Online Reconfiguration of Clustered NoSQL Databases for Time-Varying Workloads

Sophia automatically reconfigures NoSQL databases for optimal performance by predicting future workloads and performing a cost-benefit analysis before initiating any changes.

Innovators at Purdue University developed a system known as Sophia to reconfigure a NoSQL Database Management System for highest throughput as the application characteristics change.

Sophia increases the economic lifecycle of databases through a Cost Benefit Analysis (CBA) coupled with a Reconfiguration Plan, implements intelligent incremental reconfigurations, and predicts future workloads up to an hour ahead using a Workload Predictor, thereby optimizing throughput. In addition, the Sophia program will initiate reconfiguration only when it estimates the benefit over a future time window is higher than the cost of the reconfiguration. The invention is efficient for cloud computing as well as creating and managing on-premises databases.

Benefit

Advantages:

-Adaptable for changing workloads, including no change

-Compatible with a variety of NoSQL databases

-Keeps data available to users during reconfiguration

-Performs Cost Benefit Analysis to determine optimal reconfiguration

Potential Applications:

-Cloud computing

-Distributed NoSQL databases

-Data analytics for scientific research

TRL: 5

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