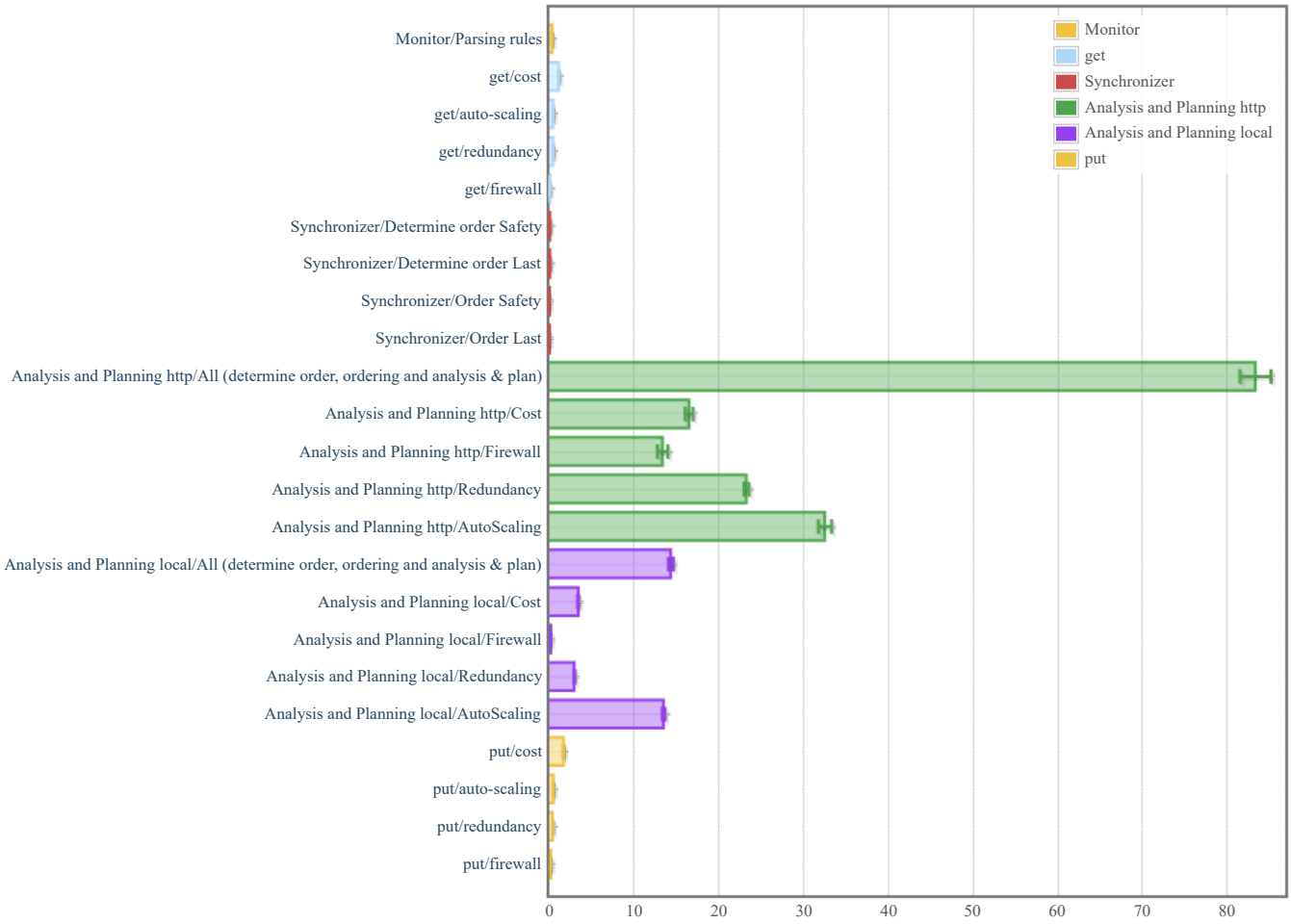
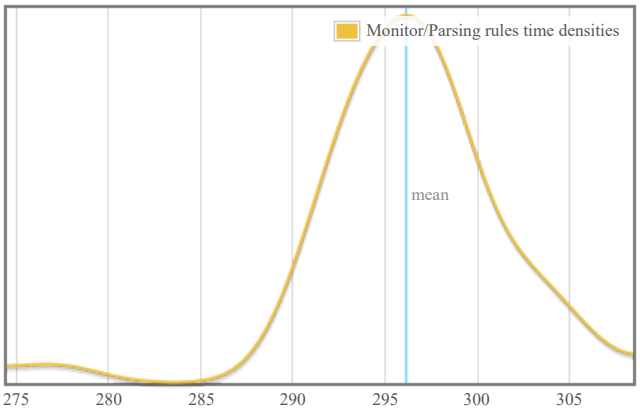
criterion performance measurements

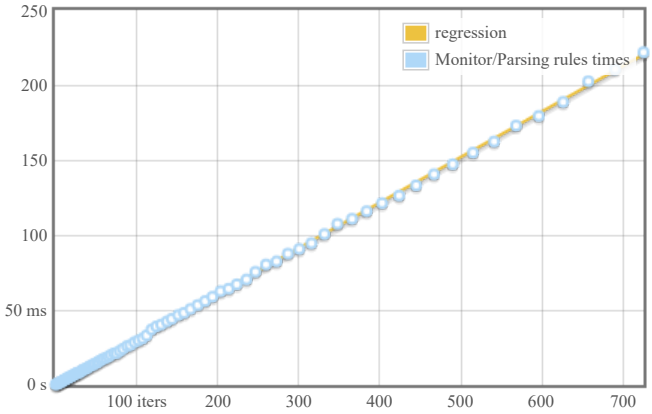
overview

want to understand this report?



Monitor/Parsing rules

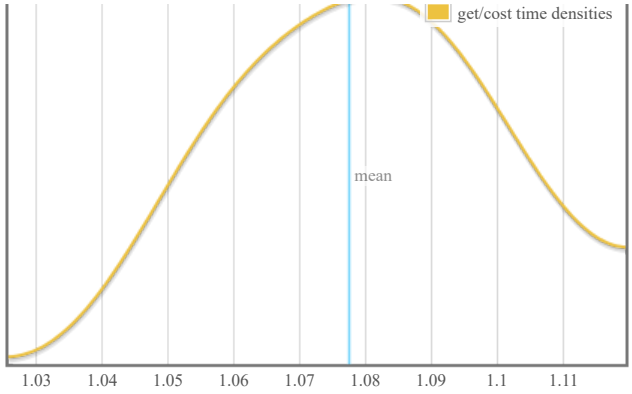


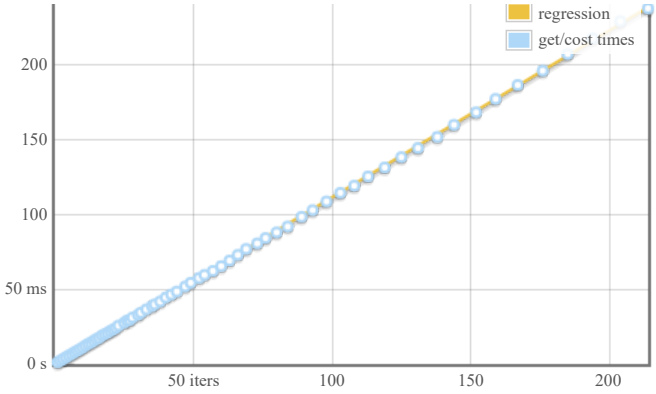


	lower bound	estimate	upper bound
OLS regression	302 µs	304 µs	306 µs
R² goodness-of-fit	1.000	1.000	1.000
Mean execution time	295 µs	296 µs	297 µs
Standard deviation	3.33 µs	4.75 µs	8.17 µs

Outlying measurements have slight (8.1%) effect on estimated standard deviation.

get/cost

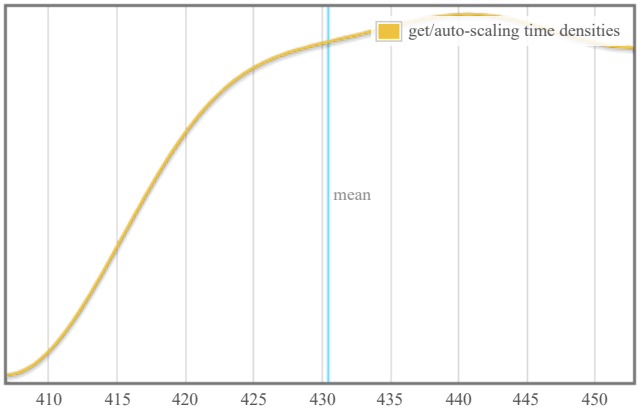


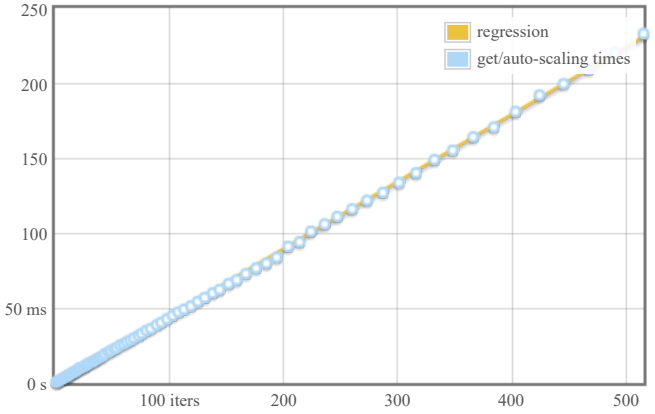


	lower bound	estimate	upper bound
OLS regression	1.11 ms	1.11 ms	1.12 ms
R² goodness-of-fit	1.000	1.000	1.000
Mean execution time	1.07 ms	1.08 ms	1.08 ms
Standard deviation	16.4 µs	19.1 µs	22.8 µs

Outlying measurements have slight (8.3%) effect on estimated standard deviation.

get/auto-scaling

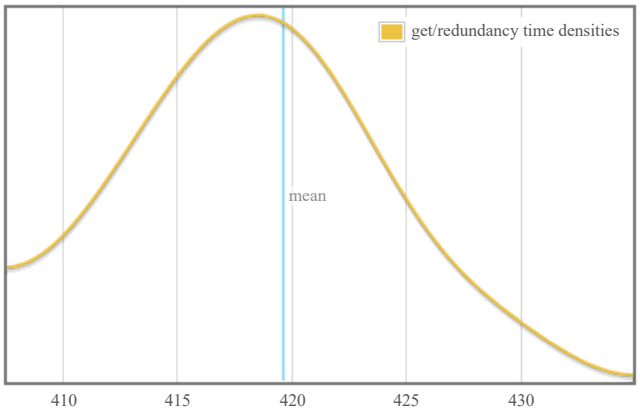


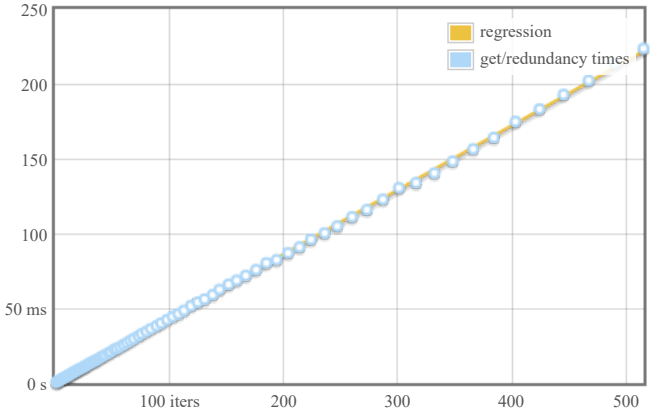


	lower bound	estimate	upper bound
OLS regression	446 µs	449 µs	450 µs
R² goodness-of-fit	1.000	1.000	1.000
Mean execution time	427 µs	431 µs	434 µs
Standard deviation	10.8 µs	11.9 µs	13.6 µs

Outlying measurements have moderate (19.9%) effect on estimated standard deviation.

get/redundancy

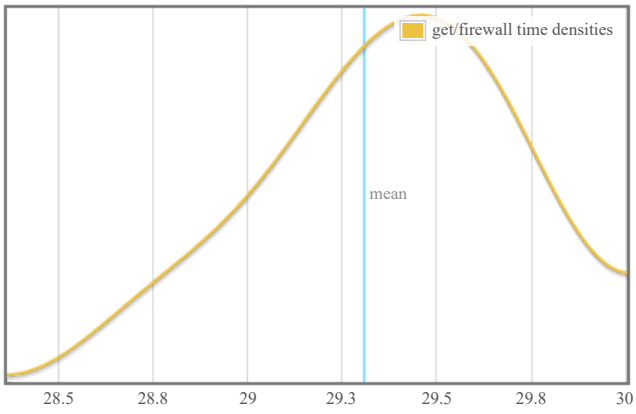


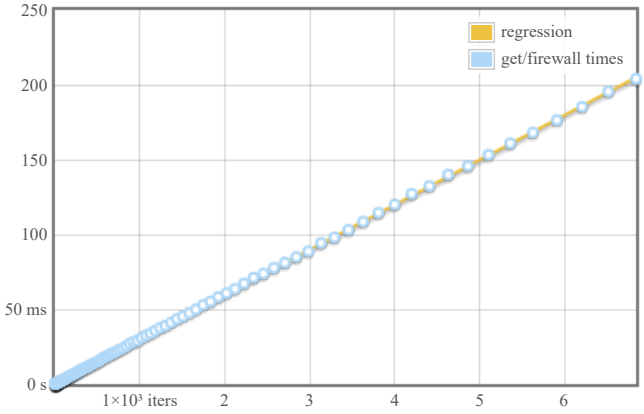


	lower bound	estimate	upper bound
OLS regression	428 µs	431 µs	433 µs
R² goodness-of-fit	1.000	1.000	1.000
Mean execution time	418 µs	420 µs	422 µs
Standard deviation	4.93 µs	6.01 µs	7.14 µs

Outlying measurements have slight (6.5%) effect on estimated standard deviation.

get/firewall

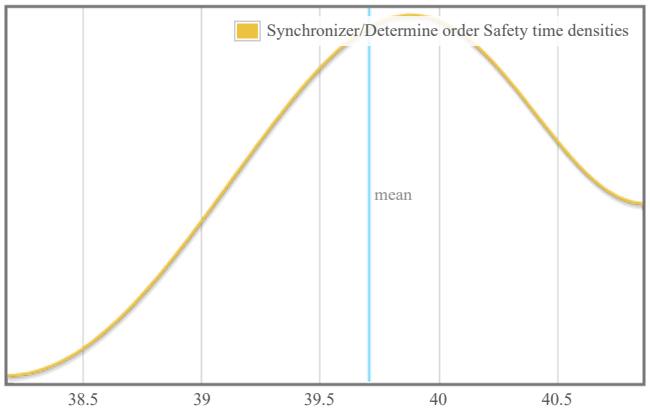


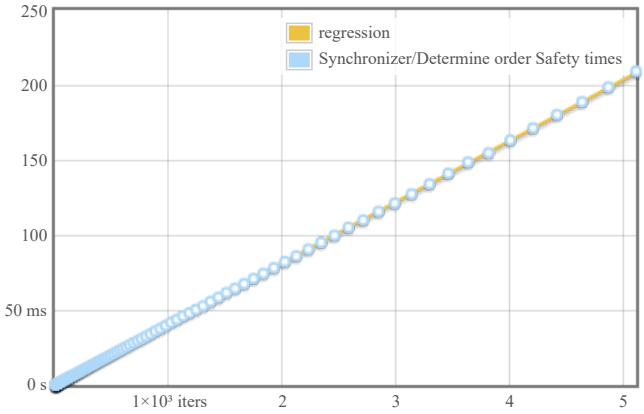


	lower bound	estimate	upper bound
OLS regression	29.9 µs	30.0 µs	30.0 µs
R² goodness-of-fit	1.000	1.000	1.000
Mean execution time	29.2 µs	29.3 µs	29.4 µs
Standard deviation	295 ns	351 ns	431 ns

Outlying measurements have slight (6.8%) effect on estimated standard deviation.

Synchronizer/Determine order Safety

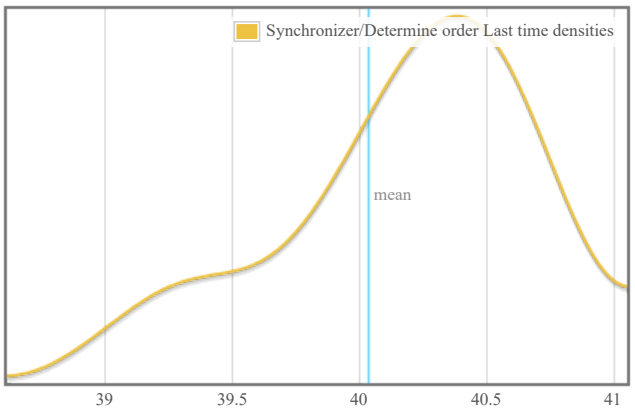


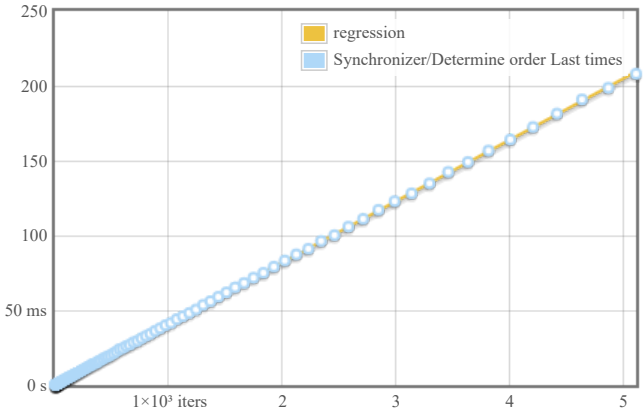


	lower bound	estimate	upper bound
OLS regression	40.7 µs	40.8 µs	40.8 µs
R² goodness-of-fit	1.000	1.000	1.000
Mean execution time	39.5 µs	39.7 µs	39.9 µs
Standard deviation	488 ns	582 ns	718 ns

Outlying measurements have slight (9.3%) effect on estimated standard deviation.

Synchronizer/Determine order Last

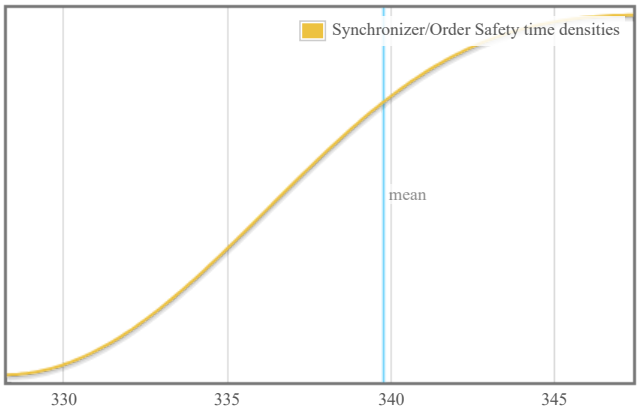


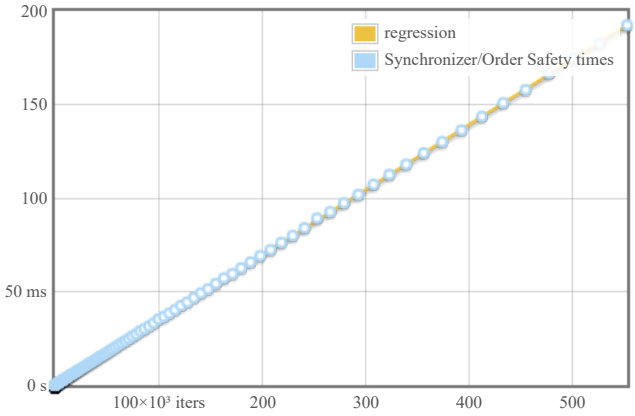


	lower bound	estimate	upper bound
OLS regression	40.9 µs	41.0 µs	41.1 µs
R² goodness-of-fit	1.000	1.000	1.000
Mean execution time	39.8 µs	40.0 µs	40.2 µs
Standard deviation	480 ns	574 ns	690 ns

Outlying measurements have slight (9.2%) effect on estimated standard deviation.

Synchronizer/Order Safety

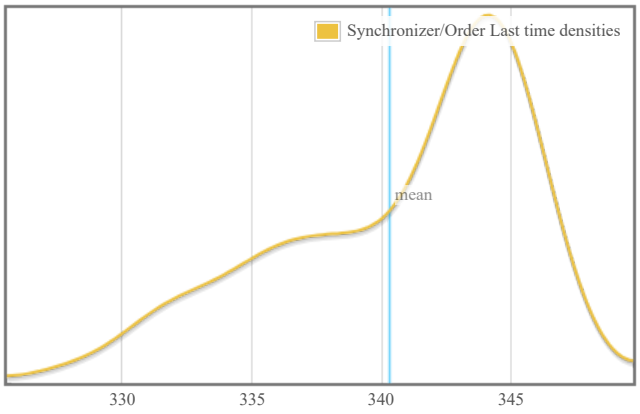


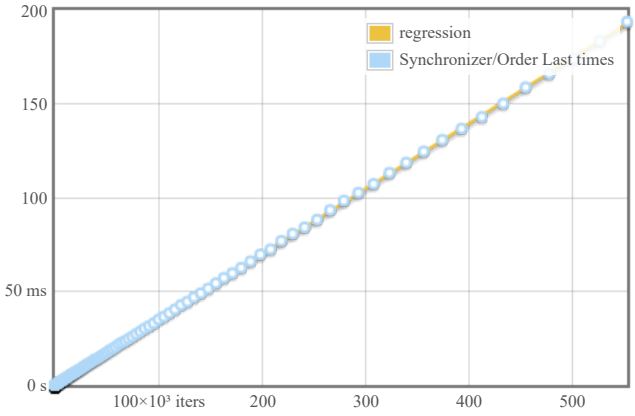


	lower bound	estimate	upper bound
OLS regression	348 ns	348 ns	349 ns
R² goodness-of-fit	1.000	1.000	1.000
Mean execution time	338 ns	340 ns	341 ns
Standard deviation	3.76 ns	4.54 ns	5.43 ns

Outlying measurements have moderate (12.8%) effect on estimated standard deviation.

Synchronizer/Order Last

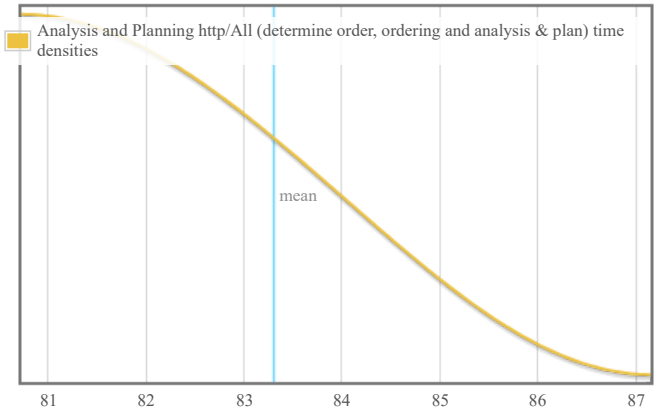


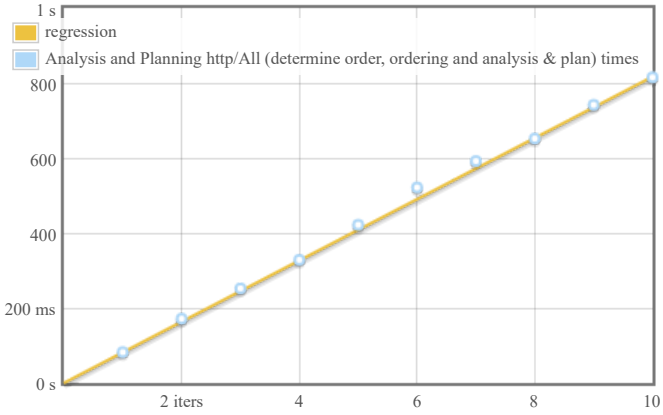


	lower bound	estimate	upper bound
OLS regression	348 ns	349 ns	350 ns
R² goodness-of-fit	1.000	1.000	1.000
Mean execution time	338 ns	340 ns	342 ns
Standard deviation	4.28 ns	5.15 ns	6.35 ns

Outlying measurements have moderate (16.2%) effect on estimated standard deviation.

Analysis and Planning http/All (determine order, ordering and analysis & plan)



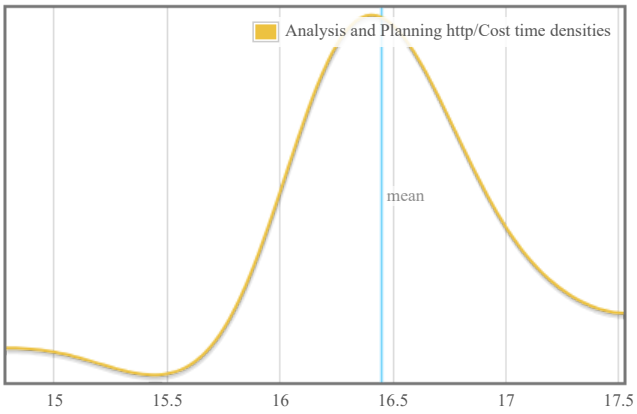


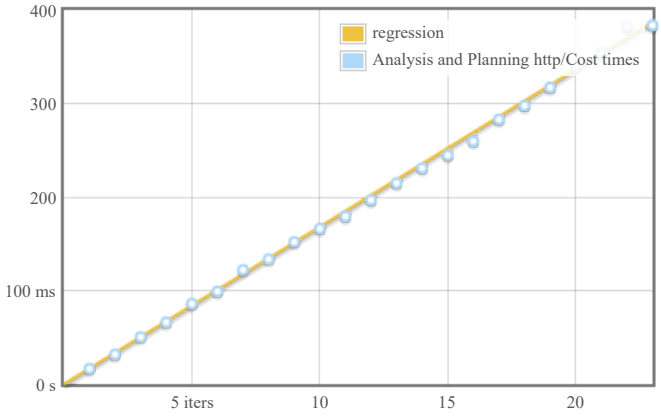
	lower bound	estimate	upper bound
OLS regression	79.4 ms	81.7 ms	85.4 ms
R² goodness-of-fit	0.995	0.998	1.000

Mean execution time	82.4 ms	83.3 ms	84.7 ms
Standard deviation	1.31 ms	1.83 ms	2.58 ms

Outlying measurements have slight (9.0%) effect on estimated standard deviation.

Analysis and Planning http/Cost

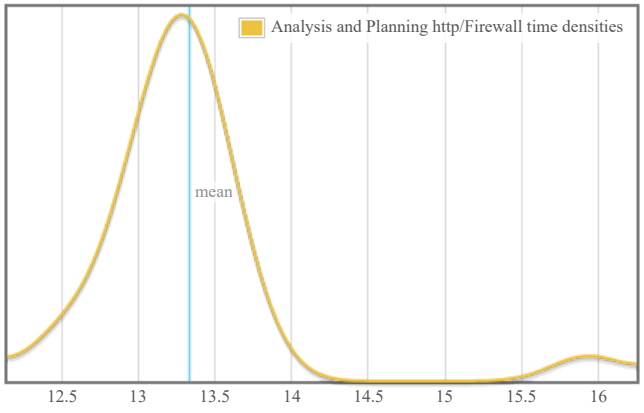


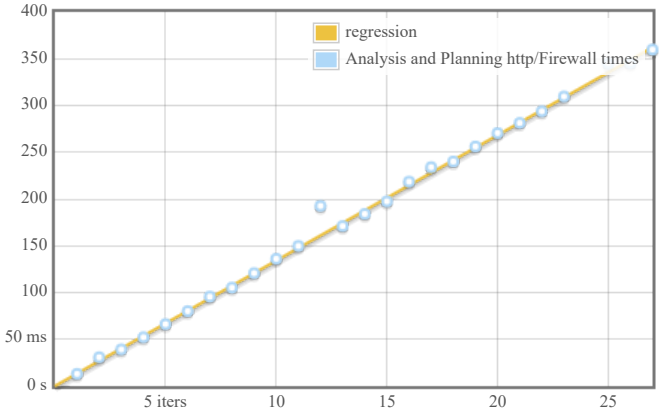


	lower bound	estimate	upper bound
OLS regression	16.5 ms	16.8 ms	17.2 ms
R² goodness-of-fit	0.997	0.998	1.000
Mean execution time	16.2 ms	16.5 ms	16.6 ms
Standard deviation	300 µs	462 µs	757 µs

Outlying measurements have slight (8.0%) effect on estimated standard deviation.

Analysis and Planning http/Firewall

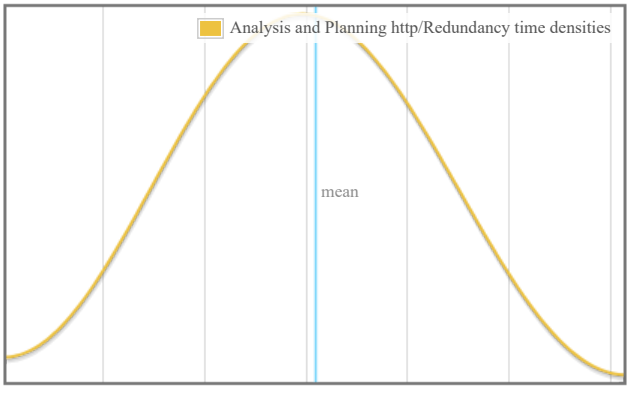


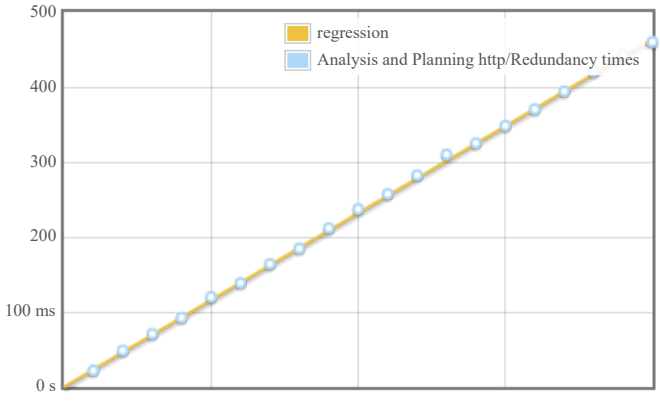


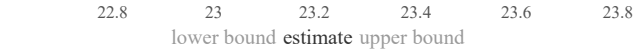
	lower bound	estimate	upper bound
OLS regression	13.2 ms	13.4 ms	13.6 ms
R² goodness-of-fit	0.986	0.996	1.000
Mean execution time	13.2 ms	13.3 ms	13.8 ms
Standard deviation	273 µs	623 µs	1.18 ms

Outlying measurements have moderate (18.2%) effect on estimated standard deviation.

Analysis and Planning http/Redundancy



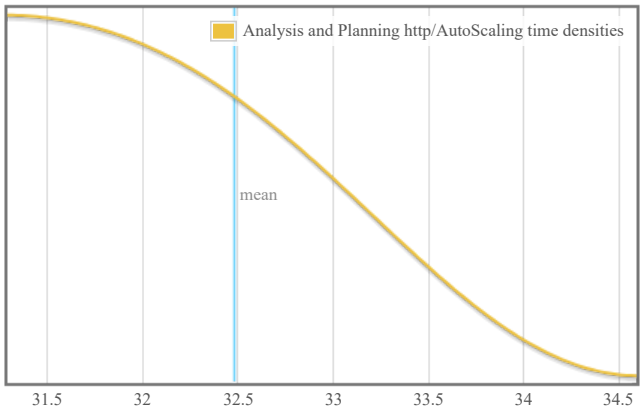


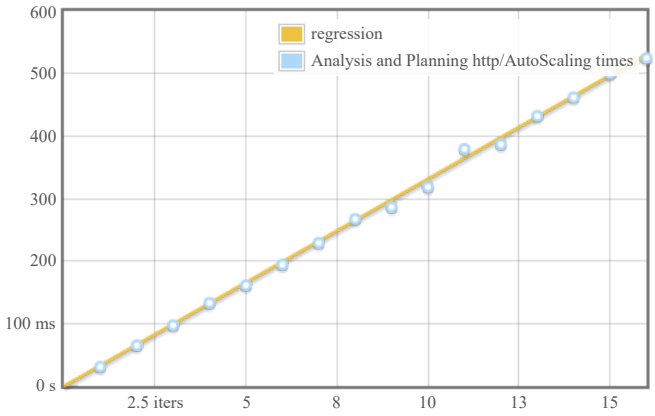


	lower bound	estimate	upper bound
OLS regression	23.0 ms	23.2 ms	23.4 ms
R² goodness-of-fit	0.999	1.000	1.000
Mean execution time	23.1 ms	23.2 ms	23.3 ms
Standard deviation	220 µs	286 µs	371 µs

Outlying measurements have slight (4.8%) effect on estimated standard deviation.

Analysis and Planning http/AutoScaling

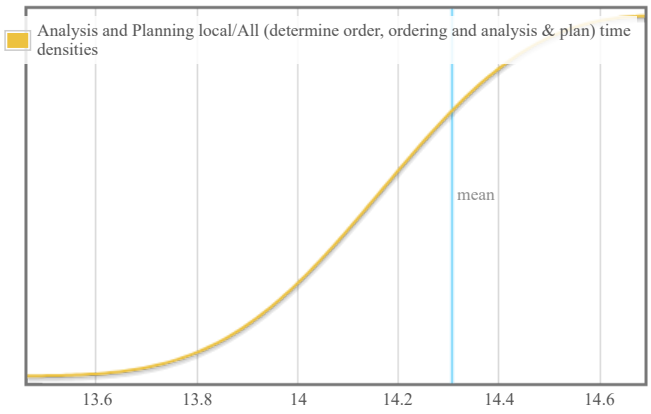


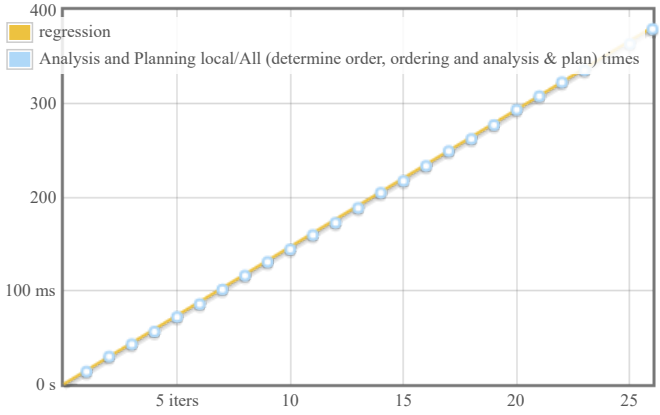


	lower bound	estimate	upper bound
OLS regression	32.6 ms	33.2 ms	33.7 ms
R² goodness-of-fit	0.995	0.998	1.000
Mean execution time	32.1 ms	32.5 ms	32.9 ms
Standard deviation	569 µs	776 µs	1.15 ms

Outlying measurements have slight (5.9%) effect on estimated standard deviation.

Analysis and Planning local/All (determine order, ordering and analysis & plan)

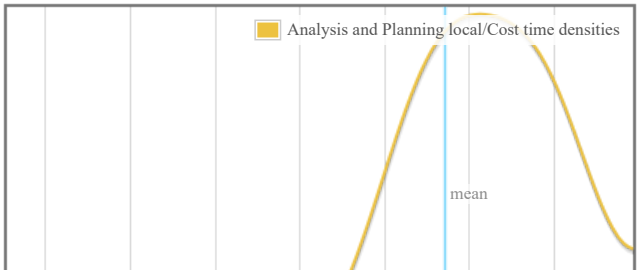


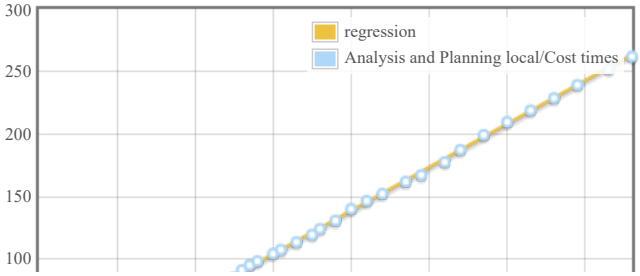


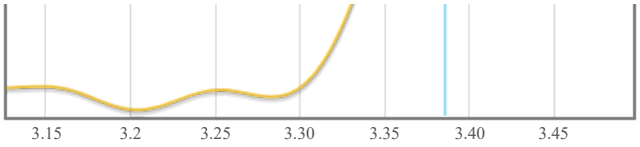
	lower bound	estimate	upper bound
OLS regression	14.6 ms	14.7 ms	14.7 ms
R² goodness-of-fit	1.000	1.000	1.000
Mean execution time	14.2 ms	14.3 ms	14.4 ms
Standard deviation	184 µs	288 µs	403 µs

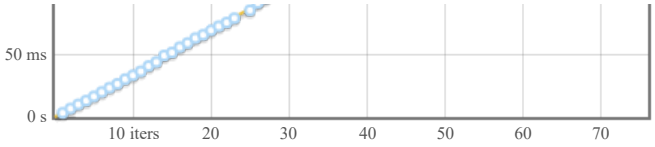
Outlying measurements have slight (3.8%) effect on estimated standard deviation.

Analysis and Planning local/Cost





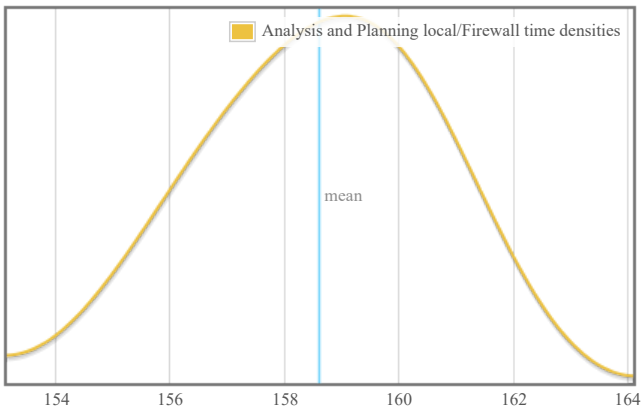


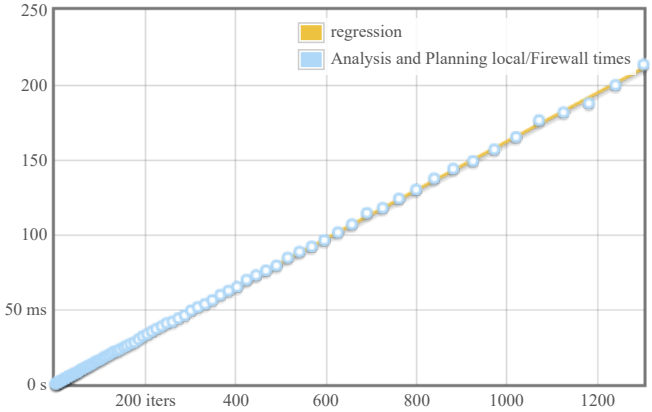


	lower bound	estimate	upper bound
OLS regression	3.46 ms	3.47 ms	3.49 ms
R² goodness-of-fit	1.000	1.000	1.000
Mean execution time	3.36 ms	3.39 ms	3.40 ms
Standard deviation	51.7 µs	74.0 µs	101 µs

Outlying measurements have slight (8.0%) effect on estimated standard deviation.

Analysis and Planning local/Firewall

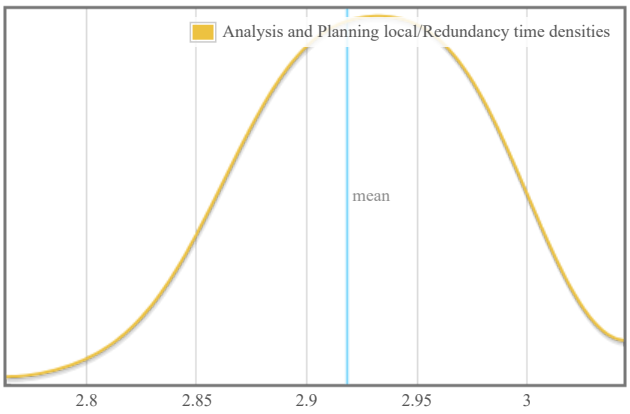


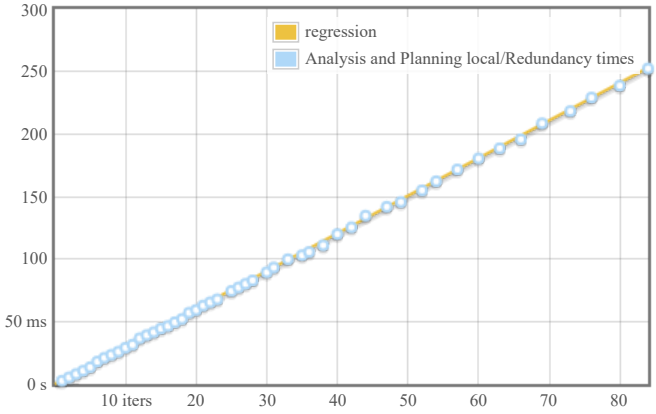


	lower bound	estimate	upper bound
OLS regression	161 µs	162 µs	163 µs
R² goodness-of-fit	1.000	1.000	1.000
Mean execution time	158 µs	159 µs	159 µs
Standard deviation	1.98 µs	2.36 µs	2.82 µs

Outlying measurements have slight (8.1%) effect on estimated standard deviation.

Analysis and Planning local/Redundancy

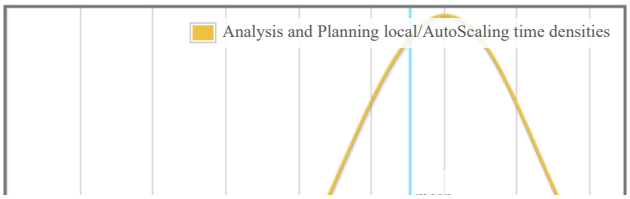


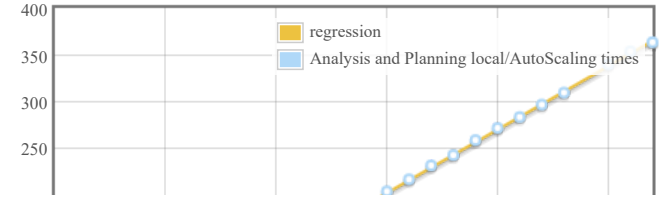


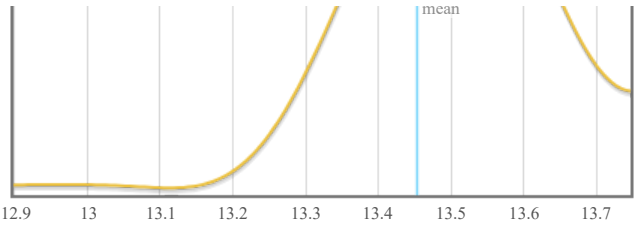
	lower bound	estimate	upper bound
OLS regression	3.00 ms	3.01 ms	3.02 ms
R² goodness-of-fit	1.000	1.000	1.000
Mean execution time	2.90 ms	2.92 ms	2.94 ms
Standard deviation	48.1 µs	58.5 µs	73.5 µs

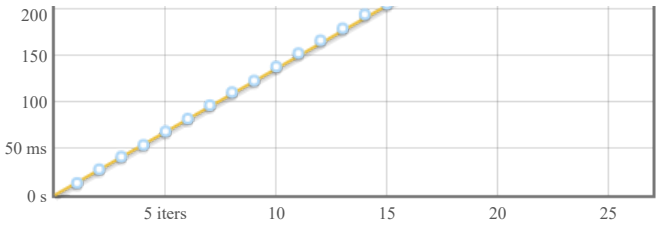
Outlying measurements have slight (7.6%) effect on estimated standard deviation.

Analysis and Planning local/AutoScaling





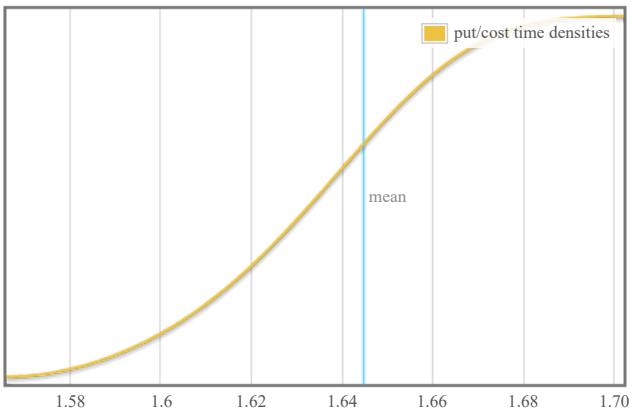


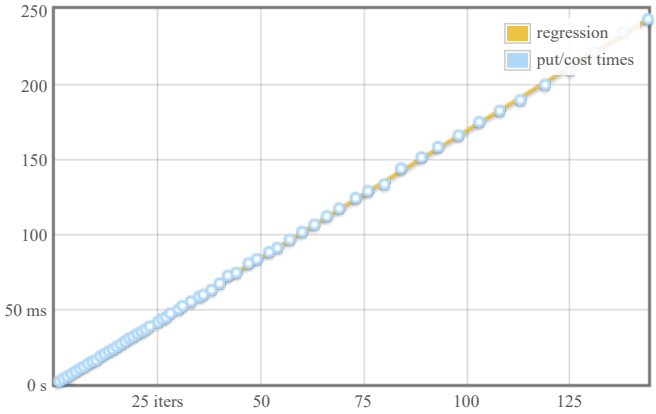


	lower bound	estimate	upper bound
OLS regression	13.4 ms	13.5 ms	13.6 ms
R² goodness-of-fit	1.000	1.000	1.000
Mean execution time	13.4 ms	13.5 ms	13.5 ms
Standard deviation	106 µs	163 µs	243 µs

Outlying measurements have slight (3.7%) effect on estimated standard deviation.

put/cost

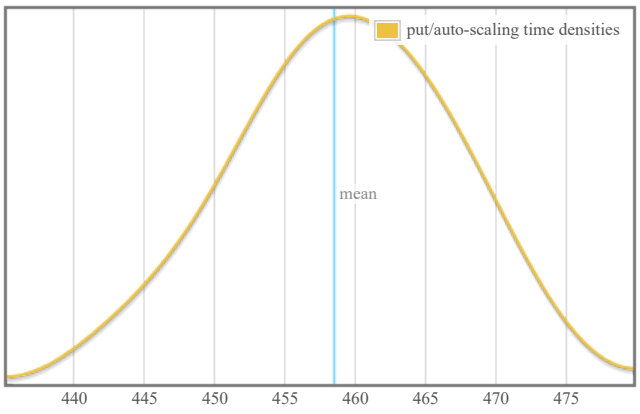


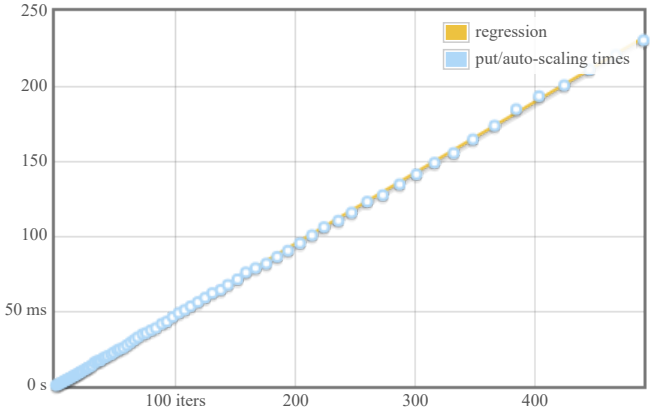


	lower bound	estimate	upper bound
OLS regression	1.69 ms	1.69 ms	1.70 ms
R² goodness-of-fit	1.000	1.000	1.000
Mean execution time	1.63 ms	1.64 ms	1.66 ms
Standard deviation	30.7 µs	35.3 µs	40.9 µs

Outlying measurements have slight (9.4%) effect on estimated standard deviation.

put/auto-scaling

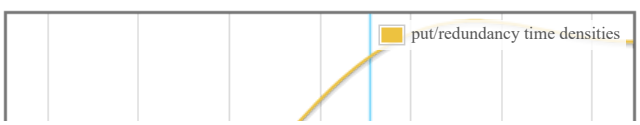


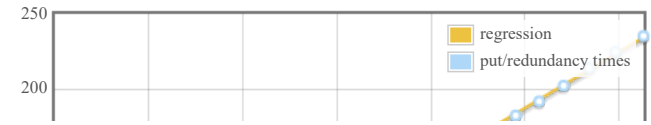


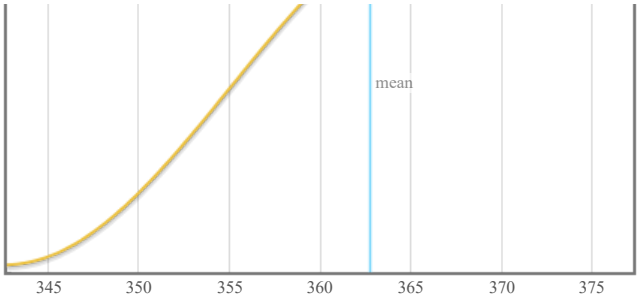
	lower bound	estimate	upper bound
OLS regression	472 µs	474 µs	476 µs
R² goodness-of-fit	1.000	1.000	1.000
Mean execution time	456 µs	459 µs	461 µs
Standard deviation	7.37 µs	8.93 µs	10.8 µs

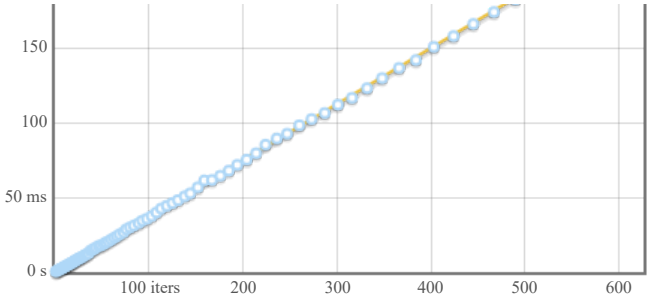
Outlying measurements have moderate (11.1%) effect on estimated standard deviation.

put/redundancy





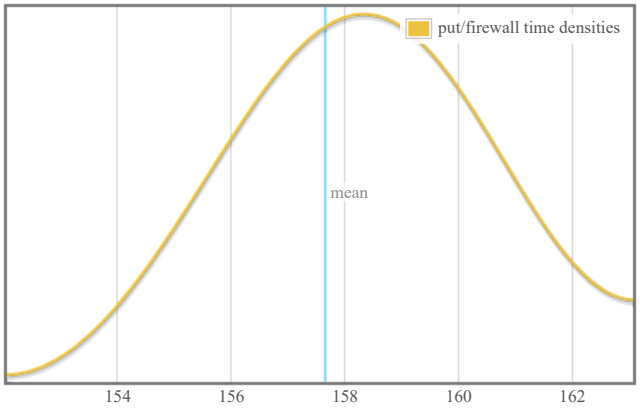


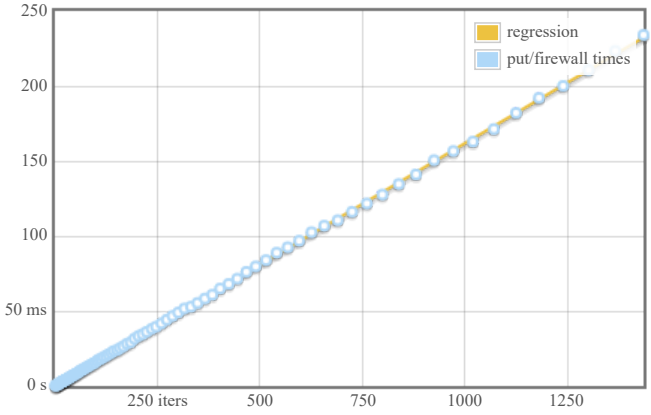


	lower bound	estimate	upper bound
OLS regression	373 µs	375 µs	376 µs
R² goodness-of-fit	1.000	1.000	1.000
Mean execution time	360 µs	363 µs	365 µs
Standard deviation	6.85 µs	8.05 µs	9.70 µs

Outlying measurements have moderate (13.7%) effect on estimated standard deviation.

put/firewall





	lower bound	estimate	upper bound
OLS regression	161 µs	162 µs	162 µs
R² goodness-of-fit	1.000	1.000	1.000
Mean execution time	157 µs	158 µs	158 µs
Standard deviation	2.29 µs	2.66 µs	3.10 µs

Outlying measurements have moderate (10.6%) effect on estimated standard deviation.

understanding this report

In this report, each function benchmarked by criterion is assigned a section of its own. The charts in each section are active; if you hover your mouse over data points and annotations, you will see more details.

- The chart on the left is a kernel density estimate (also known as a KDE) of time measurements. This graphs the probability of any given time measurement occurring. A spike indicates that a measurement of a particular time occurred; its height indicates how often that measurement was repeated.
- The chart on the right is the raw data from which the kernel density estimate is built. The *x* axis indicates the number of loop iterations, while the *y* axis shows measured execution time for the given number of loop iterations. The line behind the values is the linear regression prediction of execution time for a given number of iterations. Ideally, all measurements will be on (or very near) this line.

Under the charts is a small table. The first two rows are the results of a linear regression run on the measurements displayed in the right-hand chart.

- *OLS regression* indicates the time estimated for a single loop iteration using an ordinary least-squares regression model. This number is more accurate than the *mean* estimate below it, as it more effectively eliminates measurement overhead and other constant factors.
- *R² goodness-of-fit* is a measure of how accurately the linear regression model fits the observed measurements. If the measurements are not too noisy, R² should lie between 0.99 and 1, indicating an excellent fit. If the number is below 0.99, something is confounding the accuracy of the linear model.
- *Mean execution time* and *standard deviation* are statistics calculated from execution time divided by number of iterations.

We use a statistical technique called the bootstrap to provide confidence intervals on our estimates. The bootstrap-derived upper and lower bounds on estimates let you see how accurate we believe those estimates to be. (Hover the mouse over the table headers to see the confidence levels.)

A noisy benchmarking environment can cause some or many measurements to fall far from the mean. These outlying measurements can have a significant inflationary effect on the estimate of the standard deviation. We calculate and display an estimate of the extent to which the standard deviation has been inflated by outliers.

colophon

This report was created using the criterion benchmark execution and performance analysis tool.

Criterion is developed and maintained by Bryan O'Sullivan.