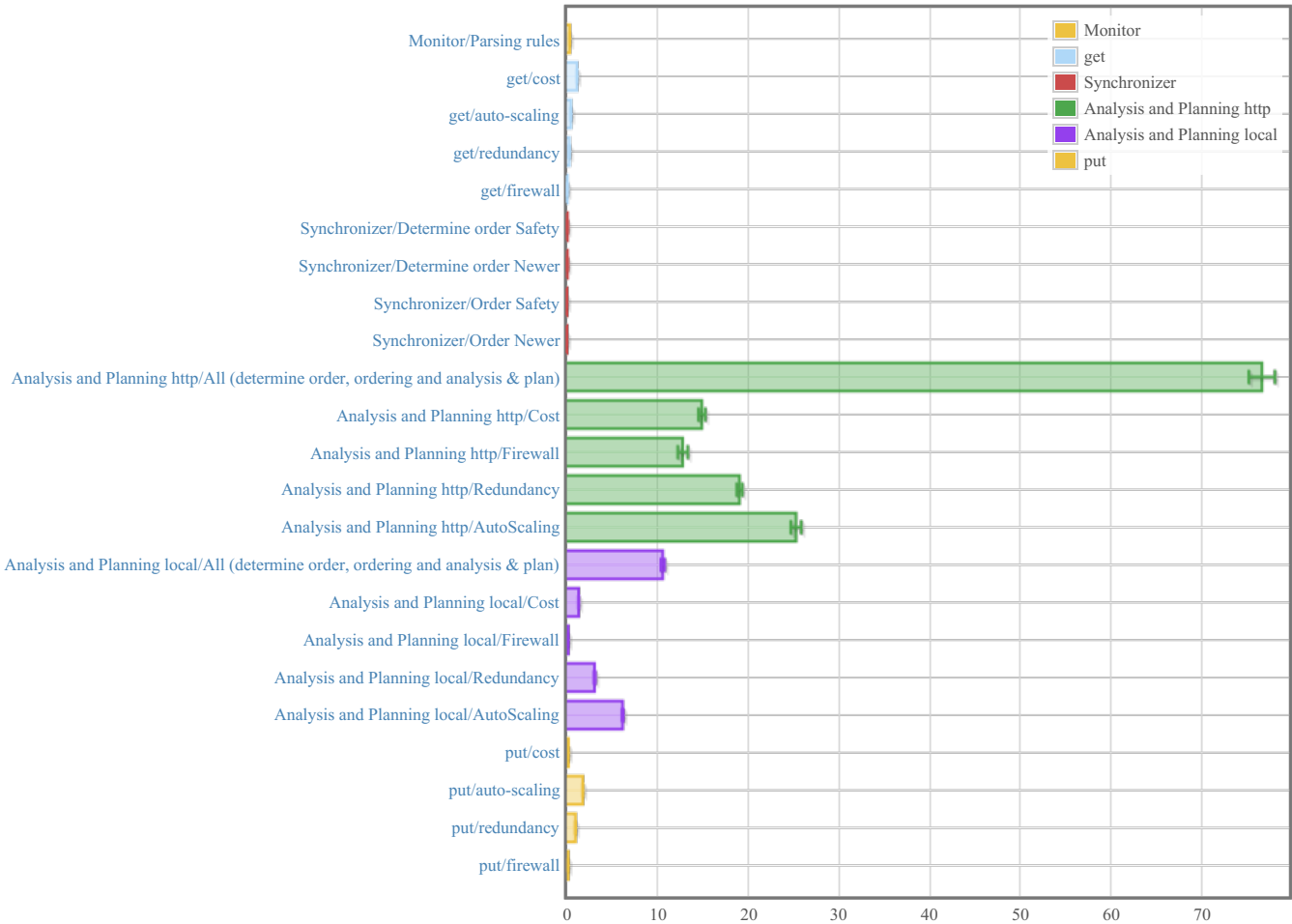


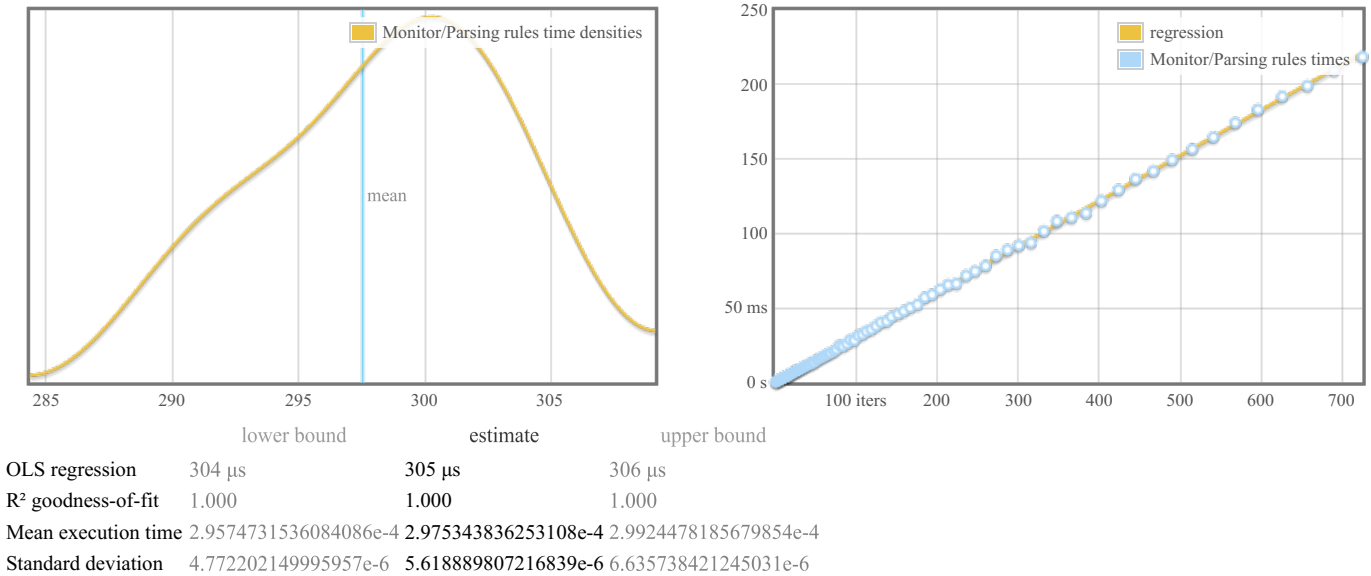
criterion performance measurements

overview

want to understand this report?



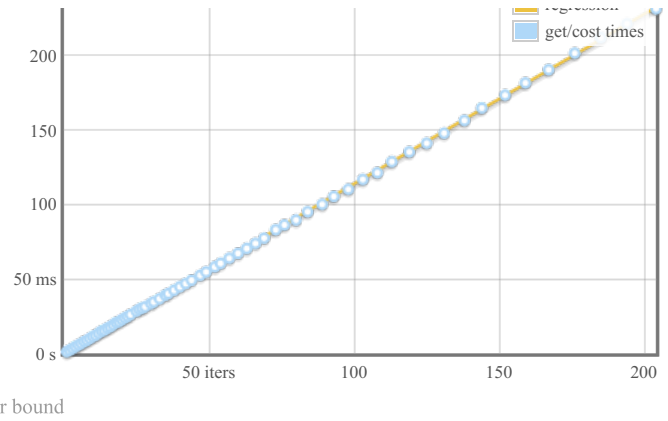
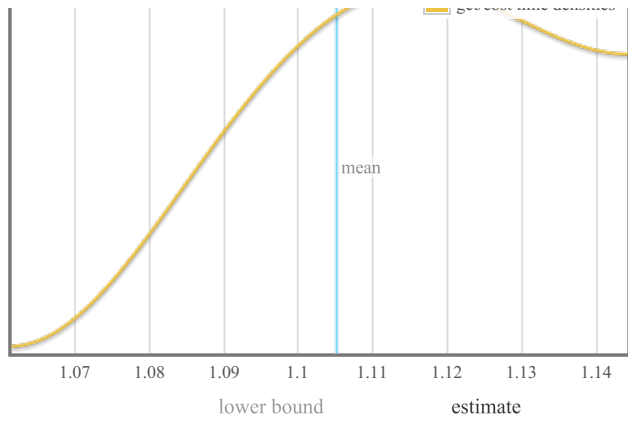
Monitor/Parsing rules



Outlying measurements have moderate (0.11168889571483578%) effect on estimated standard deviation.

get/cost

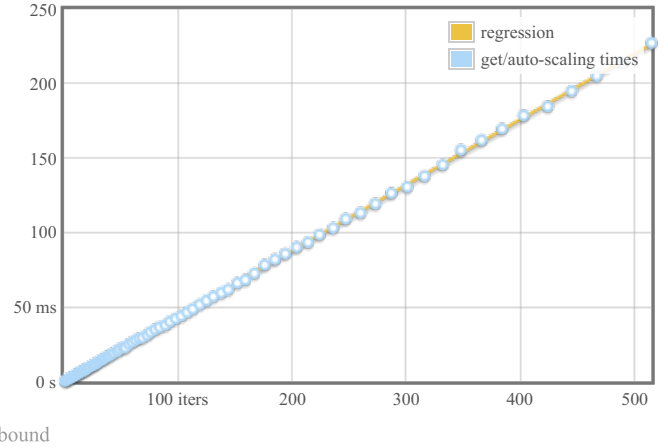
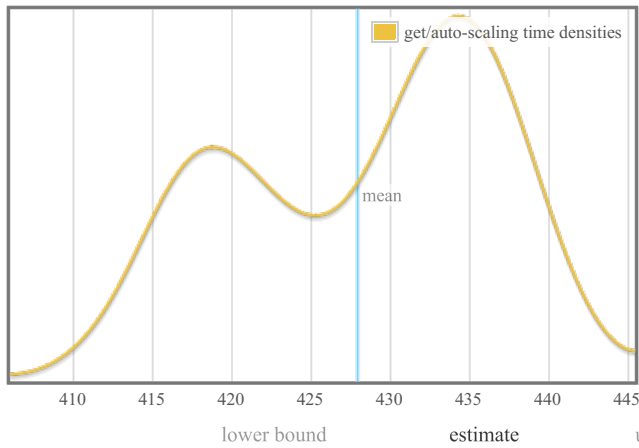




OLS regression	1.13 ms	1.14 ms	1.14 ms
R ² goodness-of-fit	1.000	1.000	1.000
Mean execution time	1.098615673957846e-3	1.1052055474445803e-3	1.1114144220313476e-3
Standard deviation	1.8735074328922767e-5	2.1253887480143876e-5	2.462662410819636e-5

Outlying measurements have slight (8.44950696923801e-2%) effect on estimated standard deviation.

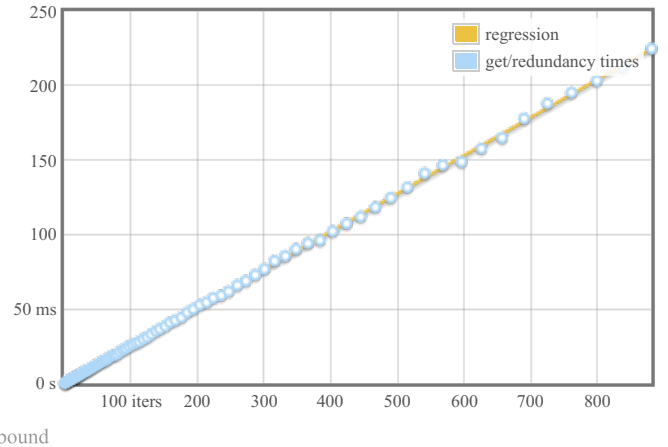
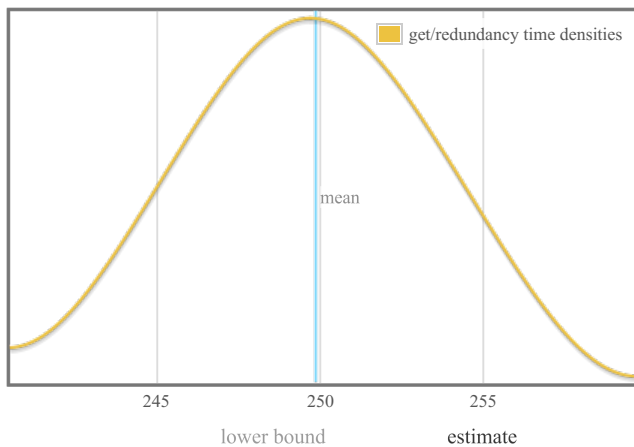
get/auto-scaling



OLS regression	438 μs	440 μs	441 μs
R ² goodness-of-fit	1.000	1.000	1.000
Mean execution time	4.2538151414524343e-4	4.27913969640436e-4	4.306051024860919e-4
Standard deviation	7.577535390889525e-6	8.634151504062157e-6	1.009564129464625e-5

Outlying measurements have moderate (0.12060595499886317%) effect on estimated standard deviation.

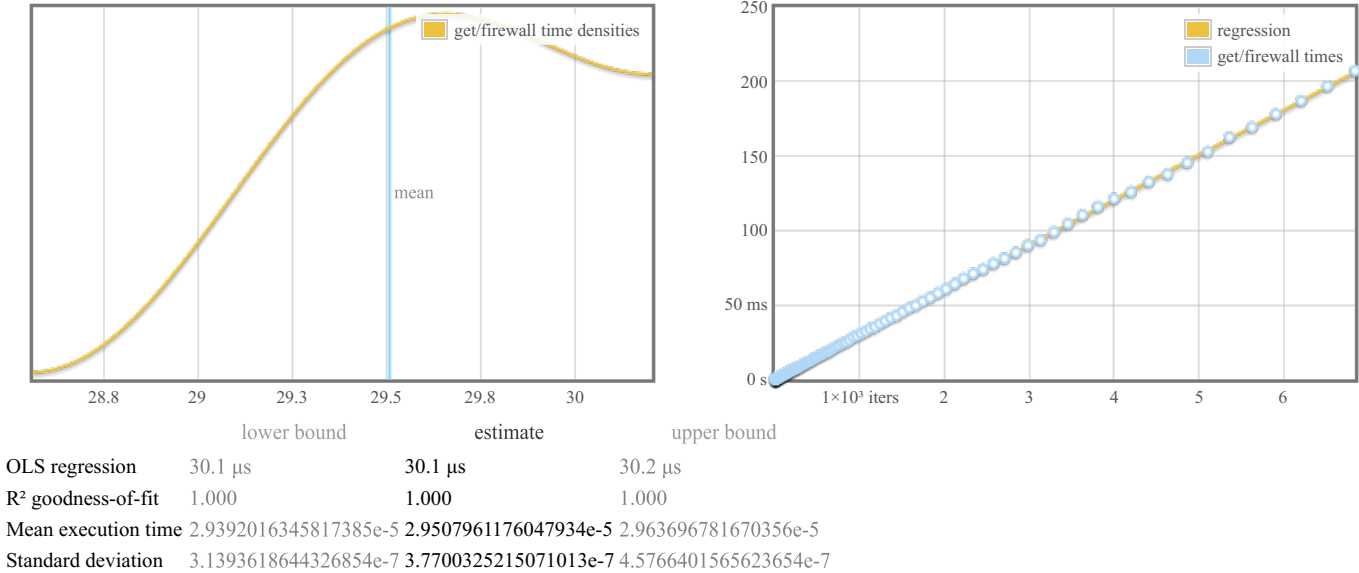
get/redundancy



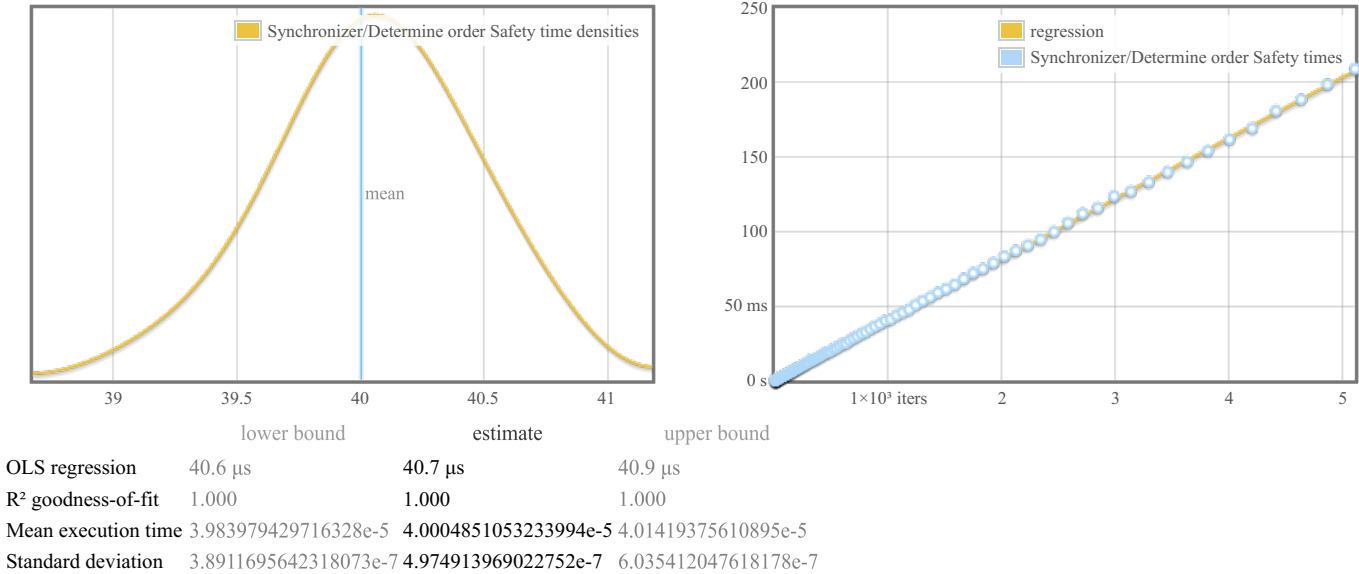
OLS regression	254 μs	255 μs	257 μs
R ² goodness-of-fit	1.000	1.000	1.000
Mean execution time	2.485899978794663e-4	2.498417116475663e-4	2.51253923632698e-4
Standard deviation	3.4515633052411713e-6	4.135570162024922e-6	4.879866094729067e-6

Outlying measurements have slight (8.772235818707116e-2%) effect on estimated standard deviation.

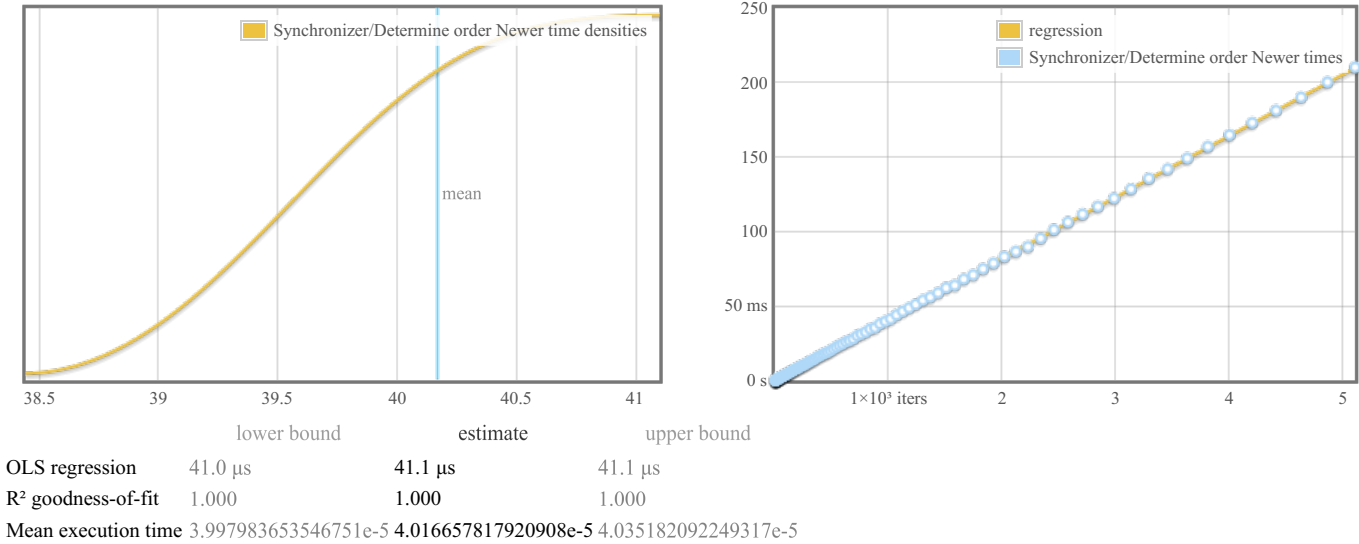
get/firewall



Synchronizer/Determine order Safety



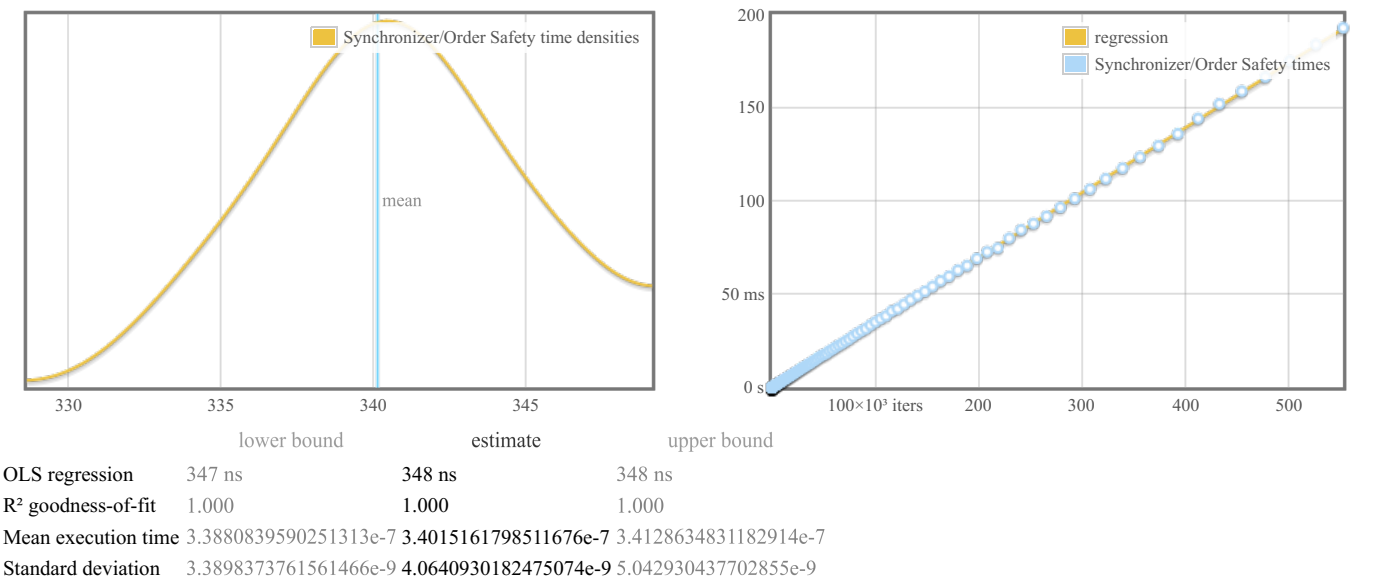
Synchronizer/Determine order Newer



Standard deviation 4.78206255648888e-7 5.797256699332812e-7 7.525993128731328e-7

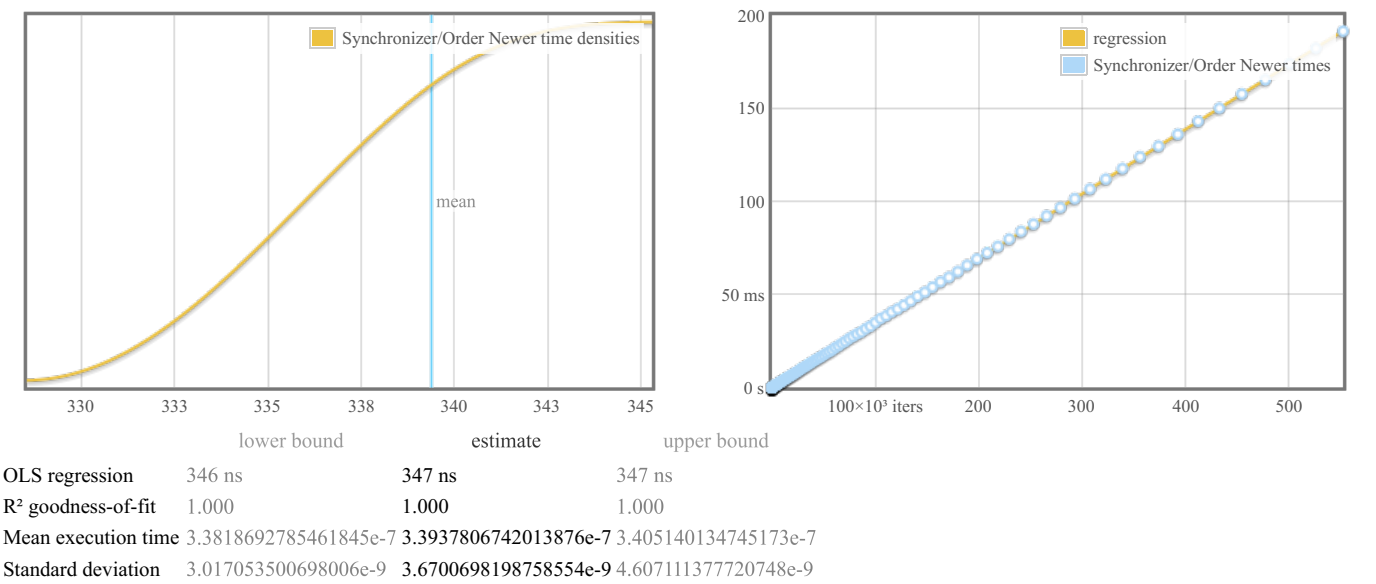
Outlying measurements have slight (9.235625136174416e-2%) effect on estimated standard deviation.

Synchronizer/Order Safety



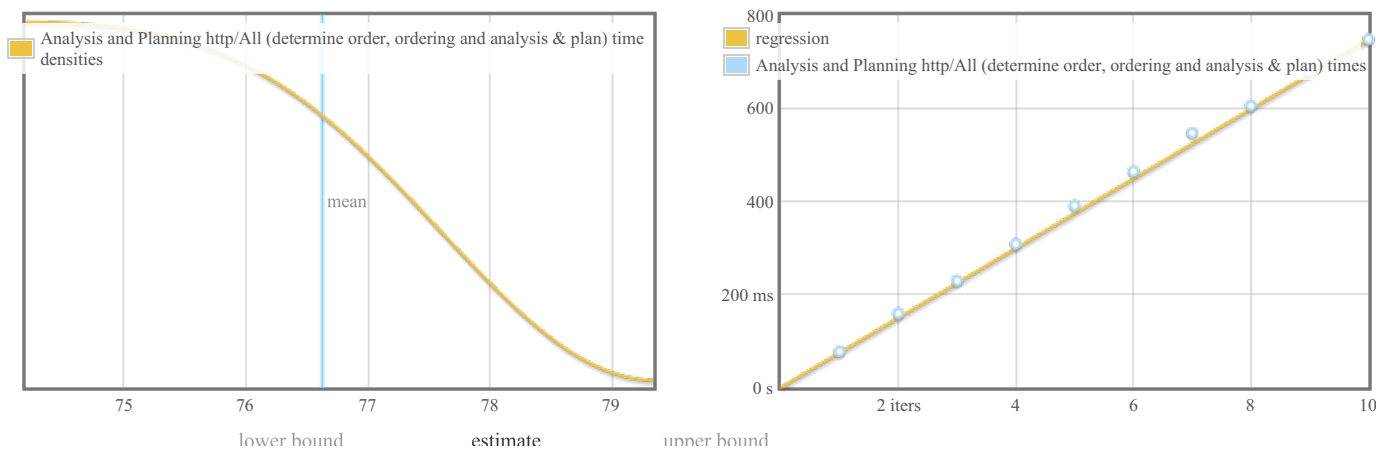
Outlying measurements have moderate (0.1073757367161997%) effect on estimated standard deviation.

Synchronizer/Order Newer



Outlying measurements have slight (9.068496664369669e-2%) effect on estimated standard deviation.

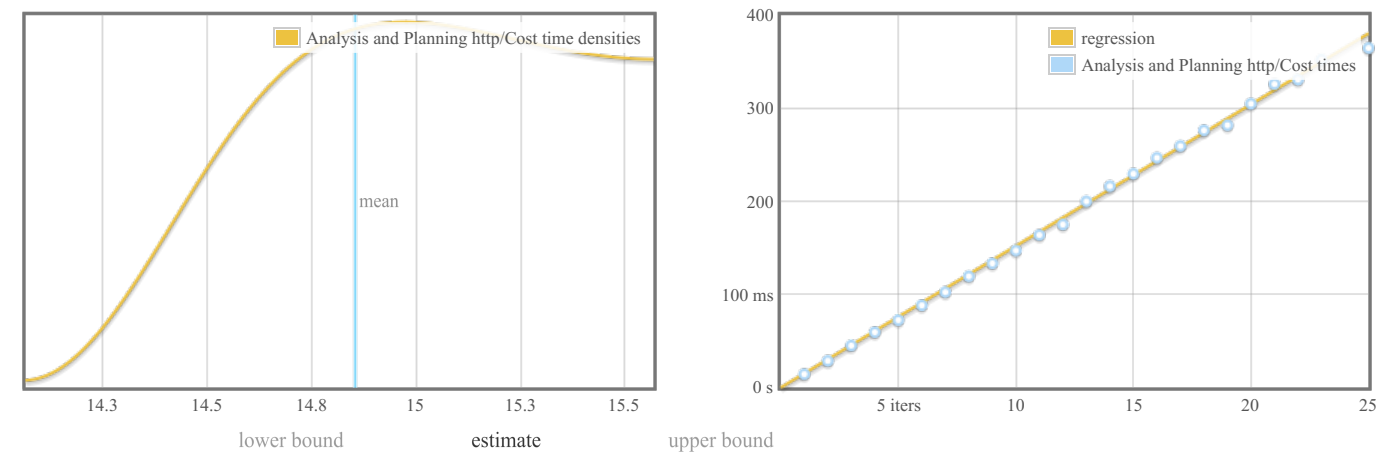
Analysis and Planning http/All (determine order, ordering and analysis & plan)



	lower bound	estimate	upper bound
OLS regression	72.8 ms	74.7 ms	77.4 ms
R ² goodness-of-fit	0.998	0.999	1.000
Mean execution time	7.577929826725671e-2	7.66218750130417e-2	7.758622692788919e-2
Standard deviation	1.0816270407949108e-3	1.4402336107264958e-3	2.044154012299928e-3

Outlying measurements have slight (9.000000000000001e-2%) effect on estimated standard deviation.

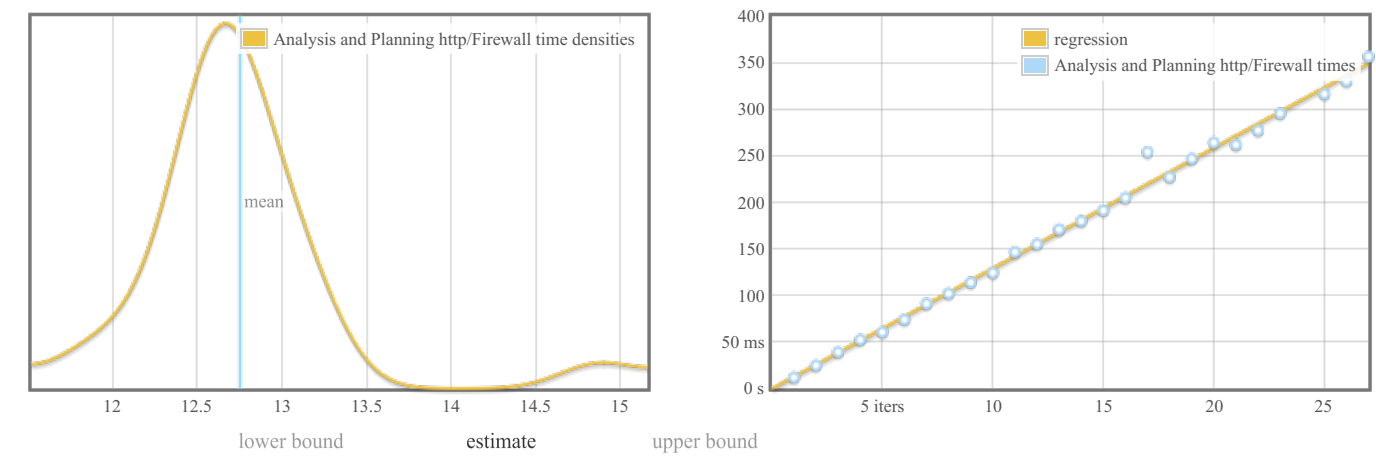
Analysis and Planning http/Cost



	lower bound	estimate	upper bound
OLS regression	14.9 ms	15.2 ms	15.6 ms
R ² goodness-of-fit	0.997	0.998	0.999
Mean execution time	1.4698561443544962e-2	1.4855589981097766e-2	1.5010518831409069e-2
Standard deviation	3.307451885633063e-4	3.80650062308999e-4	4.6186210295247825e-4

Outlying measurements have slight (4.764458479689051e-2%) effect on estimated standard deviation.

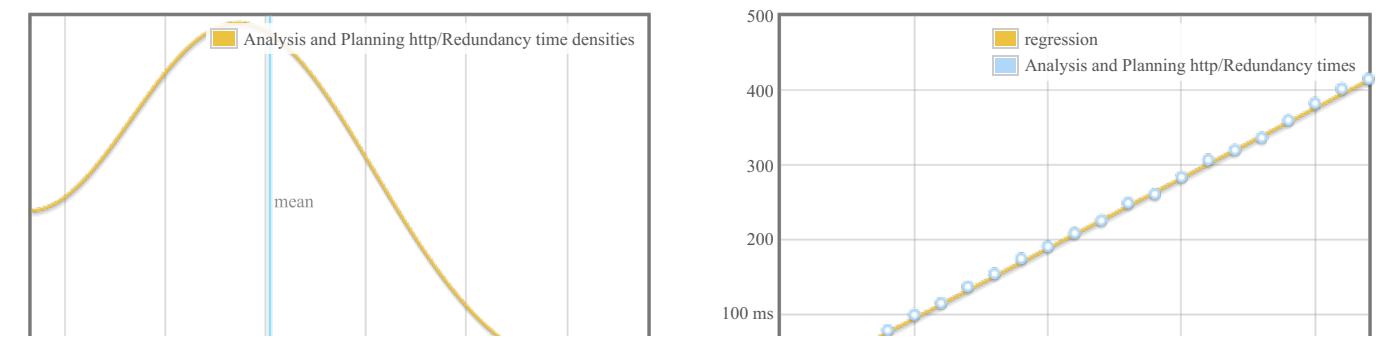
Analysis and Planning http/Firewall

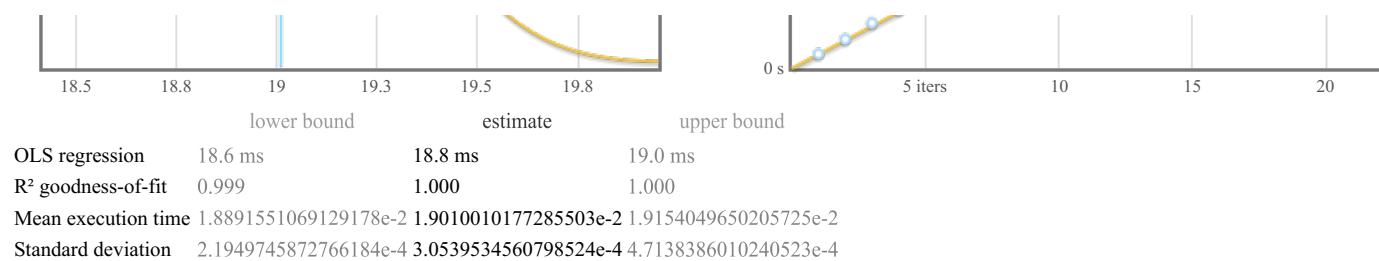


	lower bound	estimate	upper bound
OLS regression	12.7 ms	12.9 ms	13.3 ms
R ² goodness-of-fit	0.982	0.994	0.999
Mean execution time	1.2595891234018513e-2	1.275085483797489e-2	1.306775170413141e-2
Standard deviation	2.8771454994113777e-4	5.508831747815916e-4	9.912621653501489e-4

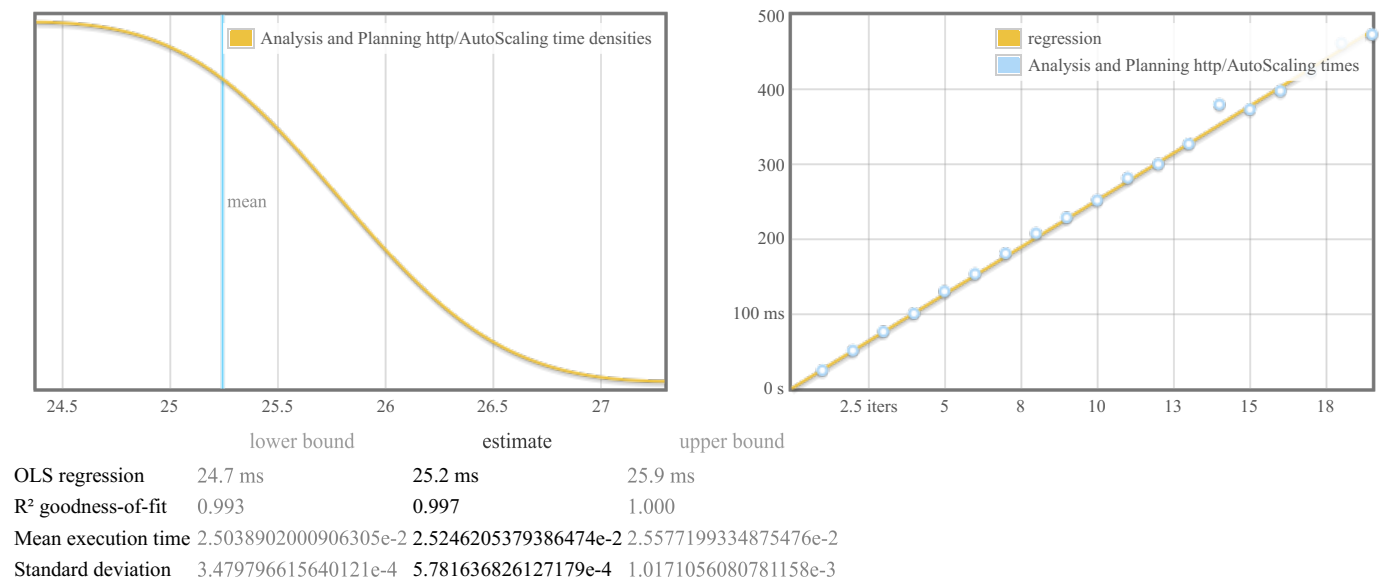
Outlying measurements have moderate (0.1804007684229334%) effect on estimated standard deviation.

Analysis and Planning http/Redundancy

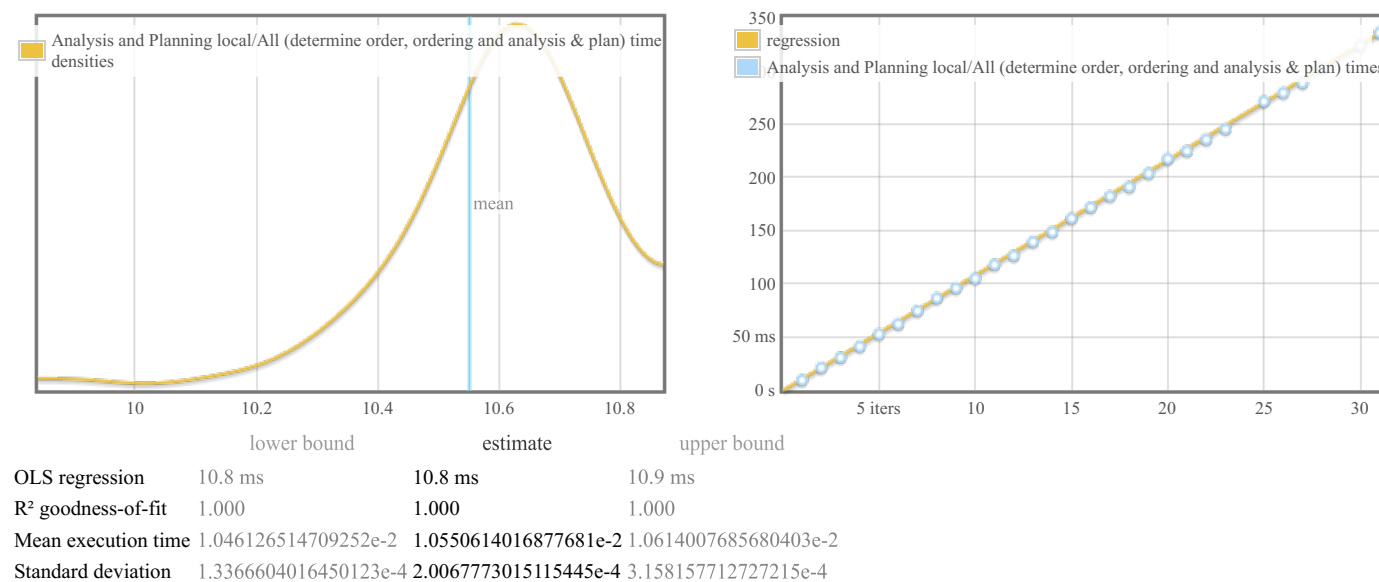




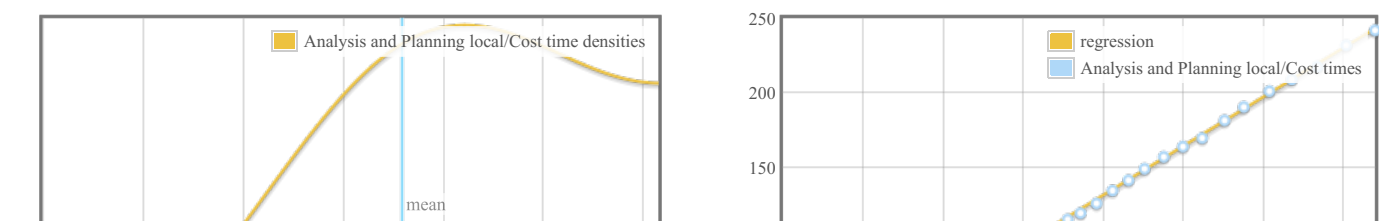
Analysis and Planning http/AutoScaling

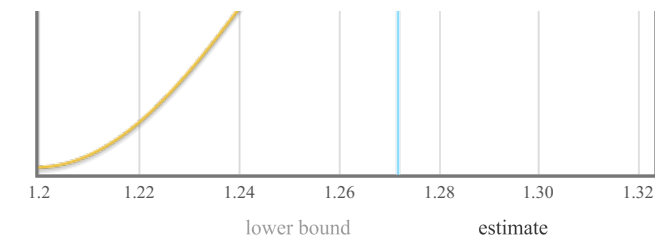


Analysis and Planning local/All (determine order, ordering and analysis & plan)



Analysis and Planning local/Cost

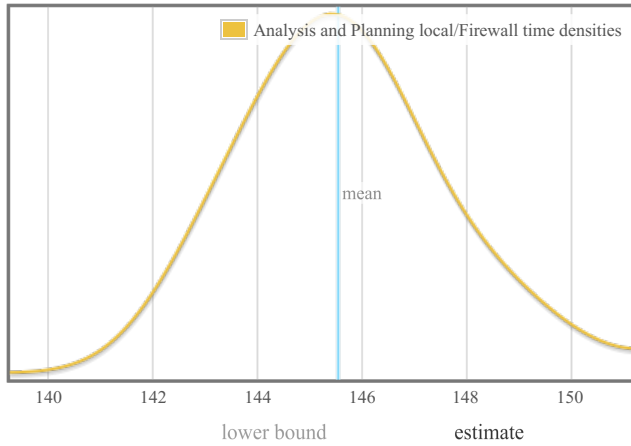




OLS regression	1.31 ms	1.31 ms	1.32 ms
R ² goodness-of-fit	1.000	1.000	1.000
Mean execution time	1.262674558809424e-3	1.2717176407745087e-3	1.2792729852734168e-3
Standard deviation	2.3581071254139504e-5	2.831602087983732e-5	3.3752277547194156e-5

Outlying measurements have moderate (0.1157321755162387%) effect on estimated standard deviation.

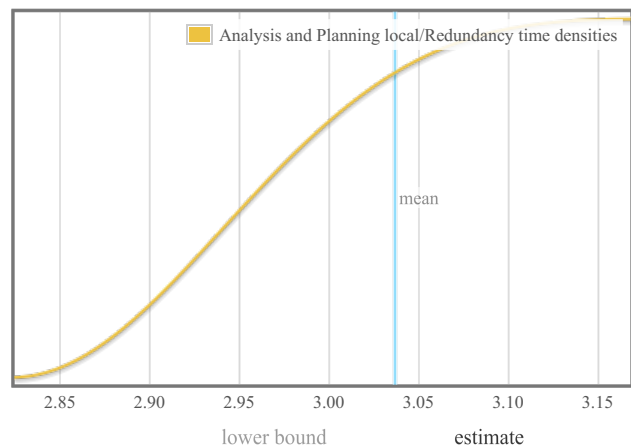
Analysis and Planning local/Firewall



OLS regression	148 μ s	149 μ s	150 μ s
R ² goodness-of-fit	1.000	1.000	1.000
Mean execution time	1.4490839859202556e-4	1.4553290627962657e-4	1.461365837094241e-4
Standard deviation	1.6628470465233422e-6	2.0436252138379126e-6	2.629231357927863e-6

Outlying measurements have slight (7.062665802336171e-2%) effect on estimated standard deviation.

Analysis and Planning local/Redundancy

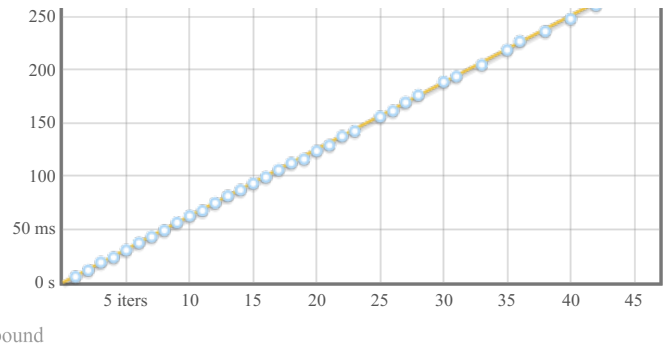
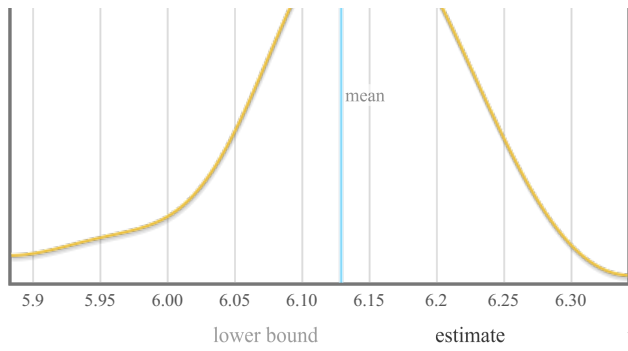


OLS regression	3.14 ms	3.16 ms	3.17 ms
R ² goodness-of-fit	1.000	1.000	1.000
Mean execution time	3.0124867519455453e-3	3.0364060849036255e-3	3.0592005095811206e-3
Standard deviation	6.635186007279379e-5	7.703650044927275e-5	9.473757753032952e-5

Outlying measurements have moderate (0.1150211676231849%) effect on estimated standard deviation.

Analysis and Planning local/AutoScaling

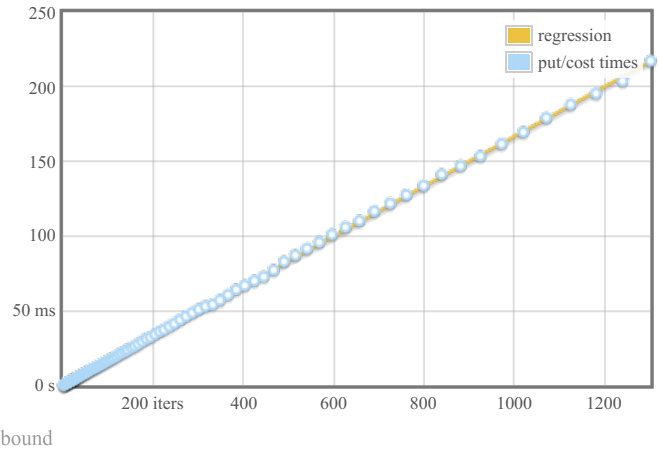
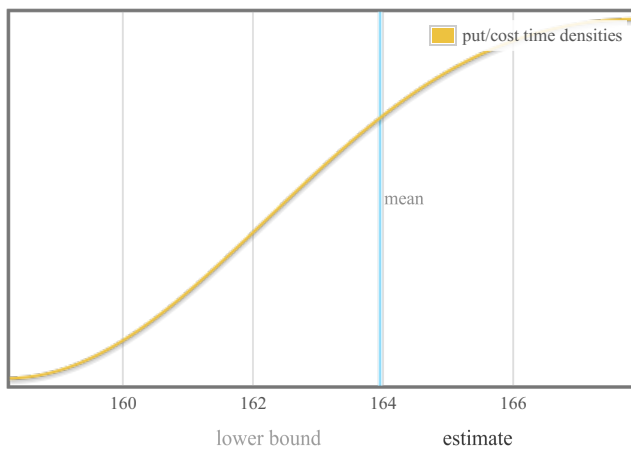




OLS regression	6.23 ms	6.27 ms	6.32 ms
R ² goodness-of-fit	1.000	1.000	1.000
Mean execution time	6.097447618820559e-3	6.129082454872966e-3	6.15921788668093e-3
Standard deviation	6.906605537950661e-5	8.948716909191689e-5	1.1540915876465039e-4

Outlying measurements have slight (2.6296566837107346e-2%) effect on estimated standard deviation.

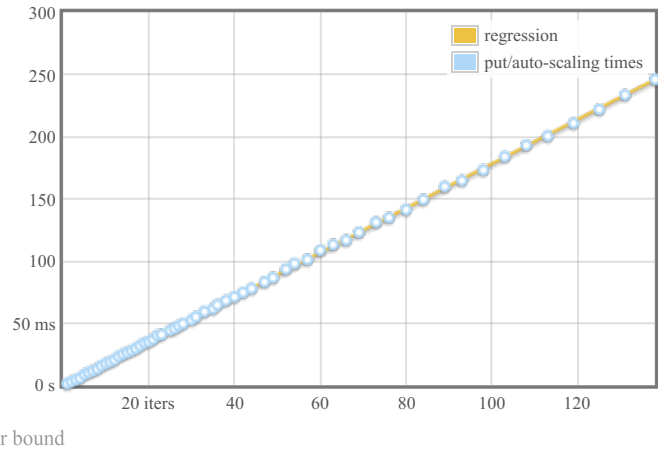
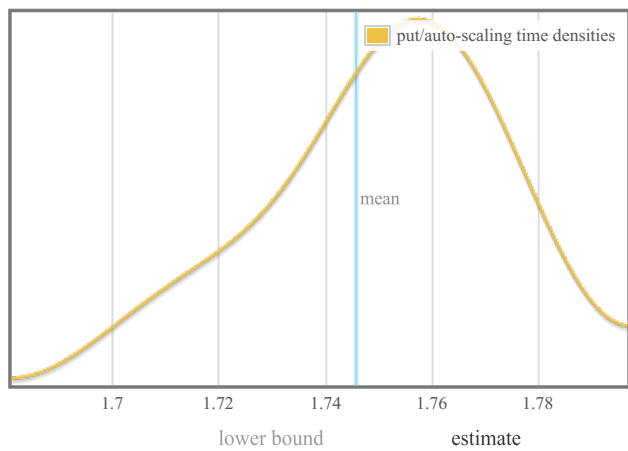
put/cost



OLS regression	166 μ s	167 μ s	167 μ s
R ² goodness-of-fit	1.000	1.000	1.000
Mean execution time	1.631500492038076e-4	1.6394947116630593e-4	1.646088158182954e-4
Standard deviation	2.032773249265234e-6	2.3543921177720175e-6	2.7696228327748894e-6

Outlying measurements have slight (7.200162865960723e-2%) effect on estimated standard deviation.

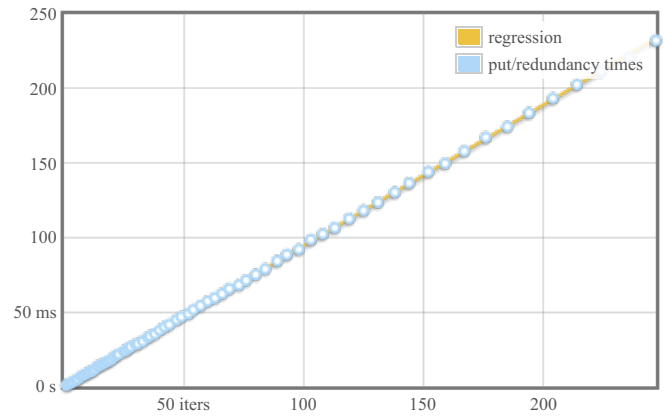
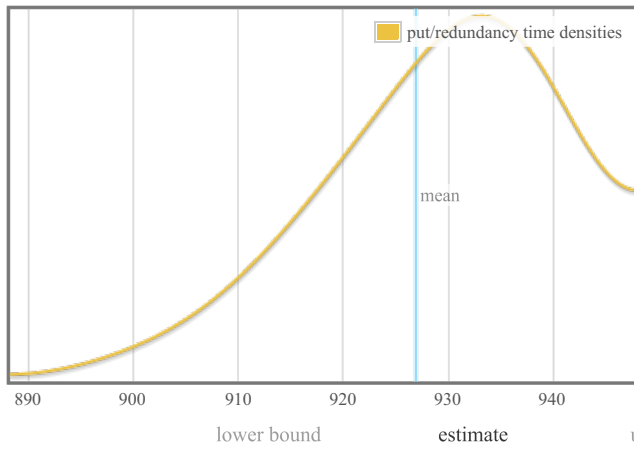
put/auto-scaling



OLS regression	1.78 ms	1.78 ms	1.79 ms
R ² goodness-of-fit	1.000	1.000	1.000
Mean execution time	1.7380739359950015e-3	1.7456904345448628e-3	1.7538713899678253e-3
Standard deviation	2.130361338968699e-5	2.5740487597937315e-5	3.0458398898947523e-5

Outlying measurements have slight (1.6661878770468114e-2%) effect on estimated standard deviation.

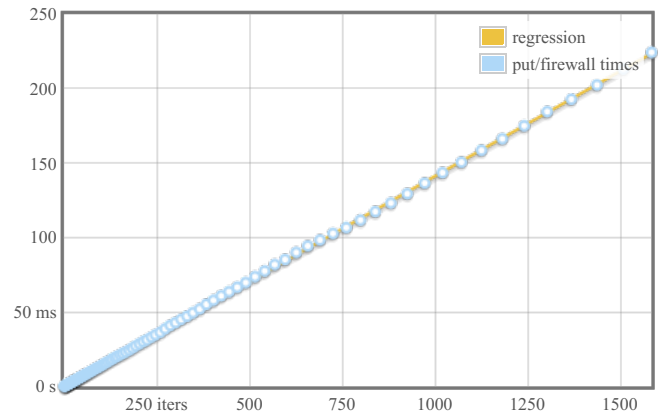
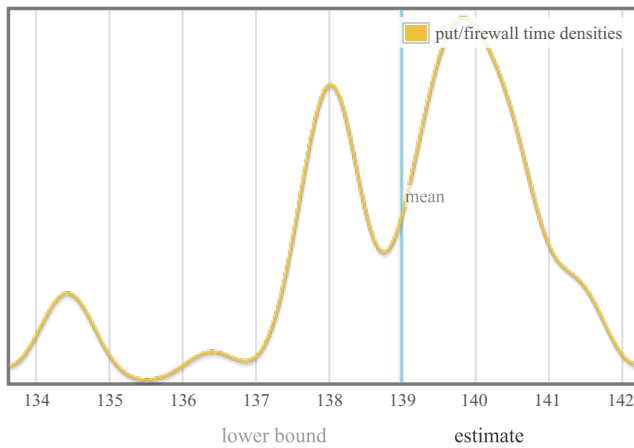
put/redundancy



	lower bound	estimate	upper bound
OLS regression	943 μ s	945 μ s	949 μ s
R ² goodness-of-fit	1.000	1.000	1.000
Mean execution time	9.227544434098948e-4	9.269313921115764e-4	9.301790329369354e-4
Standard deviation	9.846985967498018e-6	1.201310079450852e-5	1.6479760852043376e-5

Outlying measurements have slight (1.3886133703630094e-2%) effect on estimated standard deviation.

put/firewall



	lower bound	estimate	upper bound
OLS regression	141 μ s	141 μ s	142 μ s
R ² goodness-of-fit	1.000	1.000	1.000
Mean execution time	1.3833626564892338e-4	1.3898166884969169e-4	1.394223934874265e-4
Standard deviation	1.318366338577392e-6	1.7541624856141877e-6	2.303358614213123e-6

Outlying measurements have slight (6.0509003488735e-2%) 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, R^2 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](#).