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REAL-TIME NETWORK TROUBLESHOOTING IN 5G O-RAN DEPLOYMENTS USING LOG ANALYSIS

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ABSTRACT

As 5G networks evolve, the adoption of Open Radio Access Network (O-RAN) architectures has introduced both opportunities and complexities in network management. One of the key challenges faced in 5G O-RAN deployments is real-time network troubleshooting. Traditional network troubleshooting approaches often struggle to meet the demands of these dynamic and decentralized architectures. In this context, log analysis emerges as a powerful tool for diagnosing issues swiftly and accurately.

This paper explores the use of real-time log analysis techniques to troubleshoot network issues in 5G O-RAN deployments. By leveraging advanced log parsing algorithms and machine learning-based anomaly detection, network operators can identify performance bottlenecks, configuration errors, and security threats in real-time. The integration of AI-driven log analysis tools with existing O-RAN infrastructure enhances the ability to detect and resolve issues without human intervention, reducing downtime and improving overall network reliability.

The study also highlights the role of cloud-native microservices in scaling log analysis solutions, enabling efficient data processing across distributed environments. Through a comparative analysis of log management strategies, this paper provides insights into the most effective techniques for optimizing network per-formance in complex 5G O-RAN ecosystems. The findings demonstrate that real-time log analysis is a crucial component in the successful management of next-generation wireless networks, ensuring better user ex-periences and more resilient 5G deployments.

KEYWORDS: *5G, O-RAN, Real-Time Troubleshooting, Log Analysis, Network Performance, Machine Learning, Anomaly Detection, Cloud-Native Microservices, Network Reliability, Distributed Environments.*