

A QoS Ontology for Service-based Systems

SUMMARY

One of the research areas DIRC is looking into is the development of ontologies for QoS specification. Originally our project was briefed to focus purely on Grid computing, but this has been widened to consider the requirements of service centric computing as a whole, with regard to the specification of QoS. The focus of our QoS research has been to enhance dependability in services.

QoS considerations affect service development in a number of ways. One of the most important is the establishment of semantic meaning upon which to build higher level services. In order to make use of composite workflow systems, negotiation engines, contractual monitoring, service differentiation middleware etc it is first necessary to ground the concepts and phrases used for shared semantic understanding. An ontology for this type of QoS specification would perform more than a simple QoS taxonomy of terms, also allowing inference between unit / phrase types. In the simplest of cases this could include semantics to indicate that one minute is made up of sixty seconds etc. In more complex scenarios it could indicate how given metrics are composed, from what sub-metrics / values etc.

We are in the process of constructing a QoS ontology using the OWL ontology language, and the Protégé visual design environment. The structure and design of the ontology have been influenced by work put forward in a number of papers and projects, most noticeably in the implementation of parts of Jean-Claude Laprie's dependability classifications. We are also constructing a number of tools to showcase our QoS ontology. These include:

- Requirement specification / Capability specification tools
- Requirement discovery tools
- Requirement / capability differentiation and comparison tools

In order to bring these tools, concepts and ideas into the wider research community, we have submitted and had accepted papers to a number of conferences highlighted below. We are also currently in the process of bringing our ontology to a wider audience through industry collaborations including work for Qinetiq.

For more information on this part of DIRC take a look at the papers listed; or if you have a query email digs-information@lists.sourceforge.net. Below, are a few current screenshots from various aspects of our QoS cycle toolkit.

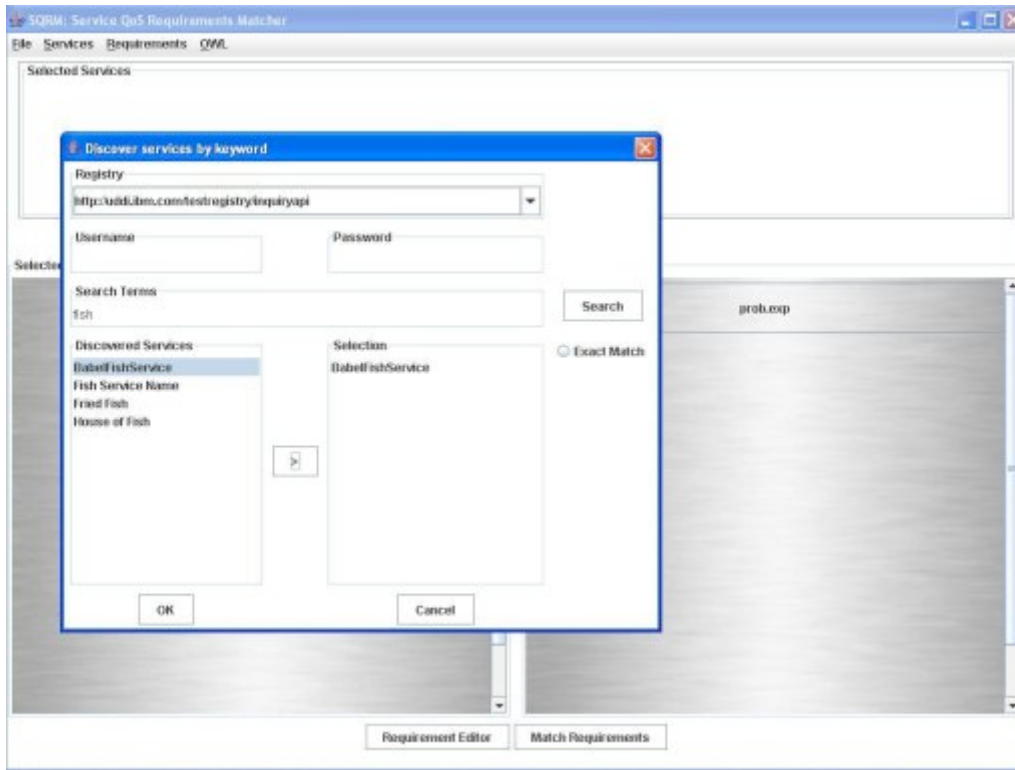


Figure 1: Service discovery using the SQR tool

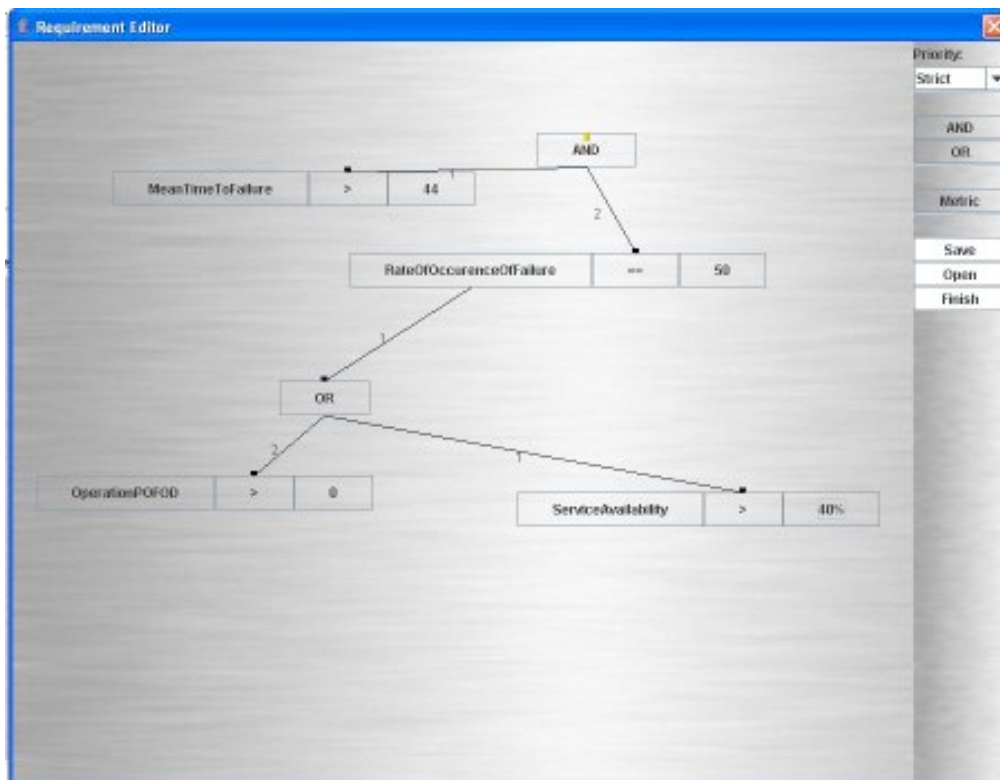


Figure 2: Specifying new requirements through dynamic visual interfaces

PAPERS:

- DIRC2005 Lock R, Dobson G. Developing an ontology for QoS. *Conference Proceedings, Nesc (National e-Science centre) Edinburgh 15-17th March 2005*. pp128-132. ISBN: 1-86220-159-5
- SOCGER2005 Lock R, Dobson G, Sommerville I. Quality of Service Requirement Specification using an Ontology. *Conference Proceedings, Paris, 30th August 2005*.
- AHM2005 Dobson G, Lock R, Sommerville I. QoSOnt: An Ontology for QoS in Service Centric Systems. *Conference Proceedings, Nottingham 18-20th September 2005*
- EuroMicro2005 Lock R, Dobson G, Sommerville I. QoSOnt: A QoS Ontology for Service-Centric Systems. *Conference Proceedings, Porto, Portugal, 31st August - 3rd September*
- eChallenge2005 Lock R, Dobson G, Sommerville I. Addressing the Contract Issue, Standardisation for QoS. *Conference Proceedings, Ljubliana, Slovakia 19-21st October 2005*