Intelligence

***Abstract*—Intelligence in Zero-touch Service Management (ZSM) is pivotal for achieving fully autonomous network and service operations. By embedding advanced artificial intelligence (AI) and machine learning (ML) techniques within the ZSM framework, networks can proactively monitor, analyze, and optimize their own performance with minimal human intervention. This enables dynamic adaptation to changing network conditions, efficient resource allocation, and rapid fault detection and resolution. In the context of ZSM, intelligence facilitates closed-loop automation, allowing the system to learn from operational data, predict future states, and make informed decisions to enhance service quality and reliability. As networks evolve towards 6G and beyond, the integration of intelligence in ZSM is essential for supporting complex, heterogeneous environments and delivering on the promise of self-optimizing, resilient, and sustainable network infrastructures.**

I. Intelligence Experiment 1

This section presents the first experiment conducted to evaluate the role of intelligence in network automation. The experiment focuses on the integration of artificial intelligence (AI) and machine learning (ML) functions within the Zero-touch Service Management (ZSM) framework. The objective is to assess how these technologies contribute to optimizing network operations and enabling autonomous decision-making processes [1].

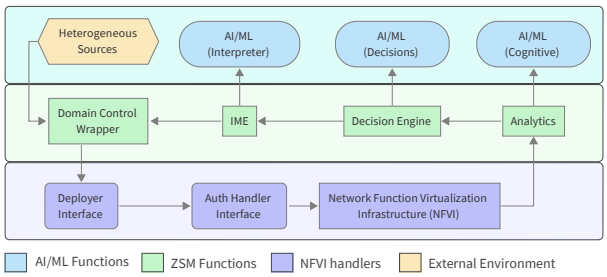

Fig. 1. AI and ML functions within the ZSM framework, illustrating their role in enhancing network automation and optimization.

References

[1] D. B. Rawat and C. Bajracharya, "Software Defined Networking for Reducing Energy Consumption and Carbon Emission," in *SoutheastCon 2016*, pp. 1–2, 2016. doi: https://doi.org/10.1109/SECON.2016.7506640.