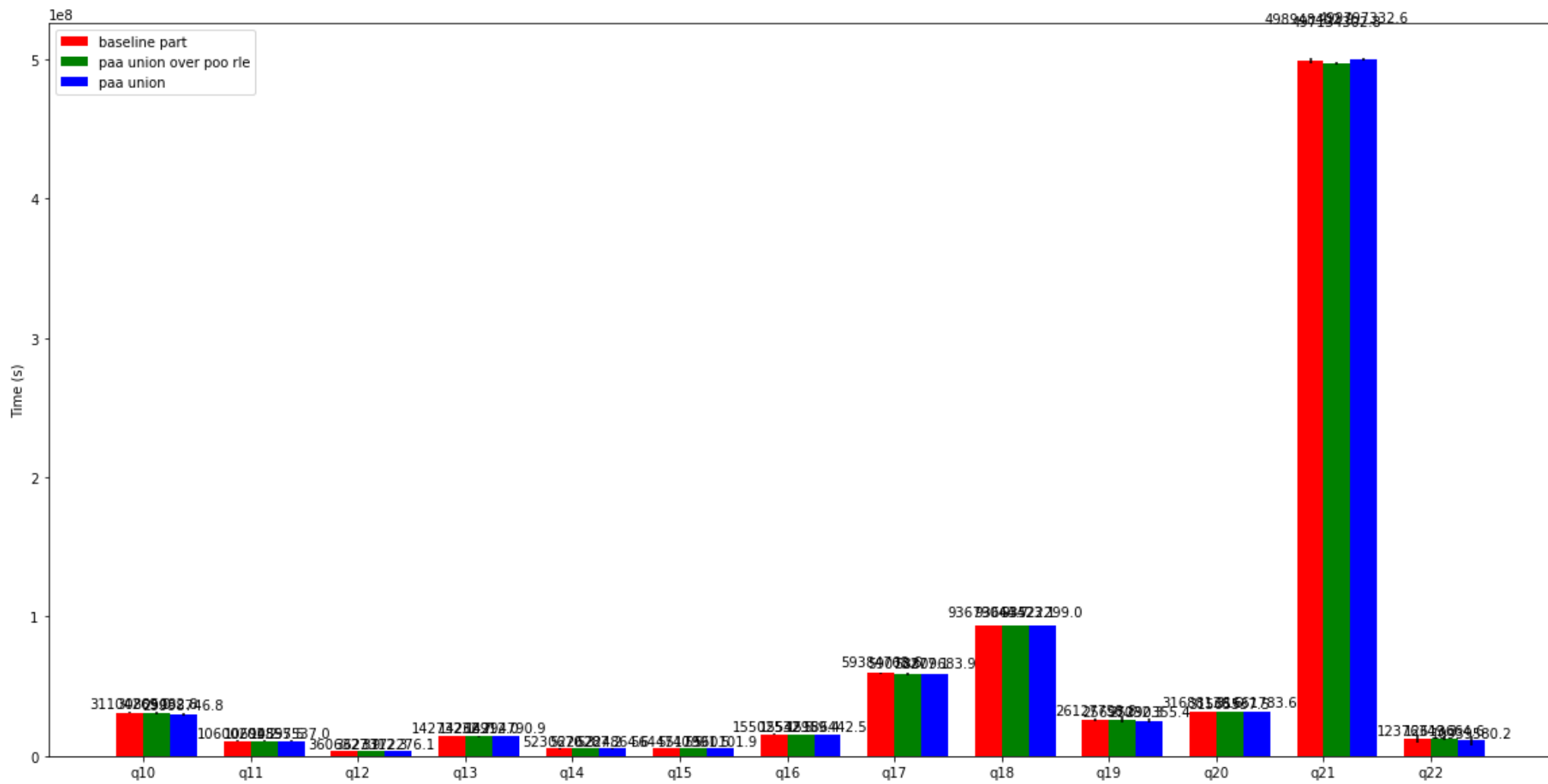
	query	baseline part mean	baseline part std.dev	paa union over poo rle mean	paa union over poo rle std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline part std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
70	presto/tpcds:q71	5277179.60	692.78	5277615.26	375.33	5277181.61	659.25	0.01	0.00	0.01	0.01	0.01	0.20543
7	presto/tpcds:q08	2577103.11	78.24	2577328.14	161.64	2577292.54	47.42	0.01	0.01	0.00	0.01	0.00	0.01185
5	presto/tpcds:q06	2433921.21	0.63	2434157.43	3.07	2433980.27	2.38	0.01	0.00	0.00	0.00	0.00	0.00000
14	presto/tpcds:q15	2465649.00	12.47	2465908.87	7.50	2465733.38	10.87	0.01	0.00	0.00	0.00	0.00	0.00000
29	presto/tpcds:q30	3073665.40	37.38	3074003.43	630.21	3073842.90	172.20	0.01	0.01	0.00	0.02	0.01	0.21898
22	presto/tpcds:q23	277201269.63	45410.93	277236220.57	64706.88	277229087.77	47787.98	0.01	0.01	0.02	0.02	0.02	0.30423
17	presto/tpcds:q18	2836099.20	11.70	2836457.55	42.39	2836420.59	15.87	0.01	0.01	0.00	0.00	0.00	0.00000
86	presto/tpcds:q87	23776216.36	178.58	23779287.57	241.13	23776435.35	225.57	0.01	0.00	0.00	0.00	0.00	0.00000
37	presto/tpcds:q38	23776221.65	76.73	23779476.76	267.22	23776468.56	179.00	0.01	0.00	0.00	0.00	0.00	0.00000
44	presto/tpcds:q45	1902805.71	20.86	1903067.75	13.83	1902828.97	24.44	0.01	0.00	0.00	0.00	0.00	0.00000
78	presto/tpcds:q79	1840131.03	0.28	1840404.24	0.13	1840268.19	0.15	0.01	0.01	0.00	0.00	0.00	0.00000
35	presto/tpcds:q36	869607.37	74.24	869739.43	29.49	869731.12	75.26	0.02	0.01	0.01	0.00	0.01	0.00233
84	presto/tpcds:q85	13097861.68	2.91	13099908.11	2.23	13097919.03	61.32	0.02	0.00	0.00	0.00	0.00	0.00000
74	presto/tpcds:q75	58076991.25	87.77	58086182.10	178.37	58245817.92	174.14	0.02	0.29	0.00	0.00	0.00	0.00000
3	presto/tpcds:q04	128856409.34	439.60	128879596.91	712.30	128857328.50	473.49	0.02	0.00	0.00	0.00	0.00	0.00000
91	presto/tpcds:q92	555418.35	0.00	555541.10	0.00	555321.85	0.00	0.02	-0.02	0.00	0.00	0.00	0.00000
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
89	presto/tpcds:q90	1707.49	0.51	1707.88	0.15	1707.71	0.25	0.02	0.01	0.03	0.01	0.01	0.10931
73	presto/tpcds:q74	51805499.07	789.90	51818399.46	591.48	51806170.30	503.98	0.02	0.00	0.00	0.00	0.00	0.00000

	query	baseline part mean	baseline part 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 part std.dev %	paa union over pooler std.dev %	paa union std.dev %	p-value
31	presto/tpcds:q32	677171.43	0.00	677343.42	0.00	677219.24	0.00	0.03	0.01	0.00	0.00	0.00	0.00000
67	presto/tpcds:q68	602061.99	18.49	602217.15	46.45	602193.79	21.09	0.03	0.02	0.00	0.01	0.00	0.00002
59	presto/tpcds:q60	895714.97	5848.33	895960.23	2036.27	897526.30	1693.35	0.03	0.20	0.65	0.23	0.19	0.92463
68	presto/tpcds:q69	606597.42	195.66	606804.86	118.24	606782.57	418.57	0.03	0.03	0.03	0.02	0.07	0.05046
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
11	presto/tpcds:q12	197885.67	0.00	197979.31	0.00	197966.31	0.00	0.05	0.04	0.00	0.00	0.00	0.00000
90	presto/tpcds:q91	132936.17	12.09	133017.37	26.99	132985.88	24.69	0.06	0.04	0.01	0.02	0.02	0.00005
96	presto/tpcds:q97	20148155.08	65.64	20162455.40	8230.42	20944016.03	17950.50	0.07	3.95	0.00	0.04	0.09	0.00167
66	presto/tpcds:q67	155773928.33	379360.46	155891788.10	152944.96	155684932.14	281877.71	0.08	-0.06	0.24	0.10	0.18	0.49642
72	presto/tpcds:q73	7826.93	0.01	7844.15	0.01	7844.16	0.01	0.22	0.22	0.00	0.00	0.00	0.00000
26	presto/tpcds:q27	79726.69	3.61	79934.34	6.51	79927.71	6.25	0.26	0.25	0.00	0.01	0.01	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
93	presto/tpcds:q94	18555123.86	4.53	18625427.82	53.67	18626535.57	96.41	0.38	0.38	0.00	0.00	0.00	0.00000
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
85	presto/tpcds:q86	50662.00	3.56	50906.21	19.84	50879.08	36.80	0.48	0.43	0.01	0.04	0.07	0.00000
88	presto/tpcds:q89	33983.45	0.00	34161.95	0.00	34161.95	0.00	0.53	0.53	0.00	0.00	0.00	0.00000
76	presto/tpcds:q77	12671.62	464.00	12738.80	597.57	13129.97	3.47	0.53	3.62	3.66	4.69	0.03	0.83219
97	presto/tpcds:q98	895827.67	5016.44	901335.50	13221.80	907046.91	13308.65	0.61	1.25	0.56	1.47	1.47	0.36256
54	presto/tpcds:q55	3786.73	0.00	3811.09	0.00	3811.09	0.00	0.64	0.64	0.00	0.00	0.00	0.00000


```
std      8
min     -36
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%     1
max      19
Name: % change base -> paa union, dtype: float64
```

TPC-H Comparison (Peak memory)





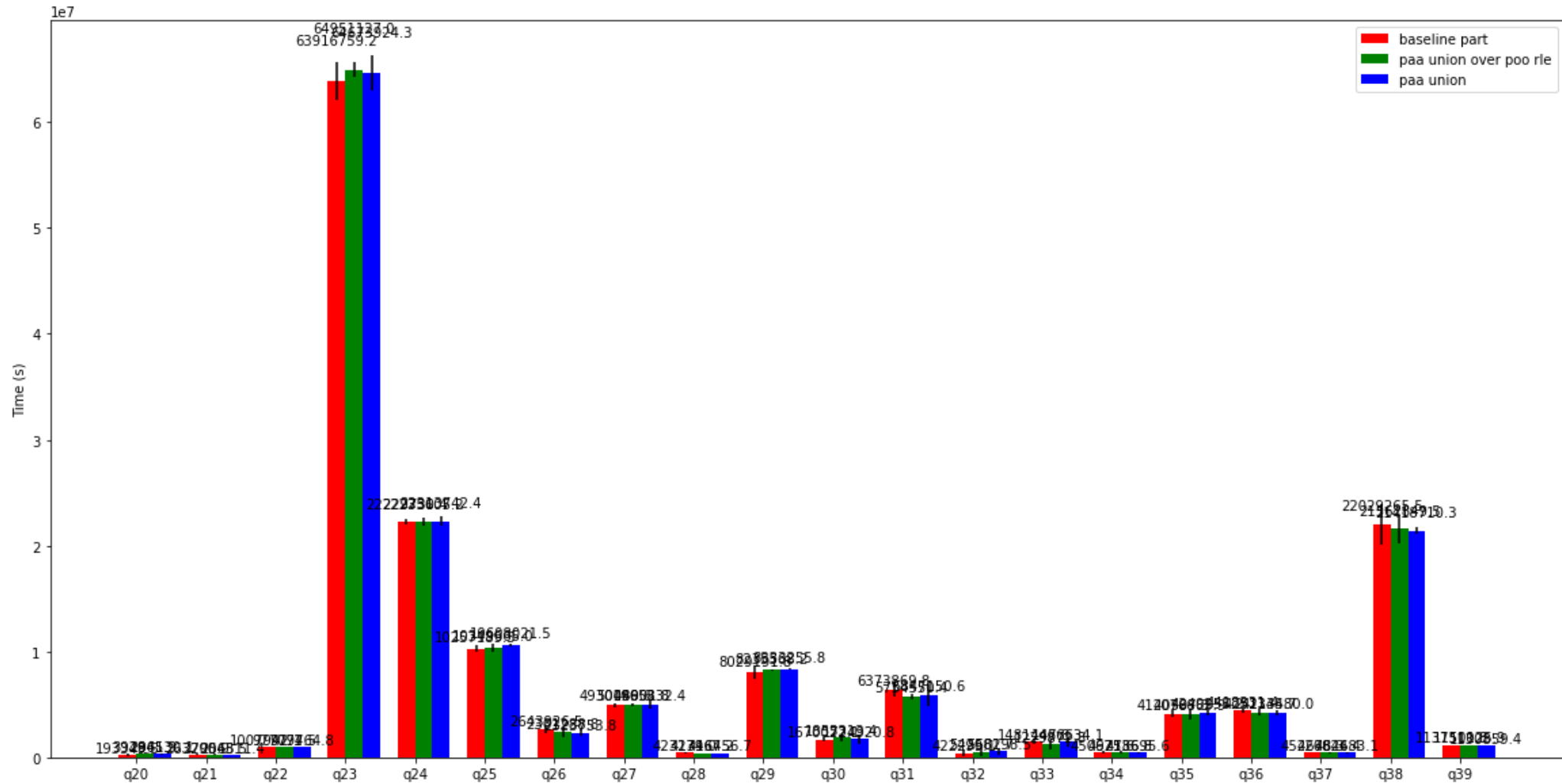
query	baseline part mean	baseline part std.dev	paa union over poo rle mean	paa union over poo rle std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline part std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
7 presto/tpch: q08	21250358.03	2378994.44	20407773.92	448805.15	21390546.97	897374.29	-3.97	0.66	11.20	2.20	4.20	0.41388
8 presto/tpch: q09	114983755.93	1068607.96	112372535.43	1395724.80	115442740.39	2324432.05	-2.27	0.40	0.93	1.24	2.01	0.00455
14 presto/tpch: q15	5644740.47	48751.63	5517991.49	100240.23	5560101.86	118433.73	-2.25	-1.50	0.86	1.82	2.13	0.01927
18 presto/tpch: q19	26127758.84	1202330.82	25697032.29	1939876.86	25290355.37	1269313.94	-1.65	-3.21	4.60	7.55	5.02	0.65377
9 presto/tpch: q10	31104269.00	686894.94	30805082.79	672723.00	29998746.82	712322.63	-0.96	-3.55	2.21	2.18	2.37	0.46352

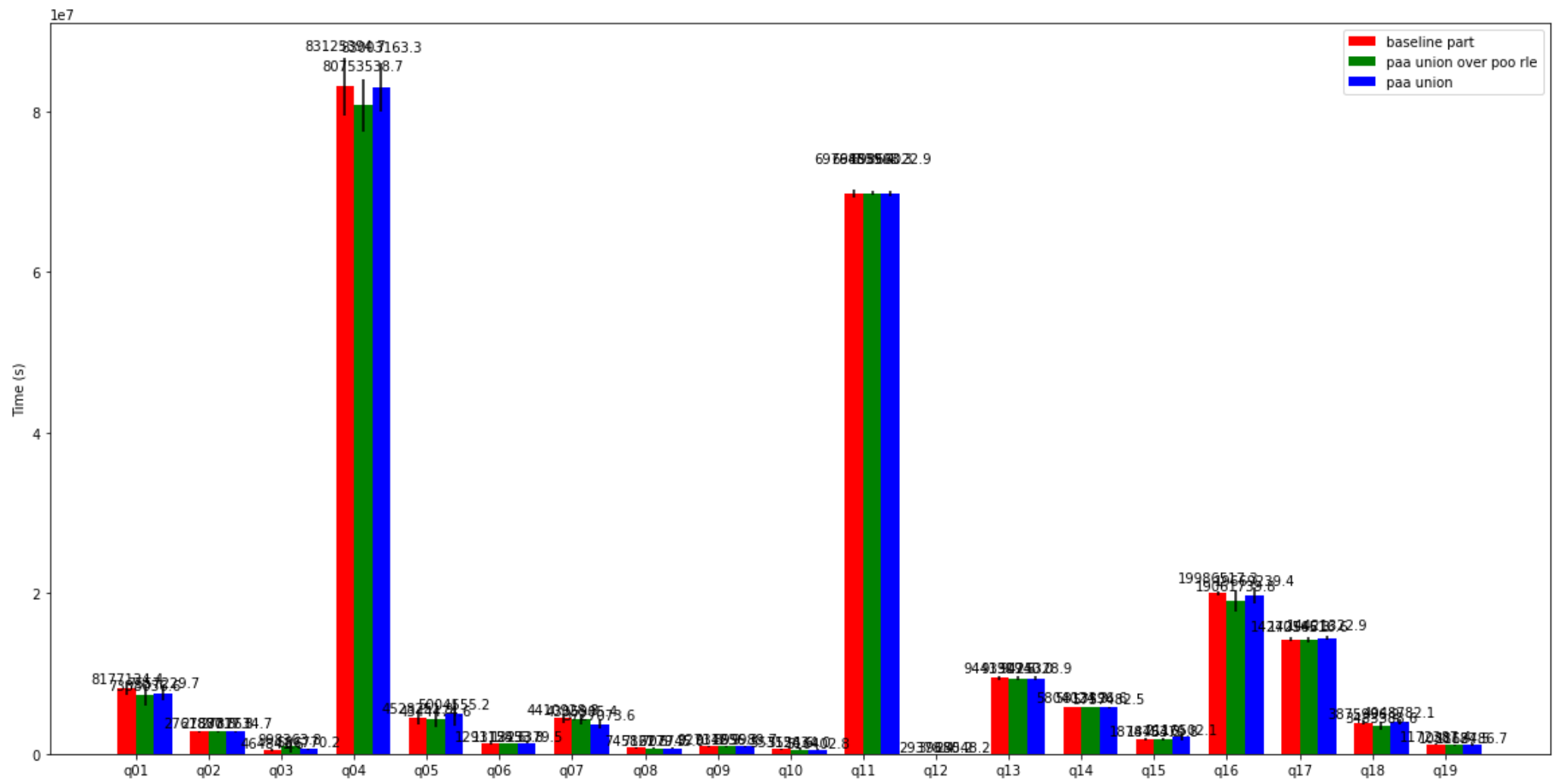

```

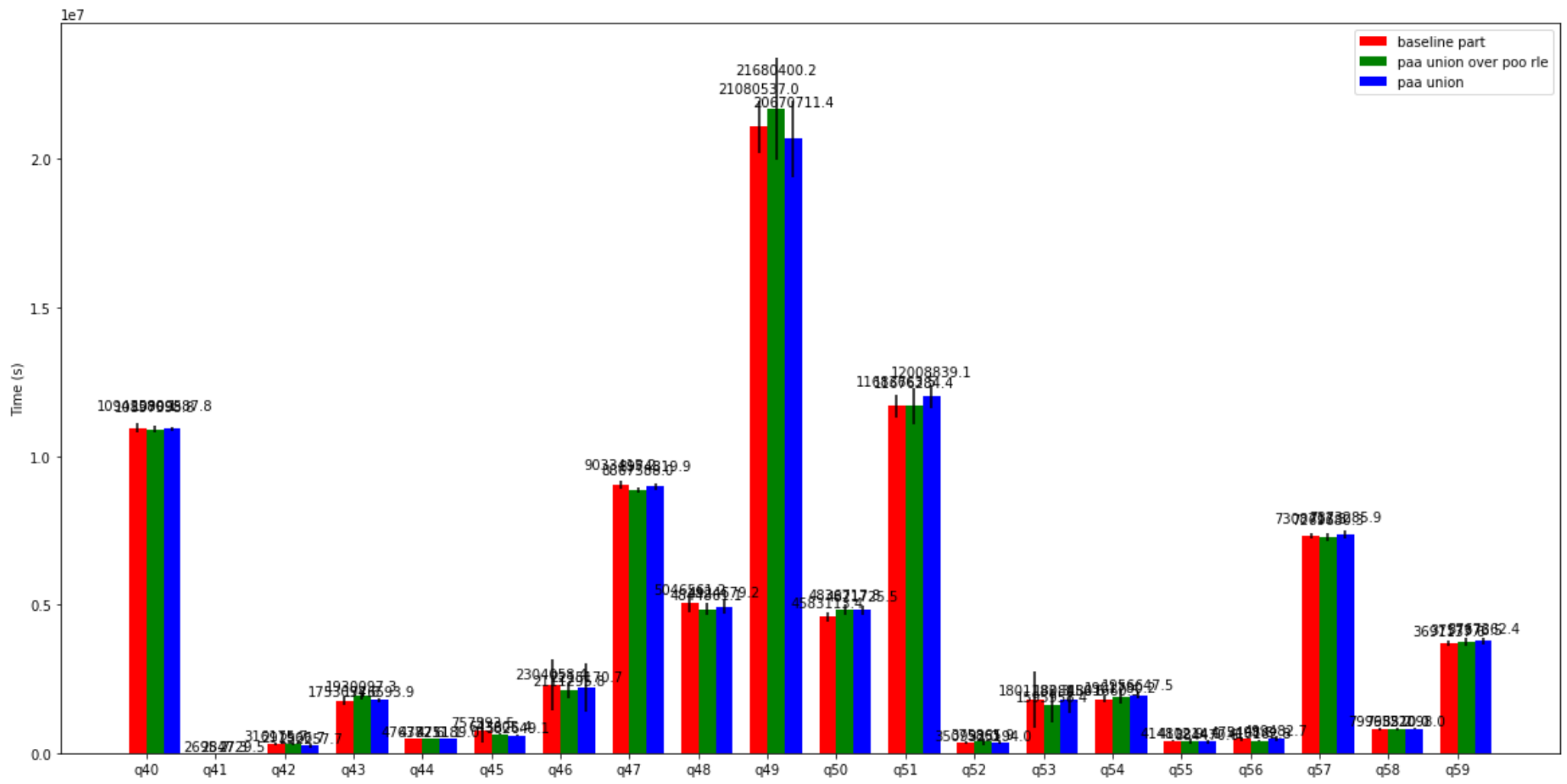
50%      -0
75%      1
max       8
Name: % change, dtype: float64
count    22
mean     -0
std       4
min     -12
25%     -1
50%     -0
75%      1
max       7
Name: % change base -> paa union, dtype: float64

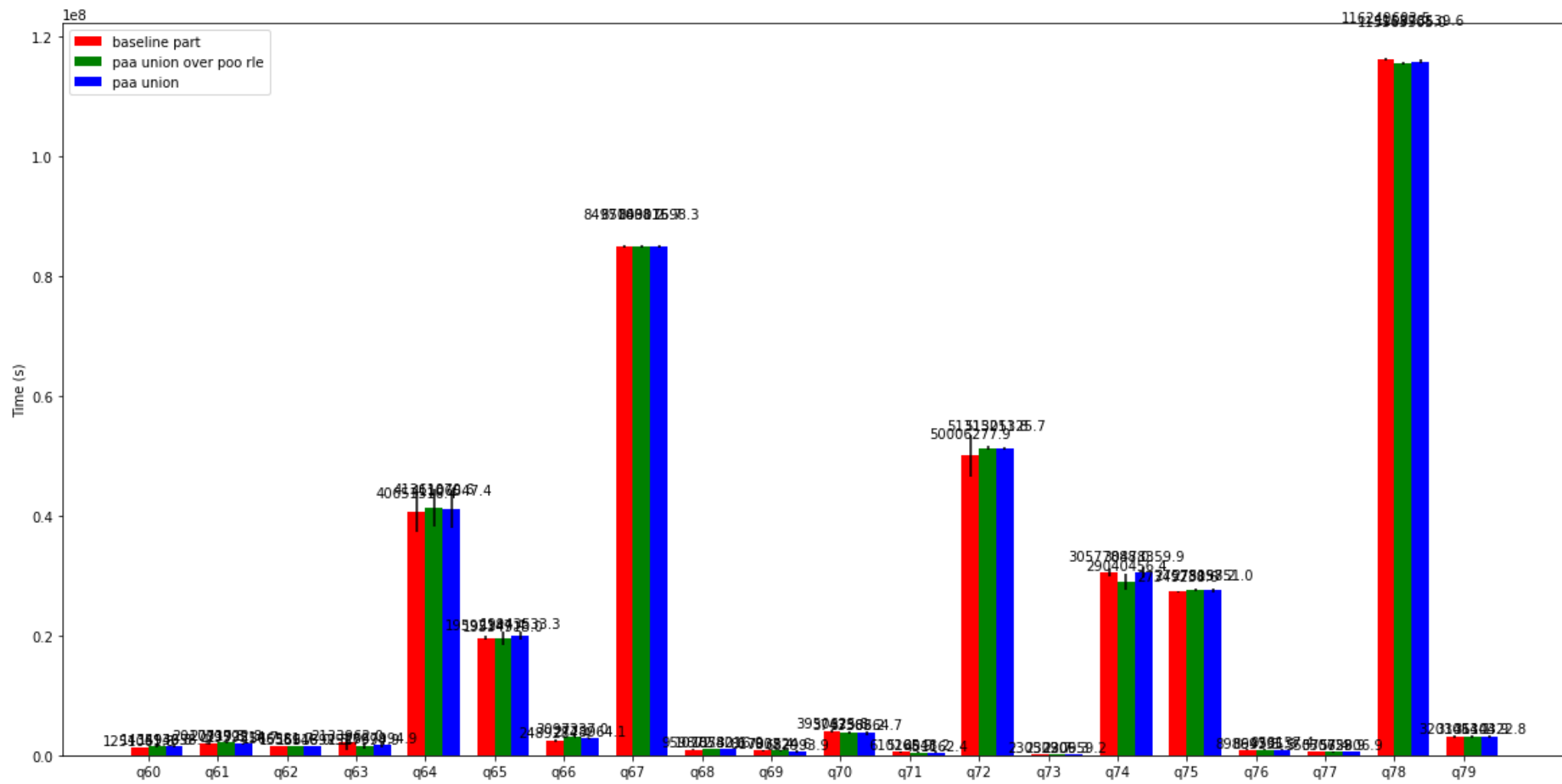
```

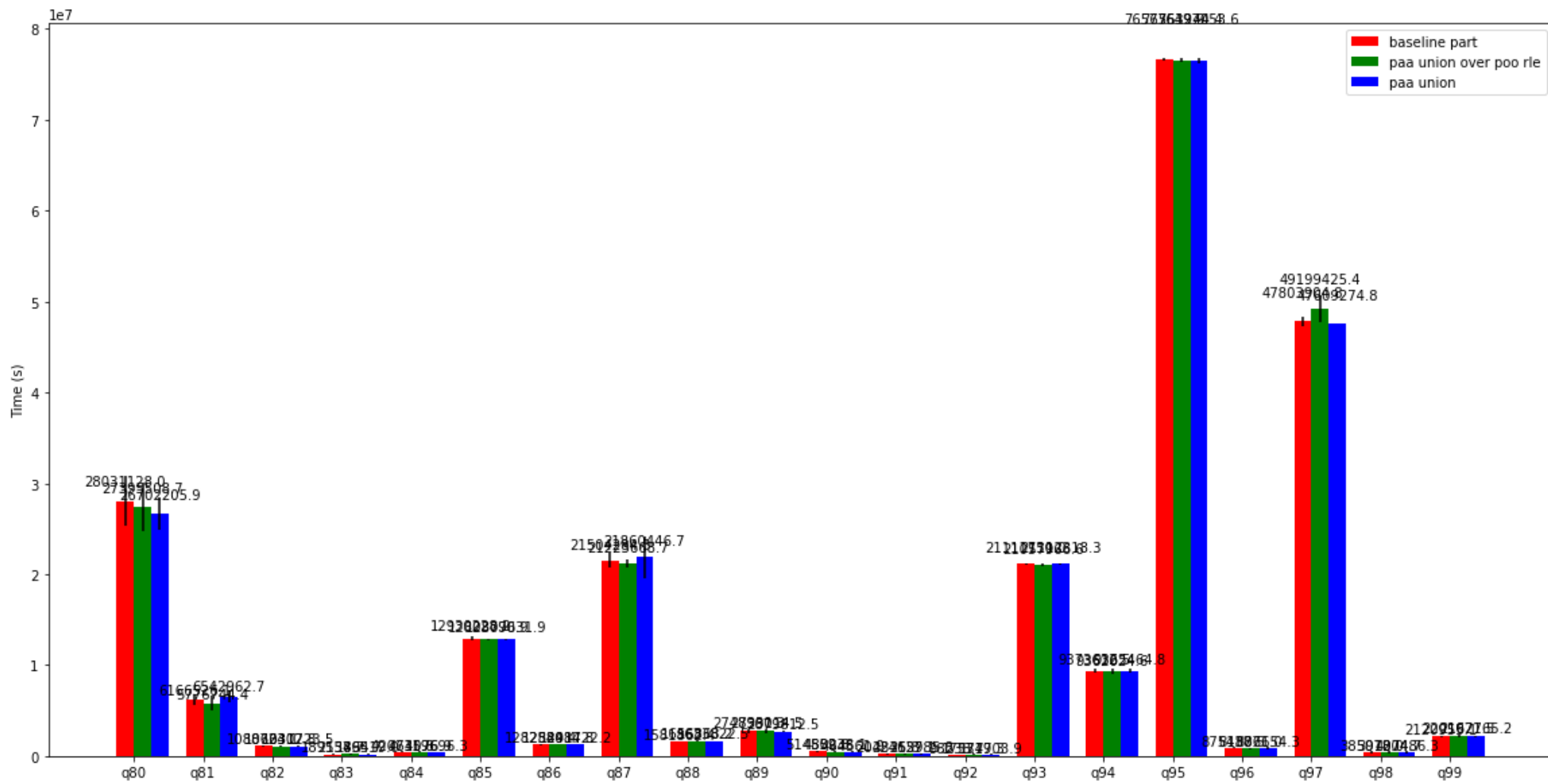
TPC-DS Comparison (Peak memory)

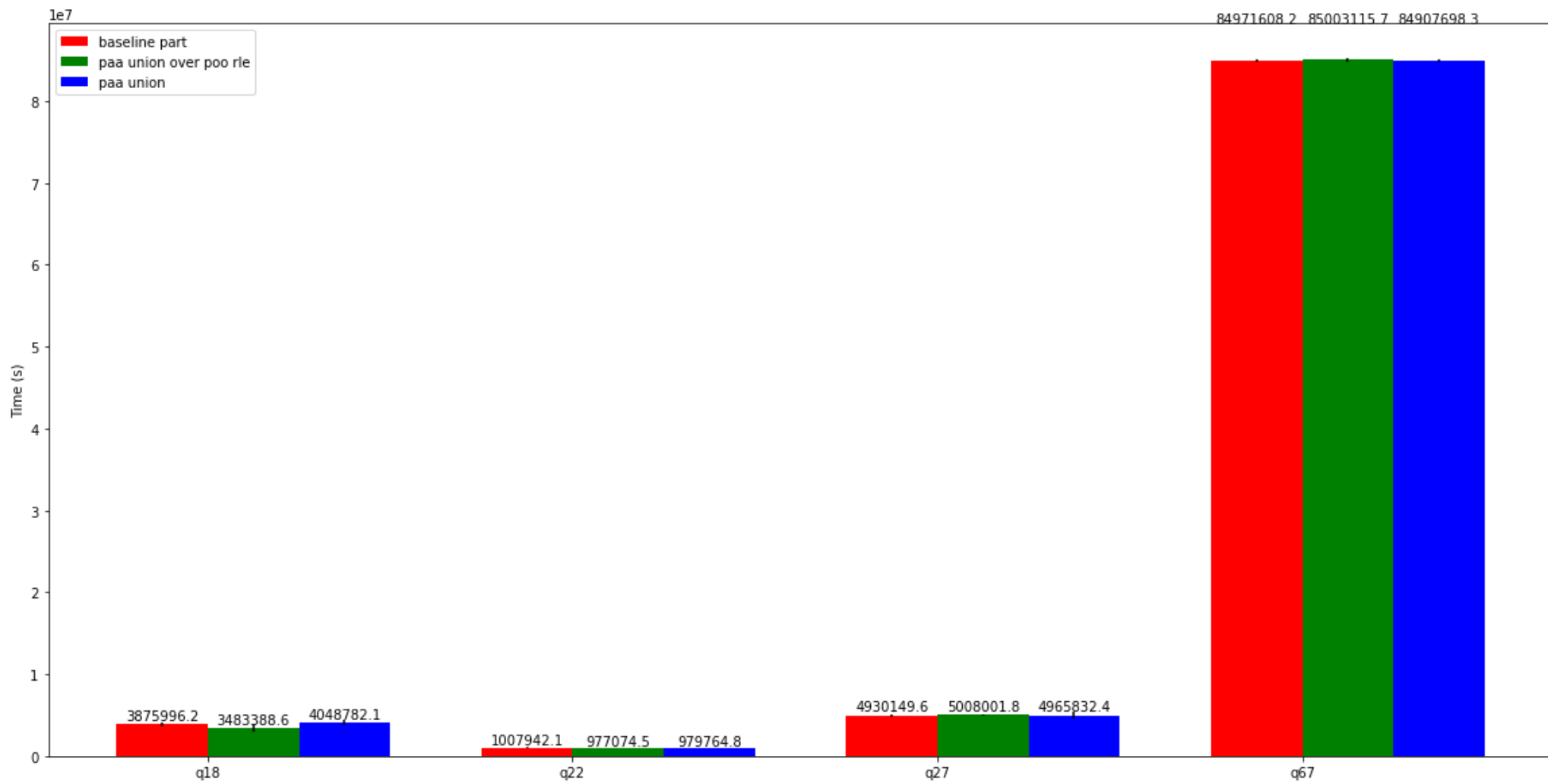












query	baseline part mean	baseline part std.dev	paa union over poo rle mean	paa union over poo rle std.dev	paa union mean	paa union std.dev	% change	% change base -> paa union	baseline part std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
62 presto/tpcds: q63	2133961.98	1192185.87	1517994.92	355466.31	1687994.91	337275.71	-28.86	-20.90	55.87	23.42	19.98	0.25307
32 presto/tpcds: q33	1481447.81	246341.32	1229872.77	452087.70	1466634.11	441980.82	-16.98	-1.00	16.63	36.76	30.14	0.25894
70 presto/tpcds: q71	610265.89	121261.88	516048.18	112255.54	451162.40	124399.69	-15.44	-26.07	19.87	21.75	27.57	0.19275
44 presto/tpcds: q45	757593.51	399688.67	643605.42	18520.02	582649.12	23812.09	-15.05	-23.09	52.76	2.88	4.09	0.50119
55 presto/tpcds: q56	475498.83	56496.89	416162.81	23434.84	499482.73	82272.70	-12.48	5.04	11.88	5.63	16.47	0.03886

	query	baseline part mean	baseline part 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 part std.dev %	paa union over pooler std.dev %	paa union std.dev %	p-value
52	presto/tpcds:q53	1801183.30	969343.36	1595958.37	557012.86	1808456.57	474531.28	-11.39	0.40	53.82	34.90	26.24	0.66256
25	presto/tpcds:q26	2643926.48	421681.74	2361288.80	460946.72	2323753.78	281529.16	-10.69	-12.11	15.95	19.52	12.12	0.29372
0	presto/tpcds:q01	8177134.36	848065.45	7338036.64	1331254.61	7557229.69	917685.89	-10.26	-7.58	10.37	18.14	12.14	0.22206
17	presto/tpcds:q18	3875996.22	277031.90	3483388.58	488869.80	4048782.06	350454.04	-10.13	4.46	7.15	14.03	8.66	0.11778
30	presto/tpcds:q31	6373869.83	632439.66	5754550.41	294779.28	5847150.61	1011102.28	-9.72	-8.26	9.92	5.12	17.29	0.05479
45	presto/tpcds:q46	2304058.38	860581.51	2111295.76	285658.87	2215170.68	820387.75	-8.37	-3.86	37.35	13.53	37.03	0.61389
41	presto/tpcds:q42	316175.66	47198.41	291966.74	45971.75	252257.67	64194.88	-7.66	-20.22	14.93	15.75	25.45	0.38927
18	presto/tpcds:q19	1172387.36	77537.30	1088187.53	74366.39	1162486.66	138407.44	-7.18	-0.84	6.61	6.83	11.91	0.08385
89	presto/tpcds:q90	514559.78	112292.85	480238.14	18253.73	464561.87	44966.10	-6.67	-9.72	21.82	3.80	9.68	0.47691
95	presto/tpcds:q96	875437.49	85214.06	818071.05	48322.41	886654.30	106872.27	-6.55	1.28	9.73	5.91	12.05	0.18198
80	presto/tpcds:q81	6166526.12	566305.65	5776744.38	809031.92	6542962.75	693231.96	-6.32	6.10	9.18	14.00	10.60	0.35644
36	presto/tpcds:q37	452678.29	28461.00	426824.42	100248.08	464683.07	56907.34	-5.71	2.65	6.29	23.49	12.25	0.55693
69	presto/tpcds:q70	3950625.82	247312.64	3743563.19	212141.01	3738664.70	312393.20	-5.24	-5.37	6.26	5.67	8.36	0.15062
73	presto/tpcds:q74	30577887.98	681293.44	29040456.42	1349678.62	30478359.87	938755.74	-5.03	-0.33	2.23	4.65	3.08	0.03194
15	presto/tpcds:q16	19986517.34	286067.92	19061739.81	1402484.32	19669239.38	982409.79	-4.63	-1.59	1.43	7.36	4.99	0.14460
4	presto/tpcds:q05	4528251.93	891938.52	4344474.59	999405.24	5004555.15	1587973.81	-4.06	10.52	19.70	23.00	31.73	0.74377
47	presto/tpcds:q48	5046561.23	288593.79	4844861.14	200231.91	4924679.19	227968.59	-4.00	-2.42	5.72	4.13	4.63	0.18986
7	presto/tpcds:q08	745821.51	31619.84	716279.29	51655.69	707744.96	56647.62	-3.96	-5.11	4.24	7.21	8.00	0.25973
35	presto/tpcds:q36	4418331.45	154164.94	4251345.67	322425.47	4213479.97	218580.44	-3.78	-4.64	3.49	7.58	5.19	0.27907

	query	baseline part mean	baseline part 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 part std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
76	presto/tpcds:q77	550757.43	29588.88	530729.91	76247.59	565806.90	15233.81	-3.64	2.73	5.37	14.37	2.69	0.56198
21	presto/tpcds:q22	1007942.14	50918.27	977074.48	3647.56	979764.79	16622.71	-3.06	-2.80	5.05	0.37	1.70	0.16938
68	presto/tpcds:q69	817807.37	78735.85	793524.64	97590.14	682993.92	239903.44	-2.97	-16.48	9.63	12.30	35.13	0.64544
3	presto/tpcds:q04	83125394.68	3554337.94	80753538.67	3342059.31	83003163.33	3042020.55	-2.85	-0.15	4.28	4.14	3.66	0.26122
6	presto/tpcds:q07	4410928.77	576500.48	4305905.37	599145.53	3727073.61	550346.97	-2.38	-15.50	13.07	13.91	14.77	0.76337
27	presto/tpcds:q28	423279.01	7503.45	413467.20	3518.93	416456.71	5639.30	-2.32	-1.61	1.77	0.85	1.35	0.01583
79	presto/tpcds:q80	28031127.98	2717826.31	27395508.65	2717416.64	26702205.85	1753647.94	-2.27	-4.74	9.70	9.92	6.57	0.69393
37	presto/tpcds:q38	22029265.53	1891702.71	21562849.47	1356675.02	21418710.34	360950.70	-2.12	-2.77	8.59	6.29	1.69	0.63417
81	presto/tpcds:q82	1088724.12	91339.60	1066302.76	68837.74	1031723.55	66921.16	-2.06	-5.24	8.39	6.46	6.49	0.64143
46	presto/tpcds:q47	9033415.15	155133.63	8867587.96	88459.88	8974819.89	116026.95	-1.84	-0.65	1.72	1.00	1.29	0.04621
78	presto/tpcds:q79	3203054.07	216804.56	3146344.92	243842.41	3110322.80	213534.45	-1.77	-2.90	6.77	7.75	6.87	0.67933
14	presto/tpcds:q15	1874753.27	156976.96	1846479.77	198627.68	2116502.14	535934.02	-1.51	12.89	8.37	10.76	25.32	0.78999
86	presto/tpcds:q87	21504284.27	844058.40	21223668.66	423517.16	21860446.73	2286275.61	-1.30	1.66	3.93	2.00	10.46	0.48339
54	presto/tpcds:q55	414812.90	28767.86	410214.05	86424.72	384470.63	80430.02	-1.11	-7.31	6.94	21.07	20.92	0.90403
34	presto/tpcds:q35	4120597.30	331063.23	4076865.90	469907.91	4249255.17	266390.61	-1.06	3.12	8.03	11.53	6.27	0.85589
84	presto/tpcds:q85	12930228.17	174672.27	12803790.95	140589.26	12807631.88	134404.98	-0.98	-0.95	1.35	1.10	1.05	0.19728
57	presto/tpcds:q58	799655.19	48095.12	793309.96	34863.57	822097.98	38189.71	-0.79	2.81	6.01	4.39	4.65	0.79890
61	presto/tpcds:q62	1566581.66	27286.74	1556945.98	50280.87	1561897.51	28216.17	-0.62	-0.30	1.74	3.23	1.81	0.68862
77	presto/tpcds:q78	116249603.50	176304.31	115563505.00	187691.23	115878539.60	296951.51	-0.59	-0.32	0.15	0.16	0.26	0.00007

	query	baseline part mean	baseline part 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 part std.dev %	paa union over poo rle std.dev %	paa union std.dev %	p-value
88	presto/tpcds:q89	2748990.29	224801.80	2733114.52	195972.66	2679812.50	99889.80	-0.58	-2.52	8.18	7.17	3.73	0.89884
12	presto/tpcds:q13	9441319.61	231451.25	9390739.96	278343.25	9425328.92	265363.82	-0.54	-0.17	2.45	2.96	2.82	0.73925
56	presto/tpcds:q57	7308713.33	91317.83	7269680.30	152530.04	7373285.86	136234.71	-0.53	0.88	1.25	2.10	1.85	0.60247
75	presto/tpcds:q76	898697.77	78970.37	894395.26	146420.39	958157.41	139564.33	-0.48	6.62	8.79	16.37	14.57	0.95074
39	presto/tpcds:q40	10941580.06	162425.04	10897598.83	100379.36	10909587.81	86414.82	-0.40	-0.29	1.48	0.92	0.79	0.58504
64	presto/tpcds:q65	19592147.41	385570.65	19534913.01	1045795.60	19943533.26	640905.15	-0.29	1.79	1.97	5.35	3.21	0.90240
92	presto/tpcds:q93	21111750.03	132314.91	21057966.64	119390.84	21112318.32	106433.08	-0.25	0.00	0.63	0.57	0.50	0.47677
72	presto/tpcds:q73	230529.65	41863.98	230206.26	45024.78	230959.23	30830.95	-0.14	0.19	18.16	19.56	13.35	0.98997
9	presto/tpcds:q10	553156.57	94422.21	552433.95	135418.19	516402.82	97324.88	-0.13	-6.64	17.07	24.51	18.85	0.99166
93	presto/tpcds:q94	9373612.52	219655.38	9362024.55	294641.63	9365464.84	246299.80	-0.12	-0.09	2.34	3.15	2.63	0.93996
16	presto/tpcds:q17	14270165.30	236678.17	14254616.56	313697.39	14421322.87	219320.86	-0.11	1.06	1.66	2.20	1.52	0.92470
50	presto/tpcds:q51	11683663.51	372712.25	11676284.44	605454.94	12008839.12	380764.88	-0.06	2.78	3.19	5.19	3.17	0.98022
94	presto/tpcds:q95	76577639.87	143144.56	76551244.37	188200.49	76497053.63	280612.40	-0.03	-0.11	0.19	0.25	0.37	0.79008
23	presto/tpcds:q24	22229730.40	261614.61	22235605.23	408680.67	22313742.40	479787.41	0.03	0.38	1.18	1.84	2.15	0.97693
66	presto/tpcds:q67	84971608.25	159389.85	85003115.69	217051.08	84907698.27	215213.55	0.04	-0.08	0.19	0.26	0.25	0.78027
10	presto/tpcds:q11	69764839.41	536515.89	69855503.32	310155.90	69866022.85	335257.80	0.13	0.15	0.77	0.44	0.48	0.72752
85	presto/tpcds:q86	1282580.44	82879.37	1284484.78	39179.17	1291722.21	56159.17	0.15	0.71	6.46	3.05	4.35	0.96042
13	presto/tpcds:q14	5804024.33	32557.53	5813396.65	36678.99	5757482.45	47275.86	0.16	-0.80	0.56	0.63	0.82	0.64975
43	presto/tpcds:q44	476372.58	1222.55	478211.09	880.54	475189.05	313.88	0.39	-0.25	0.26	0.18	0.07	0.01360

	query	baseline part mean	baseline part 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 part std.dev %	paa union over pooler std.dev %	paa union std.dev %	p-value
8	presto/tpcds:q09	927112.92	88045.08	934656.27	97551.40	899989.74	97407.62	0.81	-2.93	9.50	10.44	10.82	0.89097
74	presto/tpcds:q75	27349238.56	76310.72	27578097.19	205233.10	27515850.98	370493.86	0.84	0.61	0.28	0.74	1.35	0.02836
24	presto/tpcds:q25	10257189.53	328944.20	10349665.02	421229.28	10608021.54	87524.06	0.90	3.42	3.21	4.07	0.83	0.68066
1	presto/tpcds:q02	2761877.77	81204.16	2788017.81	70588.05	2787634.70	89736.49	0.95	0.93	2.94	2.53	3.22	0.56500
38	presto/tpcds:q39	1137510.79	15490.00	1150125.94	11248.77	1130859.44	20294.66	1.11	-0.58	1.36	0.98	1.79	0.13757
26	presto/tpcds:q27	4930149.58	184093.13	5008001.83	120342.36	4965832.40	393524.24	1.58	0.72	3.73	2.40	7.92	0.40624
97	presto/tpcds:q98	385078.03	105406.08	391204.70	110572.08	407486.34	88474.97	1.59	5.82	27.37	28.26	21.71	0.92368
22	presto/tpcds:q23	63916759.25	1774847.23	64951127.00	673098.88	64673924.30	1634779.43	1.62	1.18	2.78	1.04	2.53	0.21154
5	presto/tpcds:q06	1291155.56	127505.82	1312453.78	71810.23	1323379.47	95299.60	1.65	2.50	9.88	5.47	7.20	0.72887
63	presto/tpcds:q64	40651516.38	3351319.03	41361070.56	3194170.54	41106547.45	3207520.27	1.75	1.12	8.24	7.72	7.80	0.71519
58	presto/tpcds:q59	3691137.62	89455.15	3757376.54	135808.19	3767362.36	100056.83	1.79	2.07	2.42	3.61	2.66	0.34195
20	presto/tpcds:q21	263290.87	37440.80	270043.52	30558.79	256511.41	22510.16	2.56	-2.57	14.22	11.32	8.78	0.73925
28	presto/tpcds:q29	8029191.85	611396.24	8235568.18	118784.70	8333255.75	89919.70	2.57	3.79	7.61	1.44	1.08	0.43589
71	presto/tpcds:q72	50006277.89	3428477.09	51315211.76	294697.46	51305325.66	248427.97	2.62	2.60	6.86	0.57	0.48	0.37342
48	presto/tpcds:q49	21080537.02	874576.44	21680400.22	1720874.74	20670711.38	1286136.00	2.85	-1.94	4.15	7.94	6.22	0.46412
96	presto/tpcds:q97	47803904.83	486989.18	49199425.40	1437261.54	47609274.78	34032.79	2.92	-0.41	1.02	2.92	0.07	0.04797
60	presto/tpcds:q61	2017737.82	188083.33	2091922.82	141882.18	1959514.67	126896.43	3.68	-2.89	9.32	6.78	6.48	0.45837
98	presto/tpcds:q99	2120955.08	91773.20	2201071.49	130660.40	2162765.15	59419.83	3.78	1.97	4.33	5.94	2.75	0.24718
87	presto/tpcds:q88	1581862.43	51701.09	1656863.15	94306.44	1633822.49	41627.06	4.74	3.28	3.27	5.69	2.55	0.11840


```
std      19
min     -29
25%     -3
50%     -0
75%      3
max     115
Name: % change, dtype: float64
count    99
mean      1
std      13
min     -26
25%     -3
50%     -0
75%      3
max      78
Name: % change base -> paa union, dtype: float64
```