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AREA OF EXPERTISE: Distributed management

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DISSSERTATION TITLE: Strategies for Distributing Resource Management Among Autonomous Agents

Resource management of a computer system or network, includes ensuring the performance, reliability, and wellbeing of the system. Sharing and utilisation of computing resources are important issues in this respect in distributed systems, e.g., clouds. As these distributed systems grow in the aspects of size, heterogeneity and complexity, managing them efficiently becomes an increasing challenge.

One proposed solution has been to move the control from a centralised authority to each entity in the system or providing each entity with autonomy involving independent decision-making. However, such de-centralised control traditionally involves a lot of coordination and communication among the autonomous entities.

This PhD research addresses de-centralised coordination of autonomous entities in distributed systems with the goal of achieving efficient management. Further to this, enabling independent decision making at time of operation by autonomous entities will significantly improve resource utilisation. The results indicate that distributed management is feasible when autonomous entities get individually tailored feedback of the effects of their specific behaviour.

What kind of factors that affect precision of management are pursued in order to answer how centralised coordination can be avoided and information exchange minimised between the operating system entities. From the results of this work a novel model for decentralised management is presented. Additionally, theoretical insight into the mechanisms of scenarios governing autonomous agents are offered and this PhD research represent preliminary solutions towards a fully decentralised software system paradigm. It remains to determine whether it is feasible to implement this strategy in a real-world context, which represents a topic worthy of future pursue.