Topology Aware Analytics for Elastic Cloud Services

Abstract

The popularity of cloud computing and the flexibility that it offers, lead every day more companies moving their digital operations "into the cloud" or expand their existing cloud services portfolio. Cloud developers and service owners have a plethora of tools to assist them with the design, management, monitoring and maintenance process, which come with the deployment of any cloud application. However, recent research report showed that, despite all the above, there is a significant percentage of cloud service deployments that run underutilized and are exposed to hidden costs. Cloud usage and cost analytics tools have been introduced to the market the last five years and aim to help cloud service owners to understand the cloud service deployment resource consumption and expenses. Using deployment metadata, monitoring and cost data, these tools, provide both aggregated information for the cloud service portfolio of a user and specific information about each running instance. However, the information they offer cannot be easily utilized by the developers to optimize a single cloud service deployment. Cloud service developers need to organize the information in a different way, than Managers or IT staff, aiming at the identification of possible issues and the optimization of the cloud service deployment. In this thesis, we propose an analytics tool, targeting cloud service developers that aim to bridge this gap and provide an additional view of the existing information. The keystone of our tool is the cloud service topology, which is a way to graphically represent the blueprint of a cloud service. We organize the monitoring and cost data of a deployment in application components or tiers as previously the developer had described them in the cloud service topology. Furthermore, we apply statistical calculations, in the time-series formatted data to extract insights, such as the trend of the data, and display the effect different application tiers or parameters have to the overall application performance.