KIV/PTE Semestrální práce

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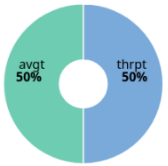
Zátěžové testování – řadící algoritmy

- Zdroj algoritmů: https://stackabuse.com/sorting-algorithms-in-java/
- Sorty: Bubble, Insertion, Selection, Merge, Heap, Quick, Native
- Řazení nad poli: seřezený, seřazený opačně, náhodný, jednou náhodný
- Metriky: Avg. time [ns], Throughput [op/s]
  - Ale ve vizualizaci je všude použit pouze avg. time

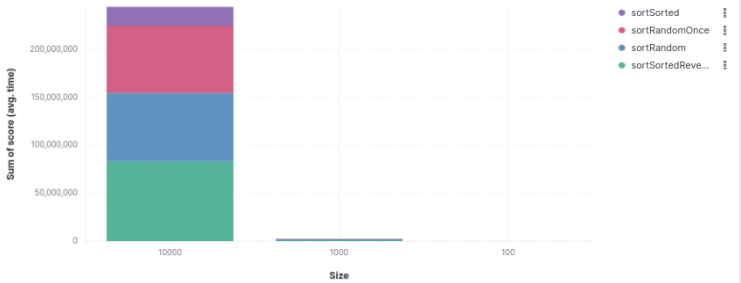
Number of records

168

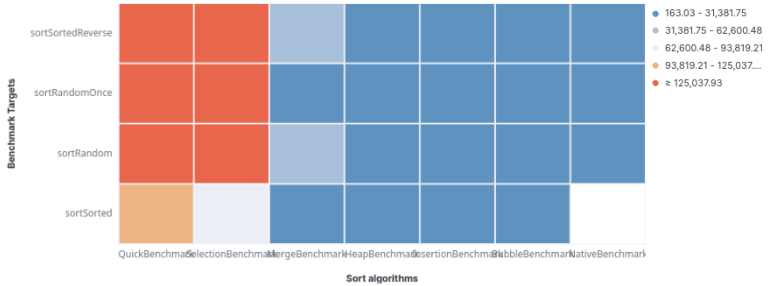
Records by modes



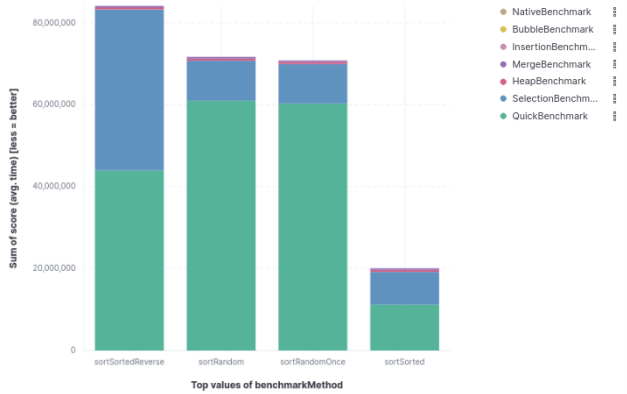
Sorting times (score) relative to array size



"Price" of sorting type using alrogrithm



Comparing sorts on different data and Sorting algorithms time of the method



Overview of scores for every algorithm depending on sort target (avg. time)

Size	Sort target	QuickBenchmark	SelectionBenchm	HeapBenchmark	MergeBenchmarl	InsertionBenchm	BubbleBenchmar	NativeBenchmarl
10000	sortRandom	60,537,867.9	9,612,107.182	471,138.467	358,750.605	11,537.778	2,424.341	1,553.625
10000	sortRandomOnce	59,841,678.6	9,419,923.655	475,271.646	362,462.056	11,558.362	2,438.457	1,579.884
10000	sortSortedReverse	43,387,557.867	39,101,809.8	463,151.064	311,599.012	11,874.117	3,673.017	1,541.79
10000	sortSorted	11,097,696.771	7,901,267.929	468,865.953	319,024.461	1,844.263	1,870.101	1,565.847
1000	sortSortedReverse	624,537.552	168,354.149	24,803.433	32,316.037	888.269	247.862	170.751
1000	sortRandomOnce	485,897.829	180,832.359	22,990.471	30,979.961	729.623	253.351	164.163
1000	sortRandom	466,828.226	183,047.853	24,227.31	31,590.389	732.975	247.424	165.46
1000	sortSorted	122,494.798	81,612.299	25,478.992	26,944.351	189.303	191.638	163.029
100	sortSortedReverse	1,564.311	1,197.68	1,519.9	2,122.053	17.655	20.462	21.902
100	sortRandomOnce	1,556.286	1,210.562	1,643.245	2,105.892	17.419	20.779	21.684
100	sortRandom	1,550.018	1,181.256	1,606.031	2,166.249	17.999	19.936	22.001
		Sum: 176,570,7...	Sum: 66,653,71...	Sum: 1,982,273....	Sum: 1,482,191....	Sum: 39,425.19	Sum: 11,427.666	Sum: 6,991.847

Average error score per size and target using algorithm

Size	Sort Targets	BubbleBenchm	QuickBenchm	SelectionBenc	InsertionBenc	NativeBenchm	HeapBenchma	MergeBenchm
100	sortRandom	5,052,425.334	9,685.618	14,221.541	634,525.099	482,641.703	20,046.002	11,491.49
100	sortSorted	4,529,760.862	14,436.789	22,338.35	268,813.205	428,908.903	19,111.182	7,541.654
100	sortRandomO...	3,445,110.973	4,455.46	5,304.503	1,519,964.94	686,389.022	49,888.747	7,342.45
100	sortSortedRev...	544,090.88	5,265.41	88,149.403	381,707.637	597,597.287	3,973.662	2,769.929
1000	sortSortedRev...	160,258.664	33,849.799	60,024.54	19,201.607	55,171.27	4,213.629	2,679.391
1000	sortRandom	111,196.531	2,008.482	647.468	79,484.621	45,569.2	8,913.771	480.814
1000	sortSorted	46,453.888	2,249.77	1,466.255	38,845.494	201,129.915	5,359.961	1,687.356
1000	sortRandomO...	44,067.461	9,055.969	3,944.624	23,298.575	15,609.02	3,685.764	1,535.108
10000	sortRandom	9,997.453	342,008.393	380,189.449	4,257.594	60,665.447	10,461.977	3,511.151
10000	sortSortedRev...	4,391.388	4,003,531.471	2,079,061.73	6,977.342	22,985.074	4,358.783	2,204.311
10000	sortRandomO...	3,465.708	772,424.645	35,212.622	10,082.29	20,423.329	19,139.222	9,804.854

Warmup iterations

5

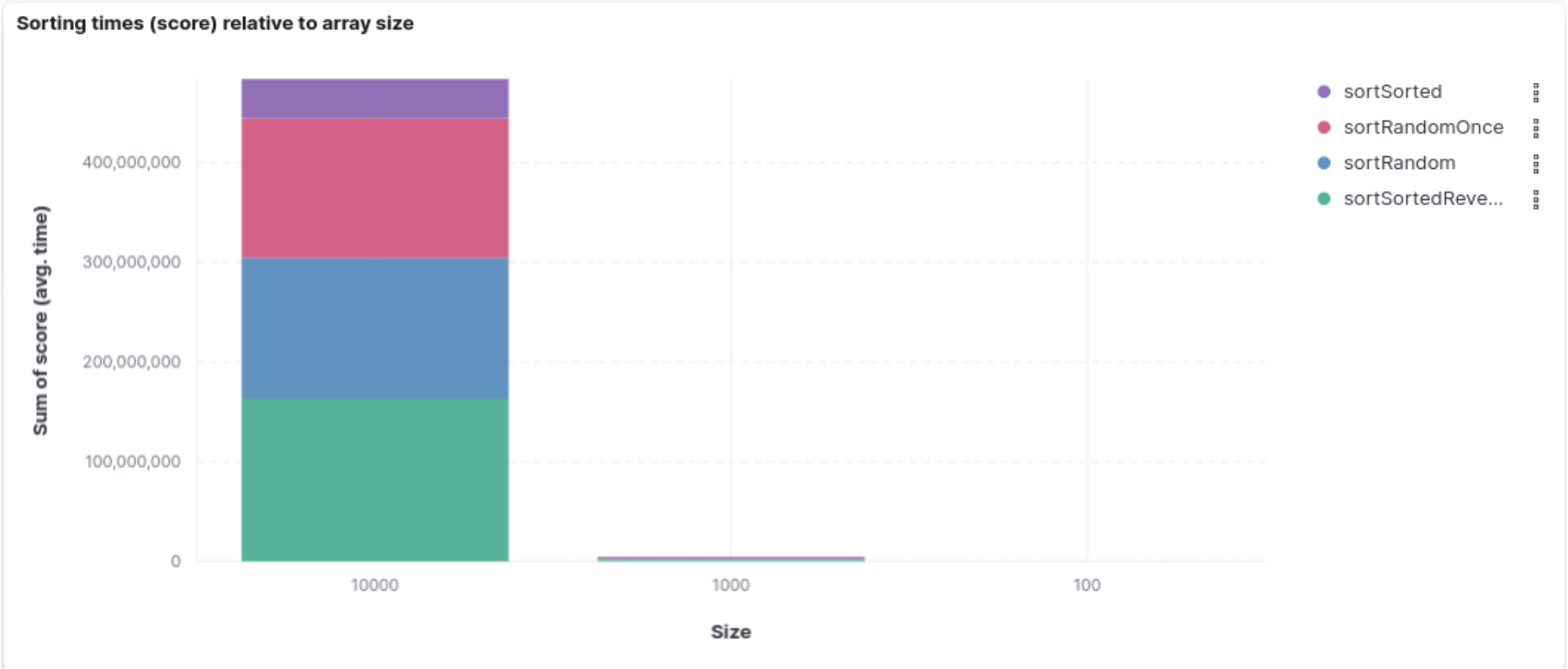
Test iterations

5

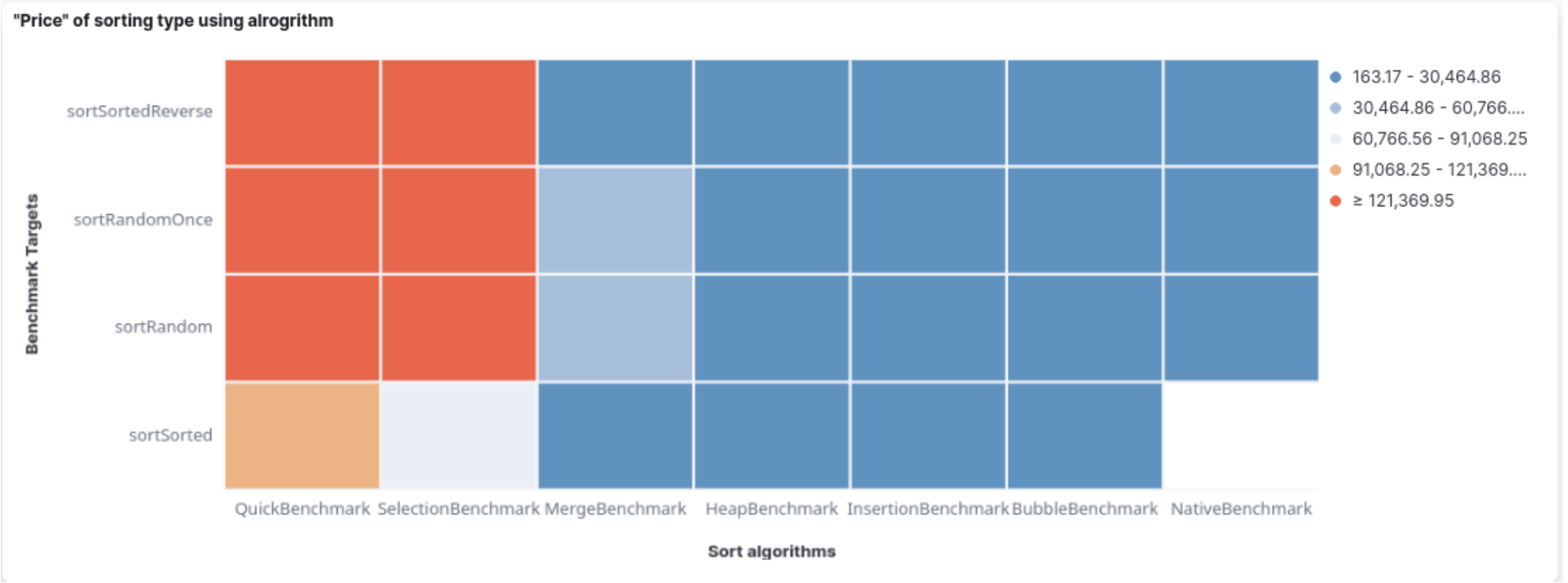
Modes

2

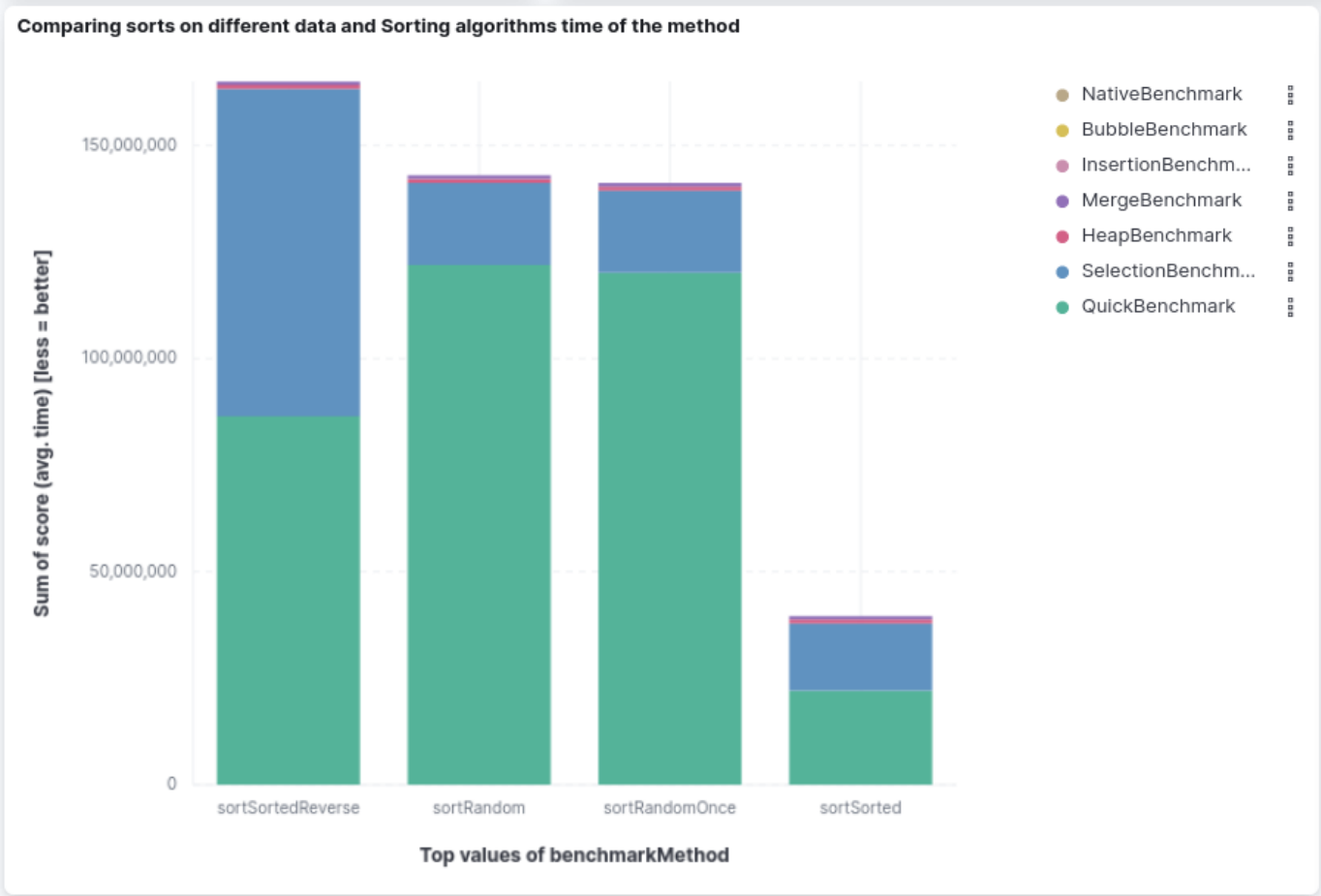
Čas řezení podle velikosti pole a jeho uspořádání



Heat mapa algoritmu podle seřezení pole



Podíl algoritmu na skóre pro odlišná seřezení pole



Tabulka součtů skóre pro velikosti a řazení pole

Overview of scores for every algorithm depending on sort target (avg. time)

Size	Sort target	QuickBenchmark ›	SelectionBenchmarl	HeapBenchmark ›	MergeBenchmark ›	InsertionBenchmark	BubbleBenchmark ›	NativeBenchmark ›
10000	sortRandom	121,032,996.6	18,878,572.182	923,248.183	712,070.981	19,518.073	4,930.915	3,083.999
10000	sortRandomOnce	119,251,707	18,851,847.218	943,145.346	703,350.118	19,310.075	4,849.533	3,121.645
10000	sortSortedReverse	85,228,605.8	76,545,886.733	911,400.381	622,219.141	22,295.227	6,080.198	3,067.552
10000	sortSorted	21,858,892.091	15,598,440.477	921,990.907	631,262.709	3,655.387	3,643.956	3,095.941
1000	sortSortedReverse	1,212,394.11	332,052.023	48,955.492	58,473.553	1,628.488	549.837	332.975
1000	sortRandomOnce	960,251.427	353,471.62	47,303.02	62,112.352	1,453.025	502.456	327.426
1000	sortRandom	941,046.291	359,384.583	47,981.402	61,926.224	1,477.186	496.559	329.971
1000	sortSorted	240,555.234	164,065.17	48,976.081	53,245.901	378.856	382.316	326.335
100	sortRandomOnce	3,108.66	2,347.353	3,168.808	4,156.54	35.167	41.007	42.908
100	sortRandom	3,080.989	2,316.582	3,162.759	4,286.83	35.535	39.985	43.308
100	sortSortedReverse	3,073.477	2,351.589	3,005.477	4,045.275	35.232	40.573	43.782
100	sortSorted	3,054.351	2,288.678	3,133.152	4,176.693	34.963	40.524	43.381
		Sum: 350,738,766....	**Sum: 131,093,024....**	**Sum: 3,905,471.009**	**Sum: 2,921,326.316**	**Sum: 69,857.213**	**Sum: 21,597.859**	**Sum: 13,859.224**

Tabulka součtu chyb podle velikosti a řazení pole

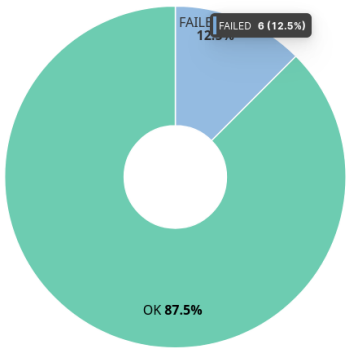
Average error score per size and target using algorithm

Size	Sort Targets	BubbleBenchma	QuickBenchmar	InsertionBenchr	NativeBenchmai	SelectionBenchi	HeapBenchmarI	MergeBenchmai
100	sortSorted	4,838,023.958	14,378.871	249,512.786	715,329.416	11,999.719	26,767.746	5,807.673
100	sortRandom	2,883,988.156	14,339.532	432,086.286	306,344.52	8,896.655	33,426.879	7,491.48
100	sortRandomOnce	2,091,970.347	8,658.811	1,132,527.788	431,442.523	6,658.206	37,101.246	5,376.98
100	sortSortedReverse	380,744.303	5,876.861	627,097.683	372,484.504	46,919.679	10,608.79	12,614.583
1000	sortSortedReverse	90,663.97	25,756.542	21,986.028	33,215.277	52,096.629	4,125.927	1,748.773
1000	sortRandom	71,153.155	2,227.392	42,147.354	39,661.182	1,383.294	7,509.085	504.656
1000	sortSorted	67,134.279	1,385.546	37,856.445	104,893.544	1,337.474	3,669.875	1,136.216
1000	sortRandomOnce	57,593.529	6,402.811	26,223.771	16,189.258	4,383.04	2,861.387	1,034.386
10000	sortRandomOnce	6,200.482	581,939.234	11,429.141	15,109.028	223,451.268	11,008.06	10,846.916
10000	sortRandom	5,497.534	223,592.718	3,375.76	33,581.14	376,279.927	5,670.342	4,885.523
10000	sortSorted	3,247.157	398,756.056	17,789.138	2,241.948	346,731.504	3,018.816	8,709.461
10000	sortSortedReverse	3,168.062	2,103,883.93	11,647.265	98,270.076	1,060,492.8	3,365.172	1,703.08

Testování REST API

- Rozšíření cvičení o 2 selhávající TC
  - Ve vlastním TS

Test results



Number of tests (steps with assertions)

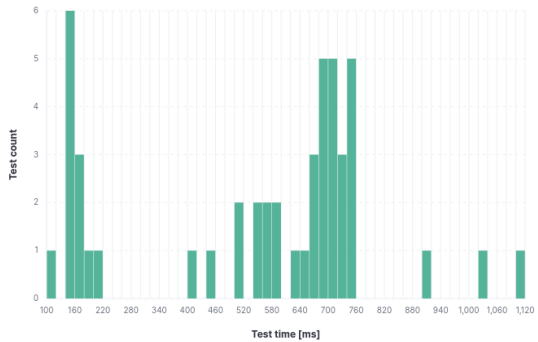
48

Total test run time

26,543

[ms]

Test run times histogram



Test results by test suites

Top values of testSuite	OK	FAILED
TS.01 Zalozeni zaznamu kocky	3	
TS.02 Exsitence zaznamu kocky	12	
TS.03 Vsechna zvirata	3	
TS.04 Vymazani zaznamu kocky	12	
TS.05 Zalozeni uzivatele	3	
TS.06 Prihlaseni a odhlaseni uzivatele	6	
TS.07 Testy k selhani	3	
	Sum: 42	Sum:

Failing test count

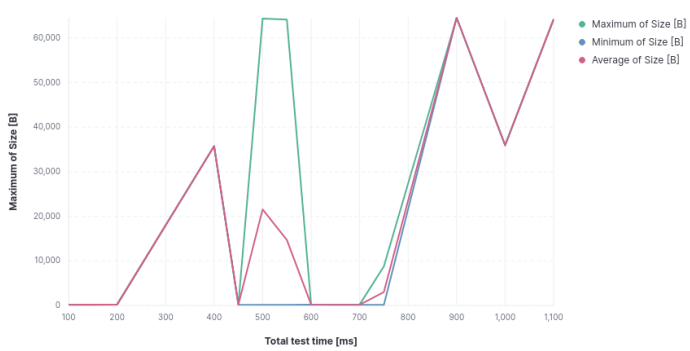
6

Avarage time of one test run

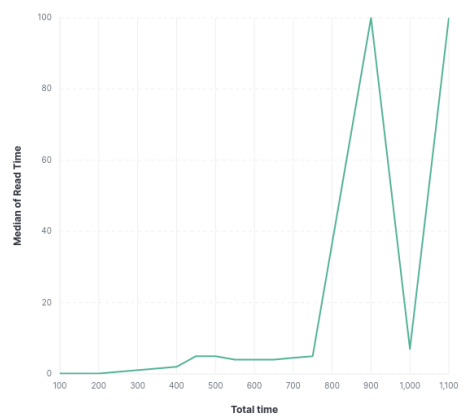
552.979

[ms]

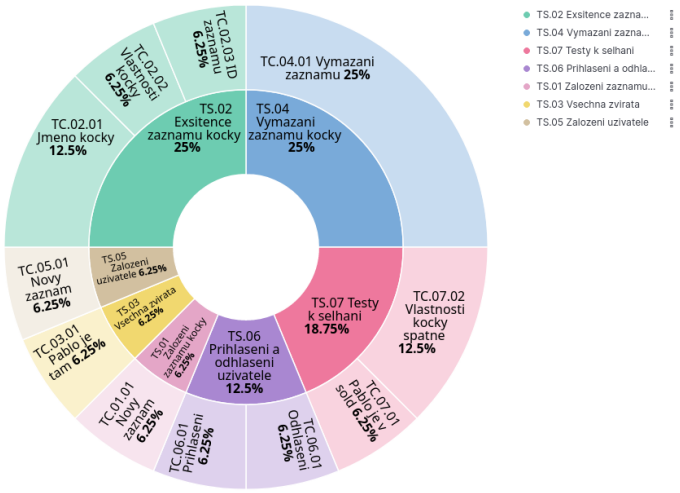
Response sizes relative to test time



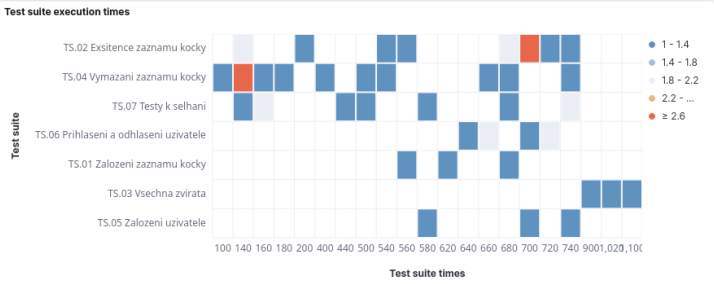
Total time relative to Read Time



Test cases per test suite



Test suite execution times

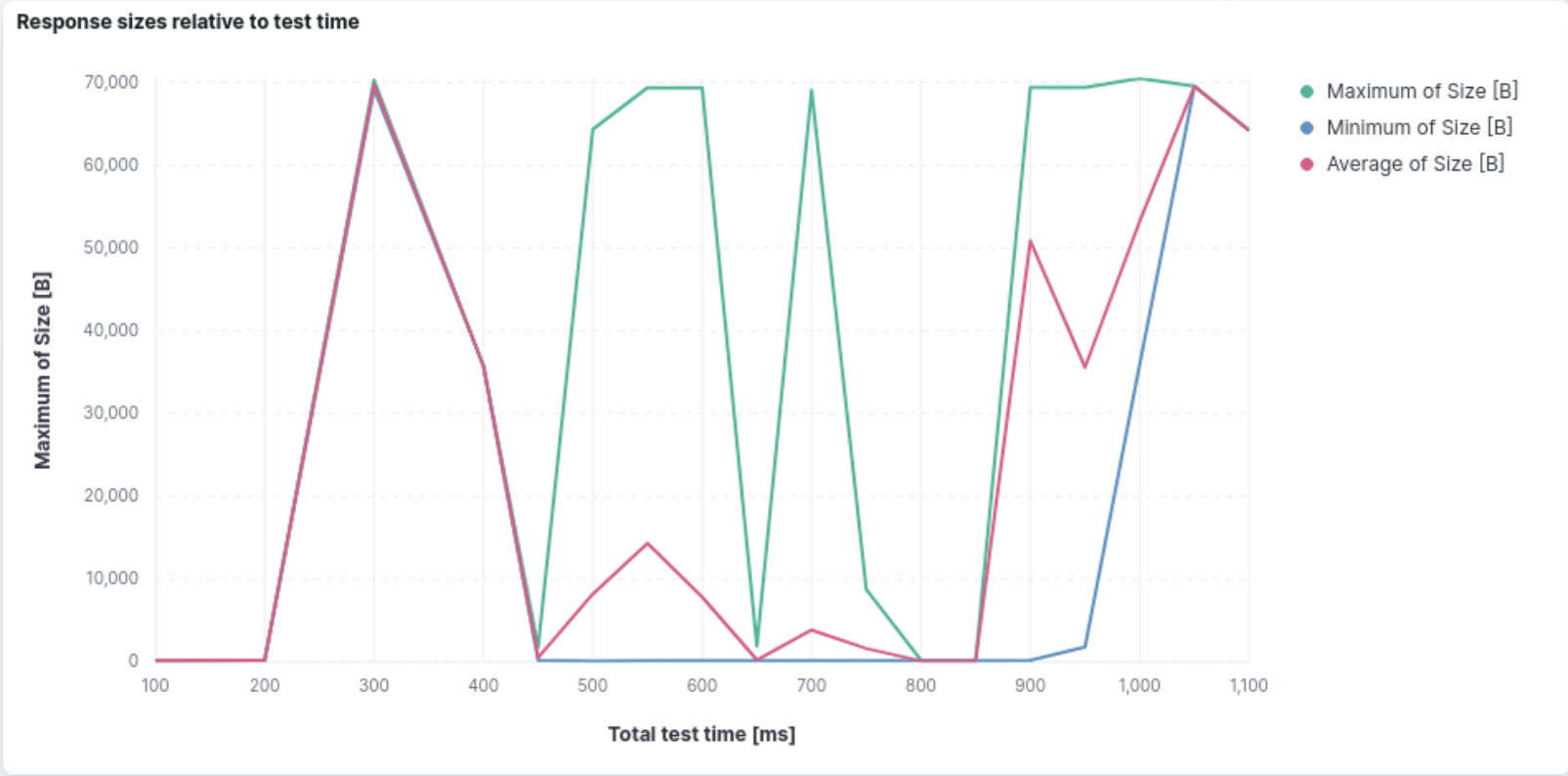
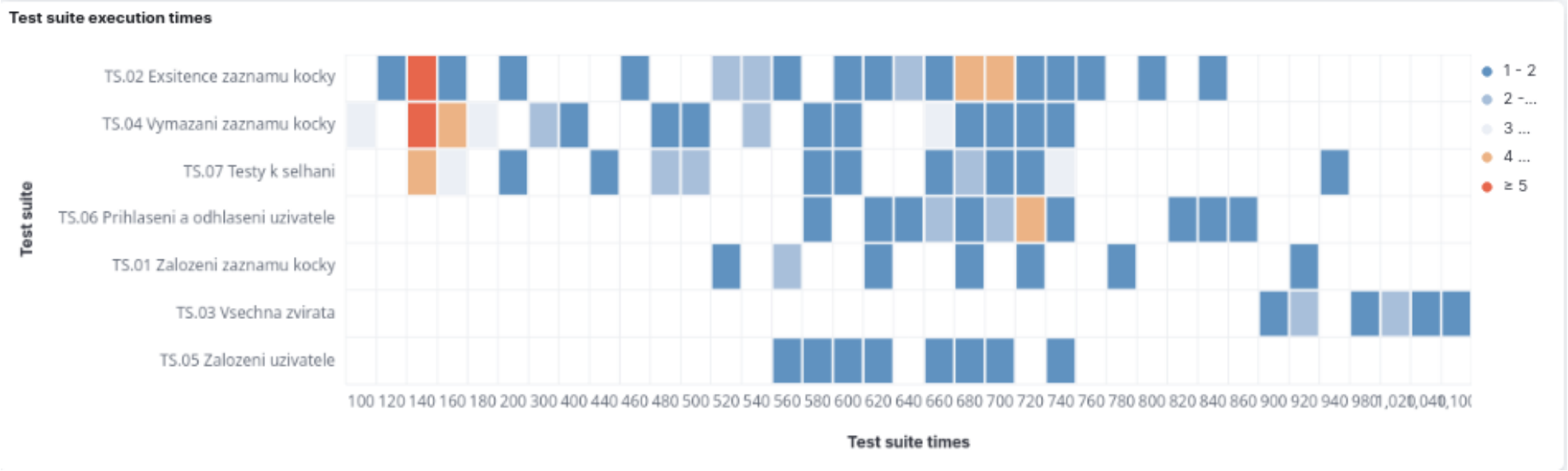


Tabulka výsledků testů

Test results by test suites

Top values of testSuite	OK ›	FAILED ›
TS.01 Zalozeni zaznamu kocky	8	-
TS.02 Exsitence zaznamu kocky	32	-
TS.03 Vsechna zvirata	8	-
TS.04 Vymazani zaznamu kocky	32	-
TS.05 Zalozeni uzivatele	8	-
TS.06 Prihlaseni a odhlaseni uzivatele	16	-
TS.07 Testy k selhani	8	16
	Sum: 112	**Sum: 16**

Čas testu v závislosti na velikosti odpovědi



Heat mapa časů testů