

Improving a Distributed Software System's Quality of Service via Architecture-Driven Dynamic Redeployment

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Abstract

The quality of service (QoS) provided by a distributed software system depends on many system parameters, such as network bandwidth, reliability of links, frequencies of software component interactions, and so on. A distributed system's deployment architecture (i.e., the mapping of software components onto hardware hosts) can have a significant impact on its QoS. Furthermore, the deployment architecture will influence user satisfaction, as users typically have varying QoS preferences for the system services they access. Finding a deployment architecture that will maximize the users' overall satisfaction is a challenging, multi-faceted problem. In this talk, I will present: (i) an extensible model of a software system's deployment architecture; (ii) a suite of tailorable algorithms for estimating an improved redeployment; (iii) a visual environment for automatically exploring large numbers of deployment options; and (iv) a runtime infrastructure for effecting the preferred deployments during system runtime. I will discuss the evaluation of this approach on a large number of representative scenarios, including two industrial settings.