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MASTER'S THESIS

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Adaptive Network Configuration using Intents in Dynamic Networks

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Presented by:
Mr Khelladi Mokhtar

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Dr. Serhane Oussama	Supervisor
Dr. AZZA Mohamed	President
Dr. Baba Ahmed Manel	Examiner

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Abstract

Adaptive network slicing has emerged as a key enabler for delivering customized and efficient services in modern, multi-tenant network environments. This thesis explores the integration of Intent-Based Networking (IBN) with Software-Defined Networking (SDN) and Network Function Virtualization (NFV) to support the automated and dynamic creation of network slices tailored to specific application requirements. By abstracting user needs into high-level intents, network operators can define service expectations—such as latency, bandwidth, and isolation—without engaging with low-level configurations. These intents are then interpreted, translated, and enforced across programmable infrastructures, enabling flexible resource allocation and real-time policy adaptation. A central focus is placed on Quality of Service (QoS) guarantees, monitoring, and orchestration across heterogeneous and evolving environments. Through an in-depth review of state-of-the-art approaches and architectural components, the thesis highlights both the opportunities and challenges in realizing scalable, intent-driven network management for next-generation systems.

Keywords: Intent-Based Networking, Network Slicing, SDN, NFV, QoS, 5G, Network Orchestration, Service Automation, Programmable Networks, Next-Generation Infrastructure