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Optimizing Messaging Patterns in IBM MQ for Scalable and Reliable Communication

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Abstract: *This article systematically optimizes IBM MQ messaging patterns for enterprise environments, addressing critical performance bottlenecks in distributed systems. The article implements targeted optimizations for Point-to-Point, Publish-Subscribe, and Request-Reply messaging patterns, complemented by advanced routing techniques and predictive monitoring capabilities. Through rigorous experimental methodology, the article demonstrates significant improvements in message processing efficiency, delivery reliability, and system resilience across various workload conditions. Integrating AI-driven workload balancing and machine learning-based anomaly detection represents a substantial advancement over traditional static configurations, enabling dynamic adaptation to changing enterprise requirements. The findings provide practical implementation strategies for organizations seeking to enhance their messaging infrastructure while identifying limitations and future research directions for intelligent middleware solutions.*

Keywords: Enterprise messaging optimization, IBM MQ, AI-driven workload balancing, Predictive monitoring, Messaging pattern architecture

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