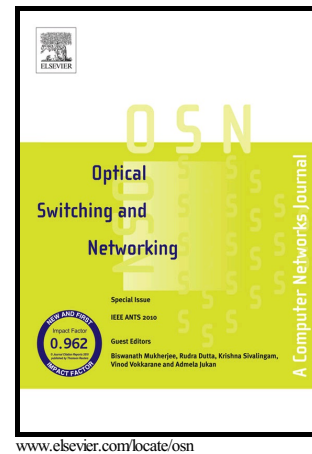


Author's Accepted Manuscript

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PII: S1573-4277(16)30078-9
DOI: <http://dx.doi.org/10.1016/j.osn.2016.10.003>
Reference: OSN427

To appear in: *Optical Switching and Networking*

Received date: 31 August 2016
Revised date: 27 October 2016
Accepted date: 30 October 2016

Cite this article as: Xiaoyuan Cao, Ion Popescu, Gang Chen, Hongxiang Guo, Noboru Yoshikane, Takehiro Tsuritani, Jian Wu and Itsuro Morita, Optimal and dynamic virtual datacenter provisioning over metro-embedded datacenters with holistic SDN orchestration, *Optical Switching and Networking* <http://dx.doi.org/10.1016/j.osn.2016.10.003>

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Optimal and Dynamic Virtual Datacenter Provisioning over Metro-embedded Datacenters with Holistic SDN Orchestration

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Abstract

Conventional mega datacenter (DC) lacks flexibility and has poor service connectivity for users faraway. Therefore, the metro-embedded DC architecture has been introduced to deliver more reliable and flexible services with less access latency. For fine-grained all-optical switching ability and high bandwidth connection, optical burst switching (OBS) ring is deployed inside the micro-DCs (mDC) and OBS over wavelength switched optical network paradigm is used for inter-mDC communication. Meanwhile, hierarchical SDN control is employed to virtualize and holistically coordinate the distributed mDCs and the metro network slices into reconfigurable virtual DC (VDC). Optimal VDC provisioning based on an integer linear programming (ILP) formulation is also developed in the SDN control plane to provide services with minimum latency and traffic load. A dynamic VDC provisioning algorithm based on partial ILP is further proposed to reconfigure the VDC with reduced complexity considering the user and resource dynamics. Experimental demonstrations conducted on the implemented metro-embedded DC prototype testbed show that optimal and fast VDC provisioning is realized based on the proposed ILP, while dynamic VDC reconfiguration makes sure that VDC is adjusted accordingly with

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