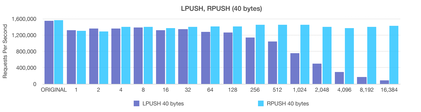
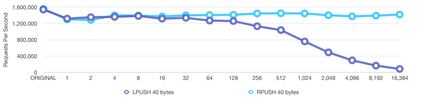
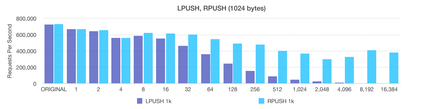
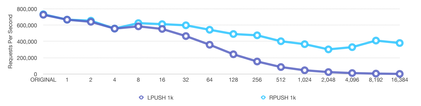
Ziplist Length vs. Operations Per Second
(pipeline of 1000 requests, 10M operations per test)

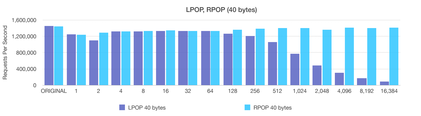
ziplist length	LPUSH 40 bytes	RPUSH 40 bytes	LPUSH 1k	RPUSH 1k	LPOP 40 bytes	RPOP 40 bytes	LPOP 1k	RPOP 1k
ORIGINAL	1,541,307	1,556,905	727,484	733,299	1,449,065	1,436,369	671,998	650,195
1	1,318,913	1,302,083	666,978	667,245	1,243,163	1,234,416	643,625	583,533
2	1,352,997	1,285,512	640,985	654,579	1,092,419	1,287,830	580,956	554,970
4	1,361,285	1,399,384	557,289	558,129	1,320,306	1,314,752	558,659	552,151
8	1,384,083	1,393,923	585,206	624,649	1,320,830	1,327,316	558,347	579,946
16	1,316,656	1,370,614	553,373	612,257	1,328,021	1,342,642	525,155	561,041
32	1,337,435	1,398,993	465,679	598,122	1,329,611	1,332,445	461,489	567,344
64	1,270,487	1,405,284	359,363	543,154	1,328,021	1,332,268	344,816	540,833
128	1,258,178	1,412,230	242,401	490,942	1,268,231	1,354,647	250,796	527,649
256	1,131,478	1,444,043	153,756	475,217	1,208,751	1,390,821	165,033	525,293
512	1,037,560	1,448,855	85,753	402,431	1,054,741	1,393,728	94,326	550,540
1,024	758,265	1,445,087	46,106	366,569	765,228	1,392,564	50,000	495,786
2,048	489,668	1,401,345	23,950	302,572	487,734	1,360,544	24,545	554,939
4,096	294,325	1,374,004	11,860	329,815	302,957	1,410,040	12,016	384,911
8,192	164,644	1,391,014	5,231	410,509	167,185	1,405,679	5,079	377,074
16,384	83,674	1,418,239	1,650	380,518	84,147	1,414,227	1,651	326,584

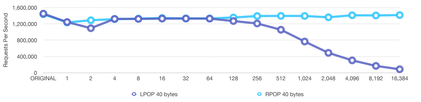






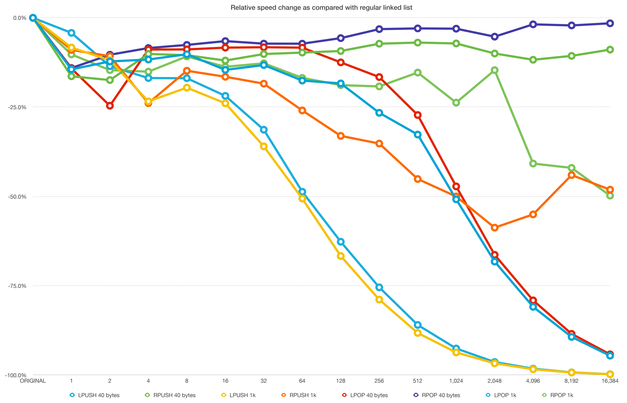


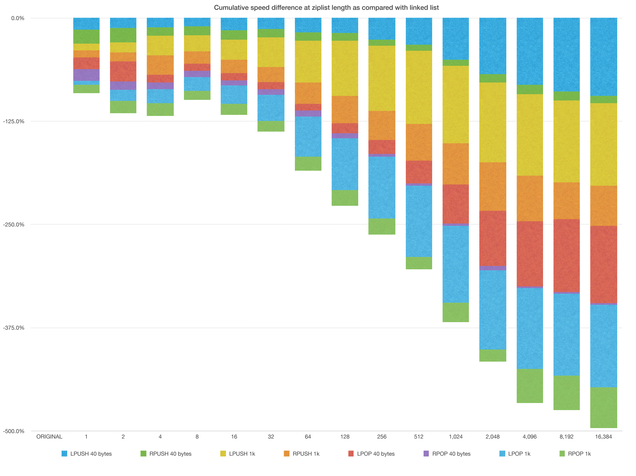




Speed Difference Vs. Original

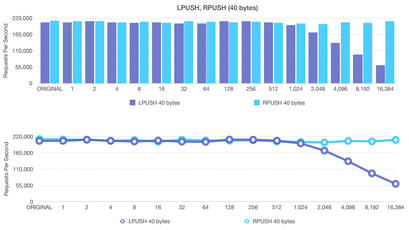
	LPUSH 40 bytes	RPUSH 40 bytes	LPUSH 1k	RPUSH 1k	LPOP 40 bytes	RPOP 40 bytes	LPOP 1k	RPOP 1k
ORIGINAL	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	-14.4%	-16.4%	-8.3%	-9.0%	-14.2%	-14.1%	-4.2%	-10.3%
2	-12.2%	-17.4%	-11.9%	-10.7%	-24.6%	-10.3%	-13.5%	-14.6%
4	-11.7%	-10.1%	-23.4%	-23.9%	-8.9%	-8.5%	-16.9%	-15.1%
8	-10.2%	-10.5%	-19.6%	-14.8%	-8.8%	-7.6%	-16.9%	-10.8%
16	-14.6%	-12.0%	-23.9%	-16.5%	-8.4%	-6.5%	-21.9%	-13.7%
32	-13.2%	-10.1%	-36.0%	-18.4%	-8.2%	-7.2%	-31.3%	-12.7%
64	-17.6%	-9.7%	-50.6%	-25.9%	-8.4%	-7.2%	-48.7%	-16.8%
128	-18.4%	-9.3%	-66.7%	-33.1%	-12.5%	-5.7%	-62.7%	-18.8%
256	-26.6%	-7.2%	-78.9%	-35.2%	-16.6%	-3.2%	-75.4%	-19.2%
512	-32.7%	-6.9%	-88.2%	-45.1%	-27.2%	-3.0%	-86.0%	-15.3%
1,024	-50.8%	-7.2%	-93.7%	-50.0%	-47.2%	-3.0%	-92.6%	-23.7%
2,048	-68.2%	-10.0%	-96.7%	-58.7%	-66.3%	-5.3%	-96.3%	-14.7%
4,096	-80.9%	-11.7%	-98.4%	-55.0%	-79.1%	-1.8%	-98.2%	-40.8%
8,192	-89.3%	-10.7%	-99.3%	-44.0%	-88.5%	-2.1%	-99.2%	-42.0%
16,384	-94.6%	-8.9%	-99.8%	-48.1%	-94.2%	-1.5%	-99.8%	-49.8%

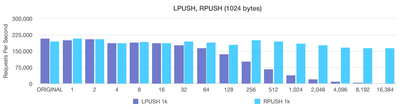


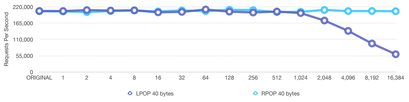


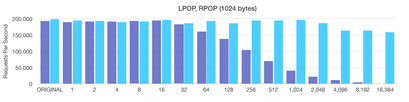
Ziplist Length vs. Operations Per Second
(no pipeline)

ziplist length	LPUSH 40 bytes	RPUSH 40 bytes	LPUSH 1k	RPUSH 1k	LPOP 40 bytes	RPOP 40 bytes	LPOP 1k	RPOP 1k
ORIGINAL	204,708	210,837	207,599	194,477	205,634	205,002	192,197	198,965
1	204,792	209,336	198,807	206,186	205,465	204,123	189,934	195,351
2	208,855	208,594	205,973	205,423	208,768	201,939	191,939	193,798
4	205,086	204,792	187,161	188,218	207,082	205,550	190,767	189,036
8	202,716	207,555	190,621	192,827	207,857	207,426	192,530	191,975
16	205,931	202,306	187,758	185,908	201,167	204,207	194,590	196,194
32	202,143	208,725	177,936	194,590	202,552	207,555	182,615	185,908
64	201,410	206,143	163,425	188,929	210,837	205,255	161,316	193,536
128	209,468	205,465	135,190	178,667	203,459	209,732	137,760	185,908
256	208,681	206,612	102,680	199,920	200,521	208,594	104,570	194,288
512	205,508	203,004	67,485	193,573	203,832	201,898	69,604	194,439
1,024	196,309	201,126	38,447	185,529	198,649	202,963	40,683	196,850
2,048	171,969	199,601	21,213	177,305	173,581	209,161	22,381	186,916
4,096	136,017	204,499	11,181	166,389	138,523	205,423	11,639	164,745
8,192	95,184	203,004	5,000	164,204	95,951	205,634	5,055	164,745
16,384	59,862	208,160	1,613	163,666	59,791	204,792	1,642	158,228



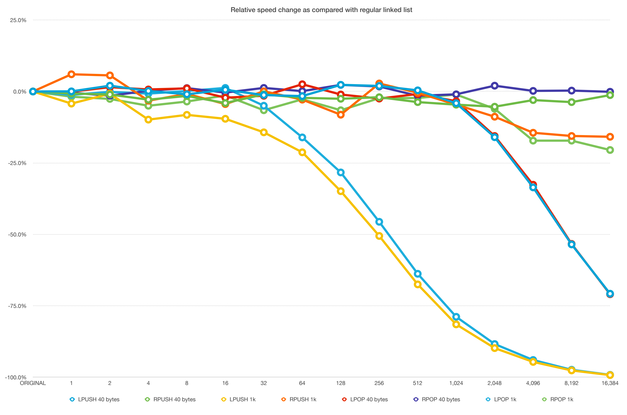


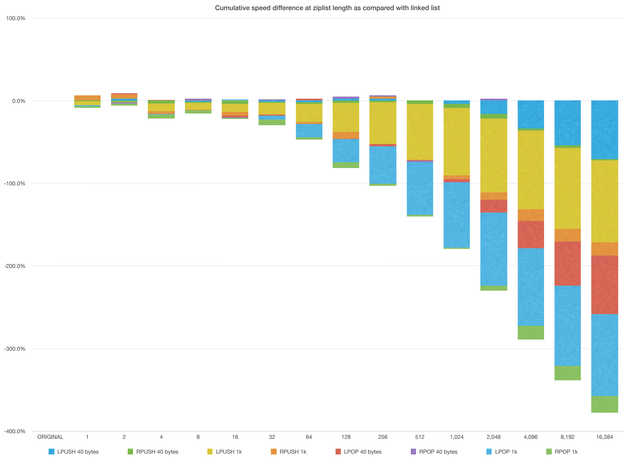




Speed Difference Vs. Original

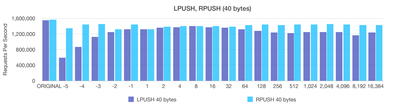
	LPUSH 40 bytes	RPUSH 40 bytes	LPUSH 1k	RPUSH 1k	LPOP 40 bytes	RPOP 40 bytes	LPOP 1k	RPOP 1k
ORIGINAL	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	0.0%	-0.7%	-4.2%	6.0%	-0.1%	-0.4%	-1.2%	-1.8%
2	2.0%	-1.1%	-0.8%	5.6%	1.5%	-1.5%	-0.1%	-2.6%
4	0.2%	-2.9%	-9.8%	-3.2%	0.7%	0.3%	-0.7%	-5.0%
8	-1.0%	-1.6%	-8.2%	-0.8%	1.1%	1.2%	0.2%	-3.5%
16	0.6%	-4.0%	-9.6%	-4.4%	-2.2%	-0.4%	1.2%	-1.4%
32	-1.3%	-1.0%	-14.3%	0.1%	-1.5%	1.2%	-5.0%	-6.6%
64	-1.6%	-2.2%	-21.3%	-2.9%	2.5%	0.1%	-16.1%	-2.7%
128	2.3%	-2.5%	-34.9%	-8.1%	-1.1%	2.3%	-28.3%	-6.6%
256	1.9%	-2.0%	-50.5%	2.8%	-2.5%	1.8%	-45.6%	-2.4%
512	0.4%	-3.7%	-67.5%	-0.5%	-0.9%	-1.5%	-63.8%	-2.3%
1,024	-4.1%	-4.6%	-81.5%	-4.6%	-3.4%	-1.0%	-78.8%	-1.1%
2,048	-16.0%	-5.3%	-89.8%	-8.8%	-15.6%	2.0%	-88.4%	-6.1%
4,096	-33.6%	-3.0%	-94.6%	-14.4%	-32.6%	0.2%	-93.9%	-17.2%
8,192	-53.5%	-3.7%	-97.6%	-15.6%	-53.3%	0.3%	-97.4%	-17.2%
16,384	-70.8%	-1.3%	-99.2%	-15.8%	-70.9%	-0.1%	-99.1%	-20.5%

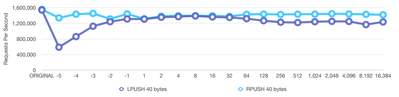


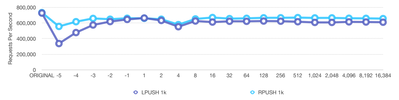


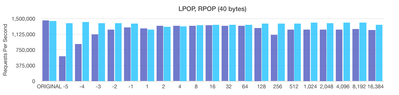
Adaptive Ziplist Length vs. Operations Per Second
(pipeline of 1000 requests, 10M operations per test)

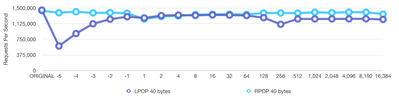
ziplist length	LPUSH 40 bytes	RPUSH 40 bytes	LPUSH 1k	RPUSH 1k	LPOP 40 bytes	RPOP 40 bytes	LPOP 1k	RPOP 1k
ORIGINAL	1,541,307	1,556,905	727,484	733,299	1,449,065	1,436,369	671,998	650,195
-5	588,582	1,339,944	336,995	556,174	587,959	1,386,963	354,874	559,660
-4	860,956	1,434,514	477,737	616,827	886,682	1,411,233	453,227	570,548
-3	1,125,873	1,454,334	574,614	658,848	1,121,579	1,382,361	514,165	548,546
-2	1,241,928	1,312,508	618,429	648,551	1,230,618	1,390,241	597,015	598,982
-1	1,311,304	1,440,715	645,870	660,895	1,290,822	1,374,193	622,975	583,226
1	1,308,387	1,314,752	663,834	660,240	1,260,716	1,236,553	639,918	585,960
2	1,355,014	1,381,979	632,711	648,551	1,319,435	1,297,185	570,907	592,297
4	1,371,366	1,396,453	552,517	579,240	1,330,672	1,310,616	557,787	552,547
8	1,389,468	1,394,311	625,743	651,976	1,323,276	1,340,123	595,203	606,465
16	1,362,955	1,393,534	612,108	670,331	1,335,649	1,347,527	591,366	595,664
32	1,350,804	1,378,930	622,239	656,297	1,329,611	1,353,548	592,136	590,807
64	1,319,609	1,429,388	621,775	659,979	1,320,132	1,345,895	591,576	600,625
128	1,267,588	1,434,926	625,234	666,578	1,268,231	1,380,453	590,145	605,254
256	1,228,803	1,427,552	623,286	667,022	1,109,016	1,381,406	594,212	601,070
512	1,220,256	1,433,897	616,333	669,344	1,237,164	1,377,410	595,522	604,339
1,024	1,241,465	1,435,544	607,533	665,336	1,238,237	1,397,028	577,701	575,043
2,048	1,250,938	1,445,714	607,533	665,779	1,238,390	1,388,310	576,701	573,395
4,096	1,248,439	1,440,507	614,628	660,939	1,239,926	1,400,168	574,053	572,738
8,192	1,167,951	1,429,797	612,745	659,631	1,241,311	1,399,189	562,114	573,723
16,384	1,235,330	1,417,635	610,128	656,599	1,225,340	1,353,180	570,451	579,039

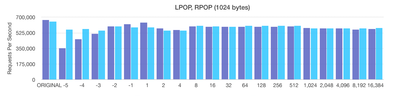


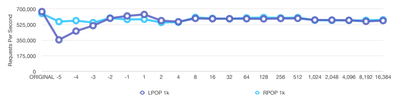






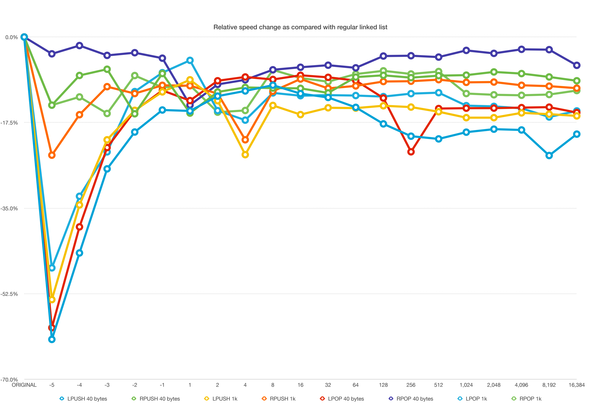


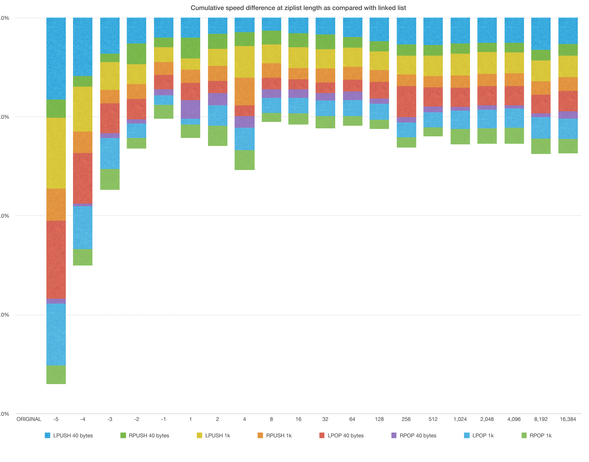




Speed Difference Vs. Original

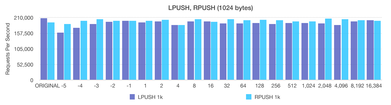
	LPUSH 40 bytes	RPUSH 40 bytes	LPUSH 1k	RPUSH 1k	LPOP 40 bytes	RPOP 40 bytes	LPOP 1k	RPOP 1k
ORIGINAL	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
-5	-61.8%	-13.9%	-53.7%	-24.2%	-59.4%	-3.4%	-47.2%	-13.9%
-4	-44.1%	-7.9%	-34.3%	-15.9%	-38.8%	-1.7%	-32.6%	-12.2%
-3	-27.0%	-6.6%	-21.0%	-10.2%	-22.6%	-3.8%	-23.5%	-15.6%
-2	-19.4%	-15.7%	-15.0%	-11.6%	-15.1%	-3.2%	-11.2%	-7.9%
-1	-14.9%	-7.5%	-11.2%	-9.9%	-10.9%	-4.3%	-7.3%	-10.3%
1	-15.1%	-15.6%	-8.7%	-10.0%	-13.0%	-13.9%	-4.8%	-9.9%
2	-12.1%	-11.2%	-13.0%	-11.6%	-8.9%	-9.7%	-15.0%	-15.4%
4	-11.0%	-10.3%	-24.1%	-21.0%	-8.2%	-8.8%	-17.0%	-15.0%
8	-9.9%	-10.4%	-14.0%	-11.1%	-8.7%	-6.7%	-11.4%	-6.7%
16	-11.6%	-10.5%	-15.9%	-8.6%	-7.8%	-6.2%	-12.0%	-8.4%
32	-12.4%	-11.4%	-14.5%	-10.5%	-8.2%	-5.8%	-11.9%	-9.1%
64	-14.4%	-8.2%	-14.5%	-10.0%	-8.9%	-6.3%	-12.0%	-7.6%
128	-17.8%	-7.8%	-14.1%	-9.1%	-12.5%	-3.9%	-12.2%	-6.9%
256	-20.3%	-8.3%	-14.3%	-9.0%	-23.5%	-3.8%	-11.6%	-7.6%
512	-20.8%	-7.9%	-15.3%	-8.7%	-14.6%	-4.1%	-11.4%	-7.1%
1,024	-19.5%	-7.8%	-16.5%	-9.3%	-14.5%	-2.7%	-14.0%	-11.6%
2,048	-18.8%	-7.1%	-16.5%	-9.2%	-14.5%	-3.3%	-14.2%	-11.8%
4,096	-19.0%	-7.5%	-15.5%	-9.9%	-14.4%	-2.5%	-14.6%	-11.9%
8,192	-24.2%	-8.2%	-15.8%	-10.0%	-14.3%	-2.6%	-16.4%	-11.8%
16,384	-19.9%	-8.9%	-16.1%	-10.5%	-15.4%	-5.8%	-15.1%	-10.9%

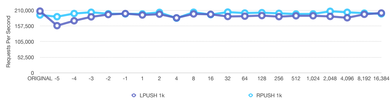


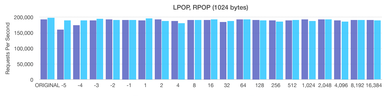


Adaptive Ziplist Length vs. Operations Per Second
(no pipeline, 1M operations per test)

ziplist length	LPUSH 40 bytes	RPUSH 40 bytes	LPUSH 1k	RPUSH 1k	LPOP 40 bytes	RPOP 40 bytes	LPOP 1k	RPOP 1k
ORIGINAL	204,708	210,837	207,598	194,477	205,634	205,002	192,197	198,965
-5	182,083	205,508	158,730	188,857	183,520	200,924	161,005	189,358
-4	204,792	205,973	175,131	199,481	205,170	203,004	174,155	190,114
-3	203,335	206,101	188,253	203,749	196,850	202,184	189,897	194,099
-2	204,876	202,184	196,117	198,689	204,248	199,124	192,901	191,241
-1	203,957	207,383	199,283	198,255	196,541	200,924	190,621	190,585
1	203,128	202,347	194,553	198,177	205,339	200,803	189,430	195,580
2	203,832	205,128	197,161	203,335	193,013	203,169	193,611	198,005
4	204,082	204,415	184,911	183,925	203,791	199,561	187,091	180,245
8	206,526	206,228	198,138	203,791	200,481	203,459	190,512	191,022
16	203,128	202,102	196,812	195,771	203,169	199,481	191,351	193,611
32	207,943	208,203	189,538	204,332	189,825	200,160	184,264	187,336
64	202,347	203,211	190,549	201,126	205,804	201,939	192,604	193,686
128	203,874	203,128	192,530	202,347	202,593	202,716	190,840	190,186
256	197,239	207,125	189,036	200,080	204,541	199,880	189,286	186,047
512	207,039	203,625	191,865	197,863	204,825	206,101	190,367	191,205
1,024	202,758	203,376	191,939	198,020	202,061	200,844	192,678	187,266
2,048	210,084	204,625	189,753	207,039	203,832	199,920	192,678	192,308
4,096	207,555	204,666	185,185	203,666	198,452	204,040	189,036	186,220
8,192	204,625	202,102	196,850	200,803	201,329	206,101	190,840	190,840
16,384	204,082	208,030	201,207	196,413	204,040	204,082	191,205	189,753

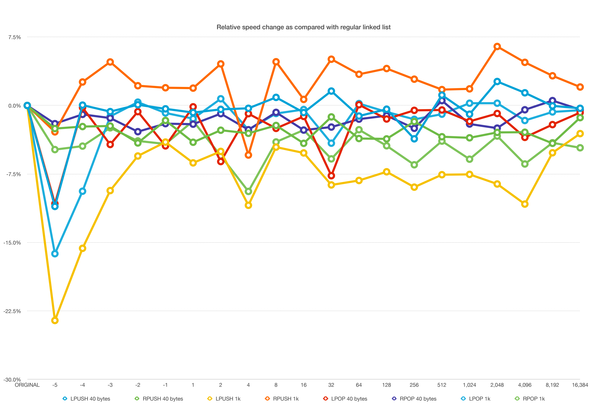


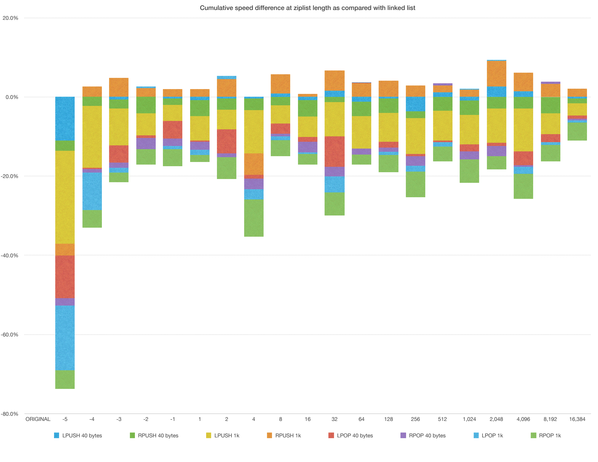




Speed Difference Vs. Original

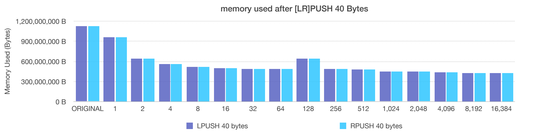
	LPUSH 40 bytes	RPUSH 40 bytes	LPUSH 1k	RPUSH 1k	LPOP 40 bytes	RPOP 40 bytes	LPOP 1k	RPOP 1k
ORIGINAL	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
-5	-11.1%	-2.5%	-23.5%	-2.9%	-10.8%	-2.0%	-16.2%	-4.8%
-4	0.0%	-2.3%	-15.6%	2.6%	-0.2%	-1.0%	-9.4%	-4.4%
-3	-0.7%	-2.2%	-9.3%	4.8%	-4.3%	-1.4%	-1.2%	-2.4%
-2	0.1%	-4.1%	-5.5%	2.2%	-0.7%	-2.9%	0.4%	-3.9%
-1	-0.4%	-1.6%	-4.0%	1.9%	-4.4%	-2.0%	-0.8%	-4.2%
1	-0.8%	-4.0%	-6.3%	1.9%	-0.1%	-2.0%	-1.4%	-1.7%
2	-0.4%	-2.7%	-5.0%	4.6%	-6.1%	-0.9%	0.7%	-5.5%
4	-0.3%	-3.0%	-10.9%	-5.4%	-0.9%	-2.7%	-2.7%	-9.4%
8	0.9%	-2.2%	-4.6%	4.8%	-2.5%	-0.8%	-0.9%	-4.0%
16	-0.8%	-4.1%	-5.2%	0.7%	-1.2%	-2.7%	-0.4%	-2.7%
32	1.6%	-1.2%	-8.7%	5.1%	-7.7%	-2.4%	-4.1%	-5.8%
64	-1.2%	-3.6%	-8.2%	3.4%	0.1%	-1.5%	0.2%	-2.7%
128	-0.4%	-3.7%	-7.3%	4.0%	-1.5%	-1.1%	-0.7%	-4.4%
256	-3.6%	-1.8%	-8.9%	2.9%	-0.5%	-2.5%	-1.5%	-6.5%
512	1.1%	-3.4%	-7.6%	1.7%	-0.5%	0.5%	-1.0%	-3.9%
1,024	-1.0%	-3.5%	-7.5%	1.8%	-1.7%	-2.0%	0.3%	-5.9%
2,048	2.6%	-2.9%	-8.6%	6.5%	-0.9%	-2.5%	0.3%	-3.3%
4,096	1.4%	-2.9%	-10.8%	4.7%	-3.5%	-0.5%	-1.6%	-6.4%
8,192	-0.0%	-4.1%	-5.2%	3.3%	-2.1%	0.5%	-0.7%	-4.1%
16,384	-0.3%	-1.3%	-3.1%	2.0%	-0.8%	-0.4%	-0.5%	-4.6%

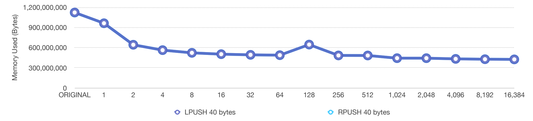


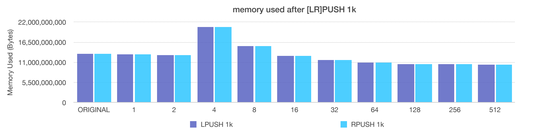


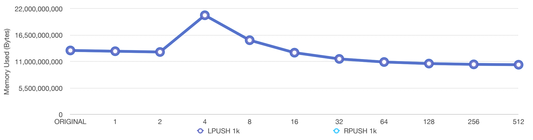
Ziplist Length vs. Memory Used
(pipeline of 1000 requests, 10M operations per test)

ziplist length	LPUSH 40 bytes	RPUSH 40 bytes	LPUSH 1k	RPUSH 1k	LPOP 40 bytes	RPOP 40 bytes	LPOP 1k	RPOP 1k
ORIGINAL	1,123,530,936	1,122,186,936	13,329,642,936	13,330,970,936	506,824	506,824	19,098,936	9,802,936
1	962,906,920	963,002,920	13,170,362,920	13,167,738,920	506,824	506,824	37,242,920	18,874,920
2	641,978,920	642,298,920	13,009,754,920	13,011,050,920	506,824	506,824	506,824	506,984
4	561,850,920	562,242,920	20,638,634,920	20,644,802,920	506,824	506,824	506,824	506,824
8	521,806,920	521,962,920	15,454,406,920	15,460,566,920	506,824	506,824	26,686,920	9,746,920
16	501,906,920	501,656,936	12,869,222,920	12,865,378,984	506,824	506,824	506,824	5,634,920
32	492,025,800	491,682,920	11,572,014,920	11,572,014,920	506,824	506,824	29,335,016	506,824
64	487,010,312	486,767,944	10,929,046,920	10,930,136,968	506,824	506,824	5,953,032	22,278,984
128	644,868,648	644,483,144	10,602,092,040	10,606,316,008	506,824	506,824	506,824	16,354,024
256	482,959,944	483,298,984	10,439,205,032	10,440,245,544	506,824	506,824	506,824	22,353,544
512	482,142,920	482,333,384	10,364,481,512	10,358,287,976	506,824	506,824	506,824	26,309,192
1,024	442,361,128	442,008,616	1,036,641,992	1,053,284,552	506,824	506,824	1,430,472	9,391,432
2,048	442,335,464	442,024,040	1,034,885,480	1,051,576,936	506,824	506,824	680,008	13,229,320
4,096	431,529,480	431,914,568	2,051,529,416	2,084,297,544	506,824	506,824	506,824	506,824
8,192	426,566,952	427,201,896	1,538,706,312	1,562,221,512	506,824	506,824	506,824	506,824
16,384	424,163,496	424,380,616	1,283,130,344	1,309,131,784	506,824	506,824	1,026,376	506,824



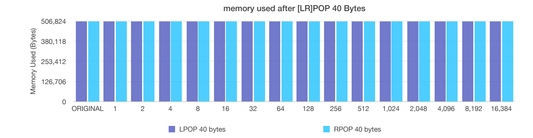


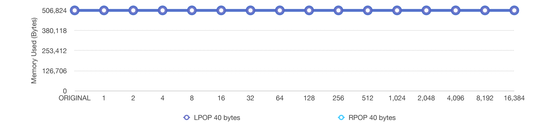


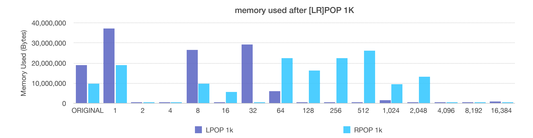


For ziplist lengths 1,024 and higher, we run 1 million operations per test instead of 10 million operations per test.

It doesn't make sense to include the memory usage of 1,024+ here because it's not running the same number of inserts.

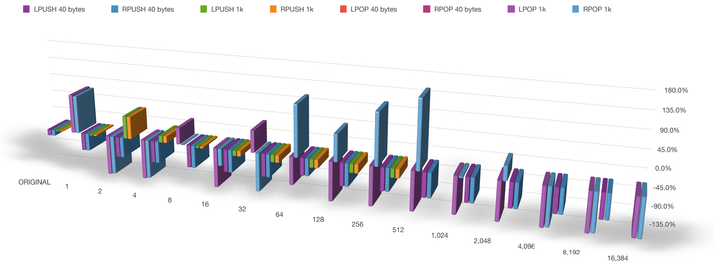


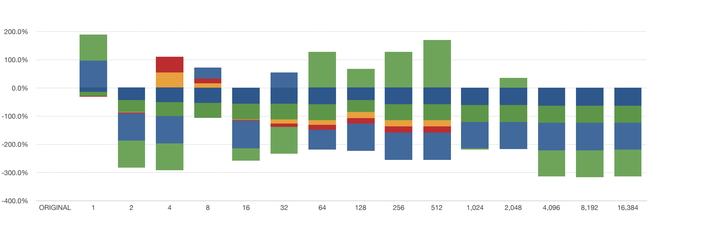




Memory Difference vs. Original

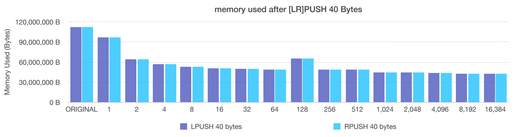
	LPUSH 40 bytes	RPUSH 40 bytes	LPUSH 1k	RPUSH 1k	LPOP 40 bytes	RPOP 40 bytes	LPOP 1k	RPOP 1k
ORIGINAL	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	-14.3%	-14.2%	-1.2%	-1.2%	0.0%	0.0%	95.0%	92.5%
2	-42.9%	-42.8%	-2.4%	-2.4%	0.0%	0.0%	-97.3%	-94.8%
4	-50.0%	-49.9%	54.8%	54.9%	0.0%	0.0%	-97.3%	-94.8%
8	-53.6%	-53.5%	15.9%	16.0%	0.0%	0.0%	39.7%	-0.6%
16	-55.3%	-55.3%	-3.5%	-3.5%	0.0%	0.0%	-97.3%	-42.5%
32	-56.2%	-56.2%	-13.2%	-13.2%	0.0%	0.0%	53.6%	-94.8%
64	-56.7%	-56.6%	-18.0%	-18.0%	0.0%	0.0%	-68.8%	127.3%
128	-42.6%	-42.6%	-20.5%	-20.4%	0.0%	0.0%	-97.3%	66.8%
256	-57.0%	-56.9%	-21.7%	-21.7%	0.0%	0.0%	-97.3%	128.0%
512	-57.1%	-57.0%	-22.2%	-22.3%	0.0%	0.0%	-97.3%	168.4%
1,024	-60.6%	-60.6%			0.0%	0.0%	-92.5%	-4.2%
2,048	-60.6%	-60.6%			0.0%	0.0%	-96.4%	35.0%
4,096	-61.6%	-61.5%			0.0%	0.0%	-97.3%	-94.8%
8,192	-62.0%	-61.9%			0.0%	0.0%	-97.3%	-94.8%
16,384	-62.2%	-62.2%			0.0%	0.0%	-94.6%	-94.8%

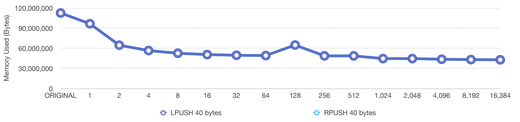


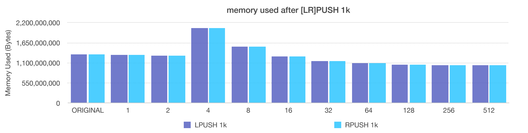


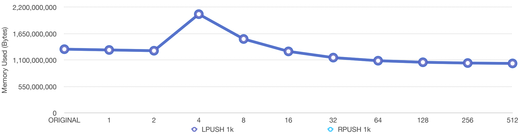
Ziplist Length vs. Memory Used
(no pipeline)

ziplist length	LPUSH 40 bytes	RPUSH 40 bytes	LPUSH 1k	RPUSH 1k	LPOP 40 bytes	RPOP 40 bytes	LPOP 1k	RPOP 1k
ORIGINAL	112,506,952	112,506,952	1,328,506,952	1,328,506,952	506,840	506,840	506,840	506,840
1	96,506,936	96,506,936	1,312,506,936	1,312,506,936	506,840	506,840	506,840	506,840
2	64,506,936	64,506,936	1,296,506,936	1,296,506,936	506,840	506,840	506,840	506,840
4	56,506,936	56,506,936	2,056,506,936	2,056,506,936	506,840	506,840	506,840	506,840
8	52,506,936	52,506,936	1,540,506,936	1,540,506,936	506,840	506,840	506,840	506,840
16	50,506,936	50,506,936	1,282,506,936	1,282,506,936	506,840	506,840	506,840	506,840
32	49,506,936	49,506,936	1,153,506,936	1,153,506,936	506,840	506,840	506,840	506,840
64	49,006,936	49,006,936	1,089,006,936	1,089,006,936	506,840	506,840	506,840	506,840
128	64,755,928	64,755,928	1,056,759,000	1,056,759,000	506,840	506,840	506,840	506,840
256	48,631,960	48,631,960	1,040,635,032	1,040,635,032	506,840	506,840	506,840	506,840
512	48,569,464	48,569,464	1,032,573,048	1,032,573,048	506,840	506,840	506,840	506,840
1,024	44,537,432	44,537,432	103,712,888	103,712,888	506,840	506,840	506,840	506,840
2,048	44,521,816	44,521,816	103,707,224	103,707,224	506,840	506,840	506,840	506,840
4,096	43,514,584	43,514,584	203,583,320	203,583,320	506,840	506,840	506,840	506,840
8,192	43,010,968	43,010,968	153,251,288	153,251,288	506,840	506,840	506,840	506,840
16,384	42,759,160	42,759,160	128,085,272	128,085,272	506,840	506,840	506,840	506,840



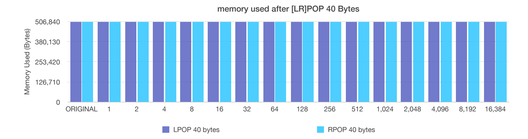


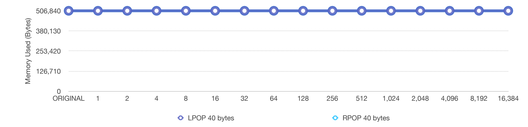


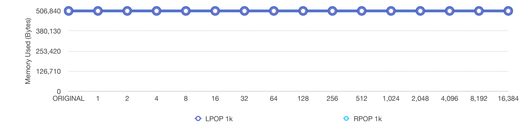


For ziplist lengths 1,024 and higher, we run 1 million operations per test instead of 10 million operations per test.

It doesn't make sense to include the memory usage of 1,024+ here because it's not running the same number of inserts.

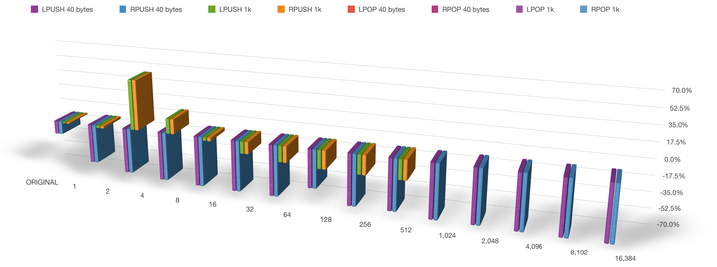


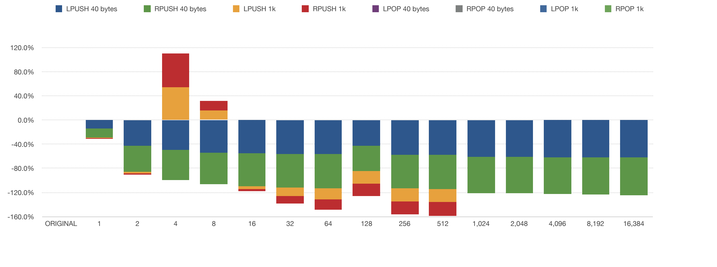




Memory Difference vs. Original

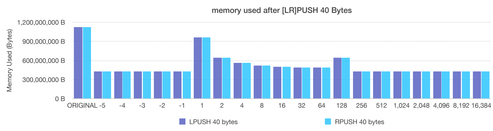
	LPUSH 40 bytes	RPUSH 40 bytes	LPUSH 1k	RPUSH 1k	LPOP 40 bytes	RPOP 40 bytes	LPOP 1k	RPOP 1k
ORIGINAL	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	-14.2%	-14.2%	-1.2%	-1.2%	0.0%	0.0%	0.0%	0.0%
2	-42.7%	-42.7%	-2.4%	-2.4%	0.0%	0.0%	0.0%	0.0%
4	-49.8%	-49.8%	54.8%	54.8%	0.0%	0.0%	0.0%	0.0%
8	-53.3%	-53.3%	16.0%	16.0%	0.0%	0.0%	0.0%	0.0%
16	-55.1%	-55.1%	-3.5%	-3.5%	0.0%	0.0%	0.0%	0.0%
32	-56.0%	-56.0%	-13.2%	-13.2%	0.0%	0.0%	0.0%	0.0%
64	-56.4%	-56.4%	-18.0%	-18.0%	0.0%	0.0%	0.0%	0.0%
128	-42.4%	-42.4%	-20.5%	-20.5%	0.0%	0.0%	0.0%	0.0%
256	-56.8%	-56.8%	-21.7%	-21.7%	0.0%	0.0%	0.0%	0.0%
512	-56.8%	-56.8%	-22.3%	-22.3%	0.0%	0.0%	0.0%	0.0%
1,024	-60.4%	-60.4%			0.0%	0.0%	0.0%	0.0%
2,048	-60.4%	-60.4%			0.0%	0.0%	0.0%	0.0%
4,096	-61.3%	-61.3%			0.0%	0.0%	0.0%	0.0%
8,192	-61.8%	-61.8%			0.0%	0.0%	0.0%	0.0%
16,384	-62.0%	-62.0%			0.0%	0.0%	0.0%	0.0%

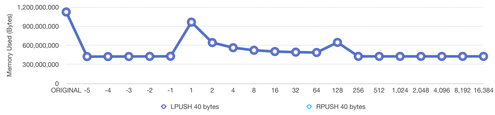


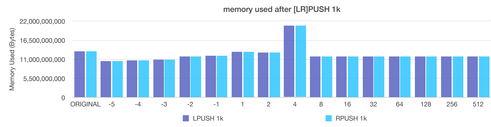


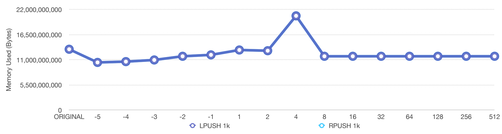
Adaptive Ziplist Length vs. Memory Used
(pipeline of 1000 requests, 10M operations per test)

ziplist length	LPUSH 40 bytes	RPUSH 40 bytes	LPUSH 1k	RPUSH 1k	LPOP 40 bytes	RPOP 40 bytes	LPOP 1k	RPOP 1k
ORIGINAL	1,123,530,936	1,122,186,936	13,329,642,936	13,330,970,936	506,824	506,824	19,098,936	9,802,936
-5	422,289,512	422,035,432	10,448,718,600	10,444,555,016	506,856	506,856	34,856,424	3,629,640
-4	423,036,552	422,868,456	10,624,533,576	10,623,475,752	506,856	506,856	506,856	33,307,272
-3	423,862,792	423,526,760	10,985,002,504	10,986,094,152	506,856	506,856	506,856	16,922,952
-2	425,062,728	425,654,856	11,791,373,480	11,790,198,472	506,856	506,856	28,707,048	5,206,472
-1	427,350,760	426,882,920	12,100,848,392	12,099,642,952	506,856	506,856	33,051,240	34,256,392
1	963,002,952	963,290,952	13,167,738,952	13,170,362,952	506,856	506,856	13,626,952	1,818,952
2	642,682,952	641,658,952	13,009,754,952	13,008,458,952	506,856	506,856	506,856	39,387,112
4	562,242,952	561,794,952	20,640,690,952	20,638,634,952	506,856	506,856	506,856	19,010,952
8	521,806,952	521,702,952	11,791,373,480	11,789,027,048	506,856	506,856	14,605,480	4,035,048
16	501,606,952	501,806,952	11,791,373,480	11,791,373,480	506,856	506,856	15,781,512	506,856
32	491,633,832	492,711,976	11,790,198,472	11,796,075,016	506,856	506,856	29,883,080	20,483,048
64	486,622,344	486,476,968	11,791,373,480	11,792,548,232	506,856	506,856	29,878,760	1,682,984
128	645,254,696	644,833,448	11,791,373,480	11,792,548,232	506,856	506,856	506,856	11,083,016
256	426,035,752	425,950,920	11,794,898,984	11,789,027,048	506,856	506,856	33,404,264	9,906,984
512	425,781,320	425,823,464	11,791,373,480	11,794,898,984	506,856	506,856	22,830,504	5,206,472
1,024	425,358,792	425,654,856	1,210,610,984	1,209,434,952	506,856	506,856	24,005,512	26,354,984
2,048	425,613,736	425,823,464	1,211,787,016	1,209,434,952	506,856	506,856	20,483,048	24,004,232
4,096	425,823,464	425,272,456	1,209,434,952	1,208,260,232	506,856	506,856	25,178,952	24,004,232
8,192	425,823,464	425,399,912	1,210,610,984	1,208,260,232	506,856	506,856	20,479,752	24,004,232
16,384	425,781,320	425,613,736	1,211,787,016	1,208,260,232	506,856	506,856	26,354,984	1,682,984



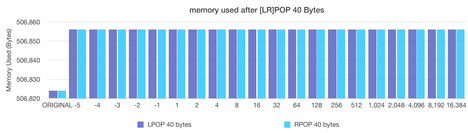


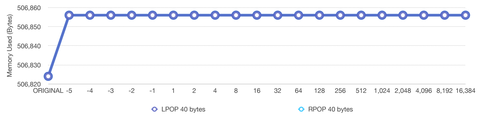




For ziplist lengths 1,024 and higher, we run 1 million operations per test instead of 10 million operations per test.

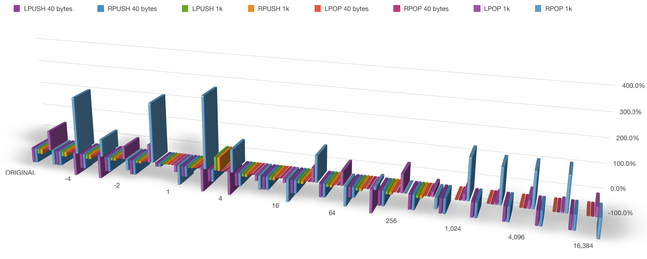
It doesn't make sense to include the memory usage of 1,024+ here because it's not running the same number of inserts.

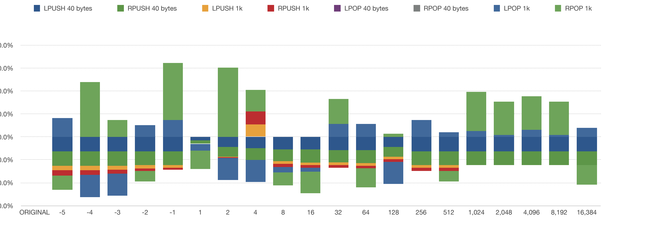




Memory Difference vs. Original

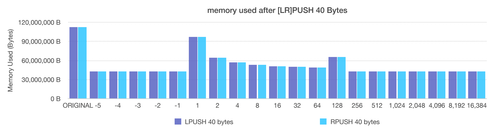
	LPUSH 40 bytes	RPUSH 40 bytes	LPUSH 1k	RPUSH 1k	LPOP 40 bytes	RPOP 40 bytes	LPOP 1k	RPOP 1k
ORIGINAL	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
-5	-62.4%	-62.4%	-21.6%	-21.7%	0.0%	0.0%	82.5%	-63.0%
-4	-62.3%	-62.3%	-20.3%	-20.3%	0.0%	0.0%	-97.3%	239.8%
-3	-62.3%	-62.3%	-17.6%	-17.6%	0.0%	0.0%	-97.3%	72.6%
-2	-62.2%	-62.1%	-11.5%	-11.6%	0.0%	0.0%	50.3%	-46.9%
-1	-62.0%	-62.0%	-9.2%	-9.2%	0.0%	0.0%	73.1%	249.5%
1	-14.3%	-14.2%	-1.2%	-1.2%	0.0%	0.0%	-28.7%	-81.4%
2	-42.8%	-42.8%	-2.4%	-2.4%	0.0%	0.0%	-97.3%	301.8%
4	-50.0%	-49.9%	54.8%	54.8%	0.0%	0.0%	-97.3%	93.9%
8	-53.6%	-53.5%	-11.5%	-11.6%	0.0%	0.0%	-23.5%	-58.8%
16	-55.4%	-55.3%	-11.5%	-11.5%	0.0%	0.0%	-17.4%	-94.8%
32	-56.2%	-56.1%	-11.5%	-11.5%	0.0%	0.0%	56.5%	108.9%
64	-56.7%	-56.6%	-11.5%	-11.5%	0.0%	0.0%	56.4%	-82.8%
128	-42.6%	-42.5%	-11.5%	-11.5%	0.0%	0.0%	-97.3%	13.1%
256	-62.1%	-62.0%	-11.5%	-11.6%	0.0%	0.0%	74.9%	1.1%
512	-62.1%	-62.1%	-11.5%	-11.5%	0.0%	0.0%	19.5%	-46.9%
1,024	-62.1%	-62.1%			0.0%	0.0%	25.7%	168.8%
2,048	-62.1%	-62.1%			0.0%	0.0%	7.2%	144.9%
4,096	-62.1%	-62.1%			0.0%	0.0%	31.8%	144.9%
8,192	-62.1%	-62.1%			0.0%	0.0%	7.2%	144.9%
16,384	-62.1%	-62.1%			0.0%	0.0%	38.0%	-82.8%

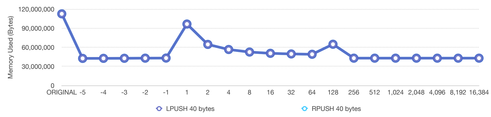


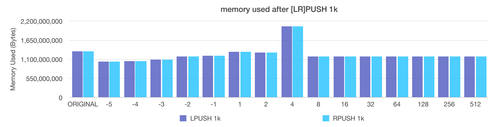


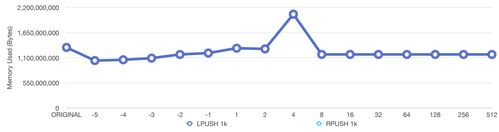
Adaptive Ziplist Length vs. Memory Used
(no pipeline)

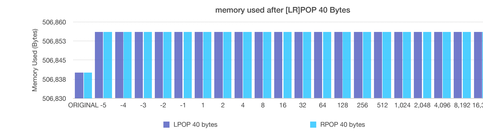
zplist length	LPUSH 40 bytes	RPUSH 40 bytes	LPUSH 1k	RPUSH 1k	LPOP 40 bytes	RPOP 40 bytes	LPOP 1k	RPOP 1k
ORIGINAL	112,506,952	112,506,952	1,328,506,952	1,328,506,952	506,840	506,840	506,840	506,840
-5	42,537,864	42,537,864	1,041,269,128	1,041,269,128	506,856	506,856	506,856	506,856
-4	42,613,960	42,613,960	1,058,571,944	1,058,571,944	506,856	506,856	506,856	506,856
-3	42,708,392	42,708,392	1,094,908,328	1,094,908,328	506,856	506,856	506,856	506,856
-2	42,901,672	42,901,672	1,175,364,232	1,175,364,232	506,856	506,856	506,856	506,856
-1	43,063,816	43,063,816	1,205,840,392	1,205,840,392	506,856	506,856	506,856	506,856
1	96,506,952	96,506,952	1,312,506,952	1,312,506,952	506,856	506,856	506,856	506,856
2	64,506,952	64,506,952	1,296,506,952	1,296,506,952	506,856	506,856	506,856	506,856
4	56,506,952	56,506,952	2,056,506,952	2,056,506,952	506,856	506,856	506,856	506,856
8	52,506,952	52,506,952	1,175,364,232	1,175,364,232	506,856	506,856	506,856	506,856
16	50,506,952	50,506,952	1,175,364,232	1,175,364,232	506,856	506,856	506,856	506,856
32	49,506,952	49,506,952	1,175,364,232	1,175,364,232	506,856	506,856	506,856	506,856
64	49,006,952	49,006,952	1,175,364,232	1,175,364,232	506,856	506,856	506,856	506,856
128	64,755,944	64,755,944	1,175,364,232	1,175,364,232	506,856	506,856	506,856	506,856
256	42,901,672	42,901,672	1,175,364,232	1,175,364,232	506,856	506,856	506,856	506,856
512	42,901,672	42,901,672	1,175,364,232	1,175,364,232	506,856	506,856	506,856	506,856
1,024	42,901,672	42,901,672	117,995,016	117,995,016	506,856	506,856	506,856	506,856
2,048	42,901,672	42,901,672	117,995,016	117,995,016	506,856	506,856	506,856	506,856
4,096	42,901,672	42,901,672	117,995,016	117,995,016	506,856	506,856	506,856	506,856
8,192	42,901,672	42,901,672	117,995,016	117,995,016	506,856	506,856	506,856	506,856
16,384	42,901,672	42,901,672	117,995,016	117,995,016	506,856	506,856	506,856	506,856

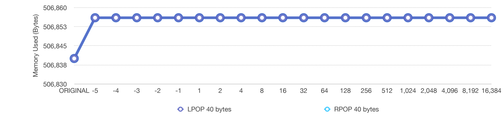


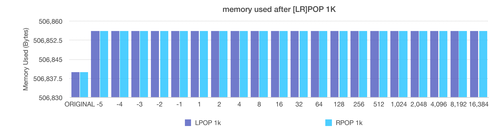


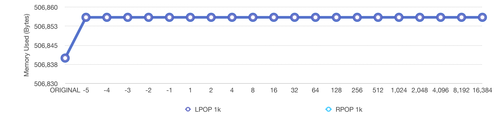


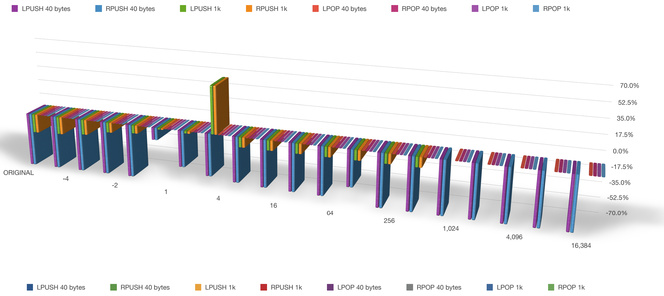
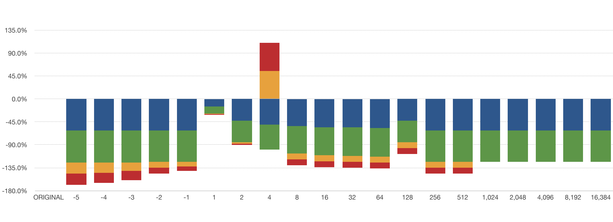










Memory Difference vs. Original

	LPUSH 40 bytes	RPUSH 40 bytes	LPUSH 1k	RPUSH 1k	LPOP 40 bytes	RPOP 40 bytes	LPOP 1k	RPOP 1k
ORIGINAL	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
-5	-62.2%	-62.2%	-21.6%	-21.6%	0.0%	0.0%	0.0%	0.0%
-4	-62.1%	-62.1%	-20.3%	-20.3%	0.0%	0.0%	0.0%	0.0%
-3	-62.0%	-62.0%	-17.6%	-17.6%	0.0%	0.0%	0.0%	0.0%
-2	-61.9%	-61.9%	-11.5%	-11.5%	0.0%	0.0%	0.0%	0.0%
-1	-61.7%	-61.7%	-9.2%	-9.2%	0.0%	0.0%	0.0%	0.0%
1	-14.2%	-14.2%	-1.2%	-1.2%	0.0%	0.0%	0.0%	0.0%
2	-42.7%	-42.7%	-2.4%	-2.4%	0.0%	0.0%	0.0%	0.0%
4	-49.8%	-49.8%	54.8%	54.8%	0.0%	0.0%	0.0%	0.0%
8	-53.3%	-53.3%	-11.5%	-11.5%	0.0%	0.0%	0.0%	0.0%
16	-55.1%	-55.1%	-11.5%	-11.5%	0.0%	0.0%	0.0%	0.0%
32	-56.0%	-56.0%	-11.5%	-11.5%	0.0%	0.0%	0.0%	0.0%
64	-56.4%	-56.4%	-11.5%	-11.5%	0.0%	0.0%	0.0%	0.0%
128	-42.4%	-42.4%	-11.5%	-11.5%	0.0%	0.0%	0.0%	0.0%
256	-61.9%	-61.9%	-11.5%	-11.5%	0.0%	0.0%	0.0%	0.0%
512	-61.9%	-61.9%	-11.5%	-11.5%	0.0%	0.0%	0.0%	0.0%
1,024	-61.9%	-61.9%			0.0%	0.0%	0.0%	0.0%
2,048	-61.9%	-61.9%			0.0%	0.0%	0.0%	0.0%
4,096	-61.9%	-61.9%			0.0%	0.0%	0.0%	0.0%
8,192	-61.9%	-61.9%			0.0%	0.0%	0.0%	0.0%
16,384	-61.9%	-61.9%			0.0%	0.0%	0.0%	0.0%