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Grid resource discovery based on distributed learning automata

Abstract

This paper focuses on resource discovery problem for Grid. Grid is a devices and services environment that has evolved with the goal of resource sharing. Grid resource discovery encompasses locating and retrieving computational resources. Existing resource discovery solutions are not well adapted to the dynamicity and heterogeneity of Grid. Query propagation is a novel approach that forwards an unsupported query from its resident peer to an adjacent peer. The concept of next generation intelligent Grid environments needs intelligent modules for resource discovery. Learning automaton is a stochastic tool with learning ability which simply adapts to the progressive environmental changes. The proposed method utilizes a distributed learning automata (DLA) which is a network of learning automata (LA). Here, multiple DLA are used for forwarding domain-specific queries. Different Grid scales are utilized for evaluation of the proposed method. Results demonstrate that the resource discovery based on DLA optimizes resource utilization, maximizes throughput, minimizes response time and avoids overload. Moreover, the algorithm is also scalable, fully distributed and failure-free.

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