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Software Defined Networking Applications in Distributed Datacenters

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Preface

Software-defined networking (SDN) has drawn increasing attention from both academia and industry as an emerging network architecture. Compared with closed traditional network architecture, SDN decouples the control function from the forwarding function to build a novel network architecture consisting of three planes: the data plane, control plane, and SDN application. SDN improves the programmability of a network to promote network innovation; however, the basic theories and key technologies of SDN are limited by the initial stage of SDN development. The goal of this book is to provide valuable insights into SDN technologies in distributed datacenters. In particular, we consider three key problems: SDN application design, SDN network deployment, and SDN network management. This book is suitable for SDN researchers and engineers.

In Chap. 1, we introduce the development of SDN and future networks and specifically focus on recent advances in SDN. In Chap. 2, an SDN-based request allocation mechanism is proposed as a typical application of SDN in distributed datacenters. With global information and central control provided by SDN, we propose a joint optimization model for request allocation from the view of both service providers and end-users. Then, we present a Nash bargaining solution (NBS)-based algorithm to implement the request allocation mechanism. In Chap. 3, an SDN controller placement strategy is proposed to achieve the deployment of SDN in distributed datacenters. We formulate the optimal controller placement problem as an integer linear program (ILP) and use an effective approximation algorithm to solve it. In Chap. 4, a management system of heterogeneous SDN controllers is presented to manage the distributed datacenter network. This system shields the differences among heterogeneous controllers to provide a uniform graphical user interface in order to reduce the complexities of network management and SDN application development. Finally, we summarize our studies and highlight future research topics related to SDN in Chap. 5.

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