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Optimizing Healthcare Data Integration and Interoperability: A Technical Perspective

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Abstract: *Healthcare data integration and interoperability represent critical challenges in today's digital health landscape. This technical perspective explores how fragmented data across disparate electronic health records, claims systems, and specialized clinical applications creates substantial barriers to cohesive patient care. The document analyzes persistent technical obstacles including data silos, format inconsistencies, and regulatory constraints that impede seamless information exchange. It presents comprehensive frameworks for overcoming these challenges through standards-based integration approaches, FHIR implementations, data pipeline automation, and master data management solutions. Security architecture considerations for HIPAA-compliant data exchange are detailed alongside business intelligence strategies that transform raw data into actionable insights. The implementation roadmap provides healthcare organizations with a structured path toward enhanced interoperability, ultimately enabling improved clinical outcomes, enhanced patient experiences, reduced costs, and increased provider satisfaction.*

Keywords: Analytics, Encryption, Governance, Interoperability, Standards

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