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Collaborative network security in multi-tenant data center for cloud computing

Abstract:

A data center is an infrastructure that supports Internet service. Cloud computing is rapidly changing the face of the Internet service infrastructure, enabling even small organizations to quickly build Web and mobile applications for millions of users by taking advantage of the scale and flexibility of shared physical infrastructures provided by cloud computing. In this scenario, multiple tenants save their data and applications in shared data centers, blurring the network boundaries between each tenant in the cloud. In addition, different tenants have different security requirements, while different security policies are necessary for different tenants. Network virtualization is used to meet a diverse set of tenant-specific requirements with the underlying physical network, enabling multi-tenant datacenters to automatically address a large and diverse set of tenants requirements. In this paper, we propose the system implementation of vCNSMS, a collaborative network security prototype system used in a multi-tenant data center. We demonstrate vCNSMS with a centralized collaborative scheme and deep packet inspection with an open source UTM system. A security level based protection policy is proposed for simplifying the security rule management for vCNSMS. Different security levels have different packet inspection schemes and are enforced with different security plugins. A smart packet verdict scheme is also integrated into vCNSMS for intelligence flow processing to protect from possible network attacks inside a data center network.