

Wireless Control Plane for Software Defined Networks (SDN) in Data Centers

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ABSTRACT

Software Defined Networking (SDN) has redefined the way data center networks are deployed and function. The ability to separate the control plane and data plane has led to simpler design and easy management. As the two networks are separate, so building an additional wired control plane leads to high cabling complexity. We propose a wireless solution for the control plane in SDNs so that there is almost no cabling involved in the deployment of an additional network. In the proposed architecture, the ToR switches in the data center network are divided into clusters with each cluster having an Access Point (AP). The switches use wireless channels to connect with the APs. The APs further connect with the SDN Controller via Ethernet cables. Our work focuses on clustering the switches in a way that the minimum number of APs are utilized to connect the switches with the SDN Controller. We propose an analytical model to find the upper bound of cluster size. We analyze our model with respect to two different channel access modes of the IEEE 802.11 Distributed Coordinated Function (DCF) namely, Basic Access Mode and RTS-CTS Access Mode. We also analyze the effects of interference and channel assignment and obtain the lower bound of cluster size. Finally, we propose an algorithm to find the optimal cluster size that satisfies the control traffic demand of switches. With extensive simulations, we demonstrate that the proposed method can significantly reduce the cabling complexity.

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Research interests: Wireless networks, SDNs, Network architectures

All are welcome!



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