

Evolutionary composition of QoS-aware web services: A many-objective perspective

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Resumen Web service based applications often invoke services provided by third-parties in their workflow. The Quality of Service (QoS) provided by the invoked supplier can be expressed in terms of the Service Level Agreement specifying the values contracted for particular aspects like cost or throughput, among others. In this scenario, intelligent systems can support the engineer to scrutinise the service market in order to select those candidates that best fit with the expected composition focusing on different QoS aspects. This search problem, also known as QoS-aware web service composition, is characterised by the presence of many diverse QoS properties to be simultaneously optimised from a multi-objective perspective. Nevertheless, as the number of QoS properties considered during the design phase increases and a larger number of decision factors come into play, it becomes more difficult to find the most suitable candidate solutions, so more sophisticated techniques are required to explore and return diverse, competitive alternatives. With this aim, this paper explores the suitability of many-objective evolutionary algorithms for addressing the binding problem of web services on the basis of a real-world benchmark with 9 QoS properties. A complete comparative study demonstrates that these techniques, never before applied to this problem, can achieve a better trade-off between all the QoS properties, or even promote specific QoS properties while keeping high values for the rest. In addition, this search process can be performed within a reasonable computational cost, enabling its adoption by intelligent and decision-support systems in the field of service oriented computation.

Publicado en: Expert Systems with Applications, vol. 72, pp. 357-370. 2017. DOI: <http://dx.doi.org/10.1016/j.eswa.2016.10.047>.

Keywords: QoS-aware web service composition, many-objective evolutionary algorithms, multi-objective optimization