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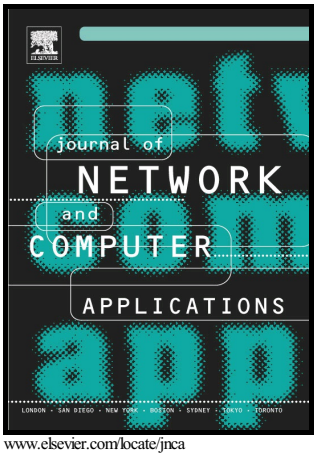

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Joint Flow and Virtual Machine Placement in Hybrid Cloud Data Centers

Heejun Roh[a], Cheoulhoon Jung[a], Kyunghwi Kim[a], Sangheon Pack[b], Wonjun Lee[a,*]

[a]*Network Research Lab., Korea University, Seoul 02841, Korea*
[b]*Mobile Network and Communications Lab., Korea University, Seoul 02841, Korea*

Abstract

With the advance of virtualization technology, the current generation of cloud data centers contains diverse applications which generate massive inter-rack traffic in a distributed and unpredicted manner. However, since existing network architectures are not suitable to supply enough network capacity, there have been several research trials to improve the network capacity *with augmented wireless links*. Especially, architectural design and link scheduling of wireless-cum-wired hybrid data center networks are of their main interests. However, the existing approaches for hybrid data center networks with direct wireless links have limited performance improvements, since virtual machines are typically placed with less consideration of traffic locality.

To this end, in this paper, we conduct a novel approach to flow and virtual machine placement problems in hybrid data center networks. We first design a threshold-based, wireless link-aware flow placement algorithm with low complexity. To enhance traffic locality, we also suggest a set of virtual machine placement algorithms under the flow placement algorithm. To fully exploit the extra capacity of the wireless links, we propose a new clustering metric for the algorithms. Extensive simulation results in hybrid data center networks with 60 gigahertz wireless links shows that combination of the proposed algorithms achieves better performance compared to baseline algorithms in flow completion

*Corresponding author
Email address: wlee@korea.ac.kr (Wonjun Lee)