Advances in Event-Driven Architecture for Integrated Design: A Case Study of ECAD–MCAD Workflows

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Abstract: *Event-driven architecture (EDA) offers a solution to the integration challenges between electronic computer-aided design (ECAD) and mechanical computer-aided design (MCAD) systems. Through the "EtoMIntegrator" case study, real-time event processing demonstrates its effectiveness in reducing design iterations, improving cross-disciplinary collaboration, and accelerating time-to-market for complex products. The implementation across multiple engineering projects reveals significant improvements in time-to-decision metrics and substantial reductions in redundant design snapshots. Loose coupling between systems maintains data integrity while accommodating rapid iteration cycles typical in modern product development. The architectural foundation—consisting of Event Publishers, Event Broker, Event Processors, and Recommendation Engine—enables asynchronous communication and intelligent workflow automation that transforms traditional "handoff" processes into continuous, proactive collaboration models. Despite initial configuration complexity and learning curves, the benefits include reduced conflict resolution time, decreased design snapshots, shorter decision latencies, and enhanced user satisfaction.*

Keywords: Event-driven architecture, ECAD-MCAD integration, Cross-domain collaboration, Loose coupling, Recommendation systems

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