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# Research Review

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INVESTIGATING QoS OF REAL-WORLD WEB SERVICES

CS4457 NETWORKS II

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## Summary

The authors of “Investigating QoS of Real-World Web Services” intended to communicate the difficulty of determining the large scale quality of service (QoS) of web services and explain why the quality is important to document. I feel the paper successfully demonstrated the difficulty of determining the QoS of the entire internet, but the methods it used in its experiments were flawed due to the enormous scale it was targeting.

The authors claim that the paper contributes a large amount of data about average quality of service experienced when sampling the majority of public web services. This is proposed to be useful because the data can continue to be reflected upon and processed for more insight into real world QoS. The authors stress the importance of understanding quality of service metrics for real world web services because they help choose the best web service out of all the choices and they help critical systems reduce downtime. Despite these claims, the experiments conducted were not directly showing these benefits and therefore I didn't find it a convincing argument. The data was collected in three separate experiments starting from 2009. The users participating in the experiments are distributed by crowd sourcing using an online platform. The experiments were conducted on a large sample set of web services (21358 services) collected from search engines and web service registries. The three experiments tested failure probability, response time/throughput, and time-aware performance.

The first test illustrated a large variation between successful web service invocations and failures indicating an unpredictable experience for the user. The experiment looked at how many invocations failed out of the total and made assumptions about the causes.

The second test showed that most response times are smaller than 1.6 seconds and throughput values are smaller than 64kbps. Similarly to the first test this experiment also showed a difference in between users. The authors repetitively mention this but do not acknowledge that this is a flaw in the testing process.

The third experiment aimed to prove that different web services perform differently during different times of the day. Invocation web services from around the world at different times produced a wide range of values that do not prove any conclusive statement.

I feel all three experiments lacked validity as many variables were ignored entirely.

## Technical Analysis

The major strength of the solution proposed in this paper is the collection of a vast amount of data regarding web service QoS. This data will allow for more research into this field revolving around topics such as: QoS prediction, fault-tolerant systems, and web service selection.

The weaknesses in the proposed solution are a result of assumptions made about the data and ignoring variables when making conclusions. When collecting the initial data the authors accepted every web service they could find into the data set and then filtered out the ones that didn't respond. They ignored the quality each service is attempting to provide. For example, someone could have created a web service just for prototyping and was never intended to be used publicly and this service would be included in the data set.

Furthermore, we can see from the outcome of the experiments that the statistics are always widely distributed. I suspect this is due to some users having better internet connections than others. This fact completely invalidates all performance related data as user sided connection can have a large impact on overall performance. The service used to provide distributed users does not ensure they have a decent internet connection.

## Suggestions & Presentation

One way to improve the validity of the experiments is to control the network variables for the users participating. If we can ensure each user has an identical network connection, it will be easier to narrow down problems on the service side.

Another way to improve the conclusions we can make from this data is to first filter the data for reputable web services that claim to provide a public service, and then group up the services based on general functionality. Then run the same method invocations on each group of services and compare the performance between them. This method will provide much more information on which types of web services provide good quality of service and which ones do not

The paper was well presented with numerous figures aiding in the explanation of each test. The publication followed a logical format and was easy to understand what the author wanted to communicate. The points were expressed in a concise manner and the length of the article was appropriate