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THE FUTURE OF MULTI LEVEL PRECEDENCE AND PRE-EMPTION IN SIP-BASED NETWORKS

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ABSTRACT

As communication technologies evolve, the complexity of managing call signalling in Session Initiation Protocol (SIP)-based networks becomes increasingly critical. This paper explores the future of multi-level precedence and pre-emption mechanisms within SIP environments. Multi-level precedence allows for the prioritization of different types of sessions based on predefined criteria, ensuring that high-priority communications are maintained even during periods of congestion. Pre-emption, on the other hand, enables the interruption of lower-priority sessions to facilitate more critical communications, thus optimizing network resource utilization.

The study discusses the challenges associated with implementing these mechanisms in real-time applications, including issues of user experience and the need for seamless transitions during call interruptions. We analyze current standards and propose enhancements that could be integrated into future SIP frameworks to improve efficiency and reliability. The implications of integrating artificial intelligence and machine learning to predict network load and dynamically adjust precedence levels are also examined.

Through simulations and case studies, the research demonstrates the potential benefits of advanced multi-level precedence and pre-emption strategies, highlighting their role in enhancing the overall performance of SIP-based networks. As the demand for robust and adaptive communication systems continues to grow, this exploration provides valuable insights for network designers and operators, ensuring that SIP technology remains responsive to evolving user needs and industry standards.

KEYWORDS: *Multi-Level Precedence, Pre-Emption, SIP-Based Networks, Call Signalling, Network Resource Optimization, Communication Prioritization, Real-Time Applications, User Experience, AI Integration, Network Efficiency, Adaptive Communication Systems.*