

DAV2 MB

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Routing Algorithm Viability Report

The dataset shows a series of samples, 42 data packets passing through 2 servers, server 1 with the old sorting algorithm and server 2 with the new. The purpose of this dataset is to be used identify the difference in latency between server 1 and 2's routing algorithms, and by extension the effectiveness or improvement of the new routing algorithm, and if this improvement is significant.

Hypotheses:

1.) A reasonable hypothesis would be that Server 2 will have a fairly reliable, or consistent, improvement in latency compared to server 1, having *roughly* the same difference in latency at each data point // a low average deviation from the average difference.

2.) Another, more important, hypothesis is the expectation that server 2 will nearly always have a lower latency than server 1, as it is intended to be a better sorting algorithm.

Methods of analysis:

The first step of analysing this data is to do a few things; the average latency for each server, calculate the differences of latency at each data point, the average difference in latency and to create a graph showing the latencies of each server.

Each of these will create a simple and accessible set of visuals to easily identify core aspects and details of the dataset.

It is also important to identify anomalies in the data and calculate these statistics without the anomalies.

Data:

Data Packet	Server 1 Latency (ms)	Server 2 Latency (ms)	Difference
1	85.2	78.1	7.1
2	88.6	76.3	12.3
3	84.4	77.9	6.5
4	87	75.4	11.6
5	86.1	76.5	9.6
6	89.3	79	10.3
7	90.5	80.2	10.3
8	87.8	77.1	10.7
9	85.7	75.8	9.9
10	86.9	76.2	10.7
11	89	78.9	10.1

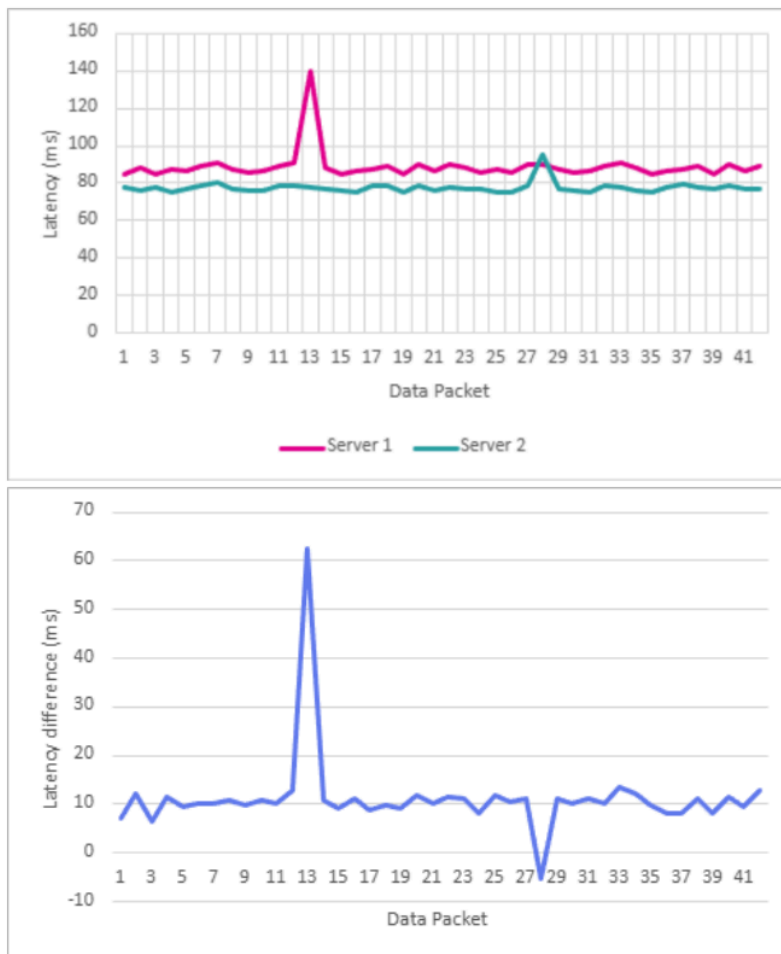
12	91.2	78.5	12.7
13	140 (anomaly)	77.4	62.6
14	88.2	77.3	10.9
15	85	76	9
16	86.4	75.1	11.3
17	87.5	78.7	8.8
18	88.8	79.1	9.7
19	84.9	75.6	9.7
20	90.1	78.3	11.8
21	86.6	76.4	10.2
22	89.6	78	11.6
23	88.1	76.9	11.2
24	85.3	77	8.3
25	87.2	75.3	11.9
26	86	75.5	10.5
27	89.9	78.6	11.3
28	90.3	95.6 (anomaly*)	-5.3
29	87.7	76.6	11.1
30	85.8	75.7	10.1
31	86.5	75.2	11.3
32	89.2	78.9	10.3
33	91	77.5	13.5
34	88.3	76.1	12.2
35	84.8	75	9.8
36	86.2	78.2	8
37	87.3	79.2	8.1
38	88.9	77.8	11.1
39	85.1	76.8	8.3
40	90	78.4	11.6
41	86.7	77.2	9.5
42	89.5	76.7	12.8

Packet 13 contains a clear anomaly and 28 may* contain an anomaly.

Average latency difference (with / without anomaly / /anomalies*): 11.252381ms / 10ms
// 10.3825ms

Average latency on server 1: 88.87142857ms // 87.5575ms

Average latency on server 2: 77.61904762ms // 77.175ms



Testing of hypotheses:

(to P levels, 0.1, 0.05 and 0.01)

1.) We can calculate the consistency of the difference in latency by first, discarding the definite anomaly at packet 13, then calculating the mean of the difference (10ms), after that the average deviation from the mean, which is exactly 0.

Despite how much this result surprises me, exactly 0 deviation from the mean would be an accepted hypothesis.

If you also removed the arguable anomaly at packet 28, you would have a mean deviation of 0.0000000000000000355, practically 0. This would still accept the hypothesis at all 3 P levels.

Ergo, the improvement in latency is significantly consistent.

[\[Excel sheet used to calculate\]](#) (Please try to contact me if this doesn't work)

2.) When we calculate how many times server 2's latency is lower than server 1's, we find that in all but 1 of 42 (or 1 in 41 if you remove the definite hypothesis) cases; server 2's latency is lower. A.K.A; 2.38095238095% (2.43902439024%).

This means every Significance level would reject the null hypothesis, as 1 singular exception is too small of a number to reasonably accept as any more than random chance. Therefore, the improvement in latency is significant.

Conclusion

It is very easy to conclude that the new routing algorithm is a significant improvement over the old routing algorithm.

However, this dataset is, all things considered; quite small. To reach a firmer conclusion, or to further prove the aforementioned conclusion, you would need a much larger dataset.

FINAL GRADE

GENERAL COMMENTS

40/100

Generic Assessment Criteria	Marks available	Marks awarded
1. Engagement with Literature Skills	10	
No bibliography or referencing.		0
2. Knowledge and Understanding Skills	30	
Some research shown would have helped to recognise the proper manner to lay out the hypothesis and tests. Some discussion in detail of the descriptive statistics would have been desirable. Setting up the experiment properly would have been a better way to go.		13

3. Cognitive and Intellectual Skills	30	
A detailed interpretation of results would have been desirable, showing explicit acceptance or rejection of both H0 and H1. Recognition of statistical significance is shown and the significance values of 0.05, 0.01 and 0.1 was reasonable. A method for recognising the outlier(s) would have been desirable.		14
4. Practical Application Skills	20	
A reasonable H0 and H1 may have been more beneficial to maybe use $H_0 = S_1 \leq S_2$ if $H_1 = S_1 > S_2$ for a one tailed test or $H_0 = S_1 = S_2$ if $H_1 = S_1 \neq S_2$. Reasonable use of line graph to show comparisons however these should have been captioned.		8
85. Transferable Skills for Life and Professional Practice	10	
		5

There is a structure with sectioning, however a much more academic style of writing would have been desirable.		
Cover page and contents as well as references would have been beneficial.		

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