

An Issue of Network Coordinate System - An Impact and Evaluation of Temporal Latency Variation

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Abstract—A network coordinate system (NCS) which predicts latencies between end-computers at low cost can improve effectiveness of resource selections on a large scale distributed and coordinated system such as a cloud computing. The NCS decides coordinates of each computer on the pre-determined geometric space, and estimates an end-to-end latency by calculating a distance between the coordinates of computers. The time variation of the actual latencies affects the prediction accuracy of the NCS, but the impact has not been evaluated yet. Therefore, in this paper, we propose a mathematical model which represents a time variation of the latencies by analyzing a dataset obtained from network measurement services, and then evaluate the impact of the model on the performance of the NCS through computer simulations. From the evaluation results, we clarify that the time variation of the latencies gradually degrades the prediction accuracy of the existing NCS algorithm with time. Furthermore, we extract requirements for a new NCS which can achieve the efficient resource selection even if the network condition dynamically changes.

Keyword—Network Coordinate System, Latency Estimation, Cloud Computing, Resource Selection, Computer Simulation



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