## Summary of Quality Model for Web Services (OASIS Web Services Quality Model TC) document

Web Service Quality Model consists of :

1.    Quality Factor of Web Services
2.    Quality Associates for Web Services
3.    Quality Activities of Web Services

1.    Quality Factor of Web Services

Web service quality as a service is literally the quality of using a Web service and depending on the views of using a service, it can be considered roughly in three layers. These 3 layers are:

    1.1    User's View
    1.2    Interoperability View
    1.3    Management & Security View

    1.1    User's View layer can be subdivided into 2 type of quality:

        1.1.1    Business Value Quality
        1.1.2    Service Level Measurement Quality

    1.2    Interoperability View can be subdivided into 2 type of quality

        1.2.1    Interoperability Quality
        1.2.2    Business Process Quality

    1.3    Management & Security View can be subdivided into 2 type of quality

        1.3.1    Management Quality
        1.3.2    Security Quality


2.    Quality Associates for Web Services

Quality Associates is the person who is related to each step of Web services life cycle. They are :

stakeholder
Developer
Provider
Consumer
QoS Broker
Quality Assurer
Quality Manager


3.    Quality Activity of Web Services

Quality Activity means the actions that should be required for securing a Web service quality and specifications. They are :

Development Quality Contract
Web Service Quality Contract
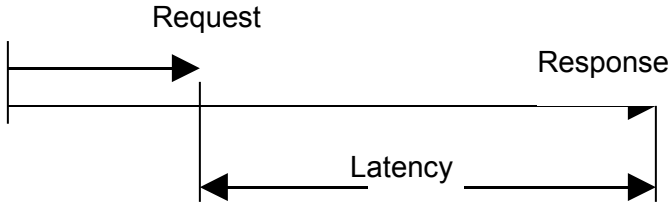

## Comparison between WSQM and QoS FE

In Service level Measurement Quality of WSQM (Item 1.1.2 of this document),  5 measurements are being mentioned. I have compared the 5 measurements with the one that we did (QoS FE) in a table form (Table 1).  I think we should rename QoS FE to QoS Measurement FE because this FE only measures the quality and nothing else. If we used QoS FE, then it will include many qualities like Business quality, Interoperability quality, Security Quality FE and many others)

Service Level Measurement Quality in WSQM is the quality that a user perceives when actually using Web services. The quality generally means how fast a Web service is provided and/or how stable it is provided, all of which are measurable at all times.

Service Level Measurement Quality in WSQM is subdivided into performance measurement sub-factors. They are:

Response Time
Maximum Throughput
Availability
Successability
Accessibility

**Table 1 : Comparison between measurement in WSQM with measurement in QoS FE**

| 1. Response Time | |
|---|---|
| WSQM | It means the time taken to send a request and to receive the response. The Response Time is measured at an actual Web service call and it can be calculated by applying the following formula. The Response Completion Time is the time that all the data for response arrives at a user, while the User Request Time is the time when the user sends a request. In general, the Response Time is calculated by the mean value during a certain time.<br><br>Response time = Response Completion Time �User Request Time |
| QoS FE | This use case allows the user to measure the performance of a Web Service. In Performance both Latency and Throughput are measured. For throughput, user sets a period of measurement. Throughput is derived as the total number of invocations for the given period of measurement. For Latency, user logs the request time and response time of invocation. Latency is derived by the response time minus the request time of the invocation.<br><br>**invoke**<br>Request<br>Response<br>Latency |

| 2. Maximum Throughput/ Throughput | |
|---|---|
| WSQM | Maximum Throughput<br><br>It means the max number of services that a platform providing Web services can process for a unit time. Throughput can be used as a performance index to evaluate a Web services provider. How many it can process also means how many users it can process concurrently in a web. The Maximum Throughput can be calculated with the following formula.<br><br>$$\text{Maximum Throughput} = \frac{\text{max complete requests}}{\text{unit time}}$$ |
| QoS FE | Throughput<br><br>For throughput, user sets a period of measurement. Throughput is derived as the total number of invocations for the given period of measurement. |

| 3. Availability | |
|---|---|
| WSQM | Availability is defined as the ratio of time period in which a Web service exists or it is ready for use, that is, the Web service is maintained. Assuming that the time when a system is not available is 'Down Time' and the time when a system is available is 'Up Time,' the Availability is the average Up Time. To get Availability, instead of monitoring Up Time continuously, we suggest using the Down Time. Down Time could be obtained by monitoring system down events occurred in operation. The following formula calculates the Availability while unit time is a time to measure the time.<br><br>$$Availability = 1 - \frac{Down\ Time}{Unit\ Time}$$ |
| QoS FE | This use case allows the user to measure the availability of a known Web Service. User sets a period of measurement and the frequency of invocation. The result of this measure is in percentage. It is derived by using the successful invocations divided by total invocations for the given period of measurement.<br>Total uptime – downtime / Total uptime X 100 %<br>= ((number of successful invocation X frequency of invocation)/period of measurement))X100%<br>= (number of successful invocations/total invocations) X100% |


| 4. Successability/ Reliability | |
|---|---|
| WSQM | Successability<br><br>Successability is defined as the extent to which Web services yield successful results over request messages. Successability means the degree to which a service is fulfilled in a given time according to an agreed contract. Successability can be calculated as the number of successful response messages over the number of request messages. That is, it represents the ratio of successfully returned messages after requested tasks are performed without errors.<br><br>$$Successability = \frac{number\ of\ response\ messages}{number\ of\ request\ messages}$$ |
| QoS FE | Reliability<br><br>This use case allows the user to measure the reliability of a known Web Service. User sets a period of measurement. The number of failures over a period of time is the measure of Reliability. It is derived as the unsuccessful invocations for the given period of measurement. |

| 5. Accessibility | |
|---|---|
| WSQM | Accessibility represents the degree that a system is normatively operated to counteract request messages without delay. In some cases, a Web service system could be accessible for external users to try accessing its resources even if its services are not available. We can know whether a Web service system is accessible by just inspecting that the system can returns an acknowledgement normally for a request message. Thus, Accessibility can be calculated as the ratio of number of acknowledgements received to the number of request messages.<br><br>$$Accessability = \frac{number\ of\ acks\ received}{number\ of\ request\ messages}$$ |
| QoS FE | This use case allows the user to measure the accessibility of a known Web Service. It is a measure denoting the success rate or chance of a successful service instantiation at a point of time. User sets the number of times of invocations. User invokes the known web service at the number of times set by the user at one go. The result of this measure is in percentage. It is derived by using the successful invocations divided by total invocations for the given period of measurement.<br><br>success rate = successful invocations/total invocations X100% (invocations are fired simultaneously) |

**Suggestions**

1.  To continue with our measurements with the aspects of QoS FE.

2.  Rename the QoS FE to QoS Measurement to better reflect the purpose and scope of the FE.