

A Review of Network Slicing in 5G and Beyond: Intelligent Approaches and Challenges

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Abstract: *With artificial intelligence, it will present simple solutions to problems by analyzing vast data. On the other hand, the introduction of network slicing to 5G networks complicates their nature because of integrating so many connected devices and diversifying services. It's now possible to automate all those network operations using intelligent techniques such as AI and machine learning. This paper surveys network slicing, focusing on its design, deployment, monitoring, and management while highlighting the role of automation in optimizing network slice operations.*

5G networks use NFV to create network slices that support different service requirements. A framework is proposed for negotiating, selecting, and assigning NSs to meet quality, security, and dynamic routing needs. Furthermore, 5G empowers IoT, an ecosystem that grows with diverse network slices. Network slicing assists IoT applications by addressing diverse requirements with dedicated slices. This paper analyzes the integration challenges of network slicing with IoT and explores how emerging technologies, such as blockchain and AI/ML, can strengthen this integration. Security in multi-network slicing, particularly with multi-tenancy, is also considered. Key issues are slice isolation, insulation, and optimization of isolation policies in a way that cost, security, and performance are balanced. A multi-layer security model is proposed to address these challenges and secure 5G networks. Finally, AI and ML emerge as critical enablers in managing the complexity of 5G networks and their applications, providing solutions for traffic routing, dynamic operations, and IoT integration while addressing evolving security concerns

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