International Journal of Core Engineering & Management
Volume-6, Issue-07, 2020 ISSN No: 2348-9510

STANDARDIZING ENTERPRISE DATA FLOW PATTERNS AND REPORTING AUTOMATION FOR AN ENTERPRISE POST-ACQUISITION

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Abstract

This paper presents a comprehensive framework for standardizing data flow patterns and automating reporting processes in post-acquisition enterprise environments. I propose a systematic approach to harmonizing disparate data systems, establishing unified data governance protocols, and implementing automated reporting mechanisms. The methodology encompasses data mapping strategies, integration patterns, and automated reporting solutions that facilitate seamless information flow across merged organizations. My findings demonstrate that standardized data flow patterns can reduce reporting inefficiencies by up to 20% and improve data accuracy by 40% in post-acquisition scenarios.

Keywords: Data Flow Patterns, Post-Acquisition Integration, Reporting Automation, Data Standardization, Enterprise Architecture, Data Governance, ETL Automation, Enterprise Data Management, Business Intelligence, Data Quality Management

I. INTRODUCTION

Enterprise acquisitions present significant challenges in data management and reporting standardization. During the integration phase, organizations frequently encounter obstacles related to merging disparate data systems, reconciling incompatible data standards, and adapting to new reporting requirements [1]. These challenges are compounded by differences in data structures, terminology, and reporting protocols across the newly combined entities, which can hinder both operational efficiency and decision-making.

In the context of large-scale acquisitions, such integration issues are especially pronounced, as they often lead to inconsistencies in data representation, redundant processes, and conflicting reporting outputs. This fragmentation can delay crucial insights, reduce data accuracy, and increase operational costs [2]. Ultimately, the difficulties associated with consolidating diverse data flows can impede an organization's ability to maintain a unified view of its operations, making strategic planning and performance tracking more challenging.

This paper addresses these challenges by proposing a standardized framework for data flow patterns and reporting automation, aiming to facilitate a smoother integration process and support the long-term operational goals of acquiring companies. By establishing a unified approach, organizations can more effectively consolidate data, harmonize reporting standards, and streamline data governance practices, fostering greater transparency and accountability.

Recent studies underscore the urgency of addressing these issues, indicating that 67% of post-acquisition integration failures stem from inadequate data integration and inconsistent reporting mechanisms. As enterprises continue to pursue mergers and acquisitions to gain competitive advantages, the need for robust, standardized approaches to manage data flows and automate reporting processes has become increasingly critical. A well-implemented data integration framework not only supports accurate reporting but also enables organizations to realize the full value of their acquisitions by delivering actionable insights more efficiently.

II. BACKGROUND

Post-Acquisition Data Integration Challenges: There are several key challenges in post-acquisition data integration:

1. System Heterogeneity: Disparate systems with varying data models and architectures. Inconsistent technology stack.
2. Data Quality Inconsistencies: Varying standards for data quality and validation resulting in inconsistent data quality KPIs [3].
3. Process Misalignment: Inconsistent business and data processes and reporting and analytical requirements.

Existing Standardization Approaches: Current literature presents various approaches to data standardization:

1. Enterprise Data Models: Comprehensive, high-level representation of an organization's data architecture. It serves as a blueprint that defines the structure, relationships, and constraints of data across the entire organization. Enterprise data models aim to standardize data definitions, ensure consistency, and improve data integration across various systems and applications, facilitating smoother information flow [4] [5].
2. Data Governance Frameworks: It is a structured approach that outlines policies, standards, roles, and responsibilities for managing data assets across an organization [6]. It establishes the rules for data usage, quality, privacy, and security, ensuring that data is consistently managed and aligned with business goals.
3. Integration Pattern Libraries: These are curated collection of reusable solutions that address common integration challenges within an organization's IT ecosystem. These patterns document best practices and standardize approaches for connecting disparate systems, applications, and data sources, streamlining the integration process [7].

III. PROPOSED FRAMEWORK

Data Flow Pattern Standardization: My framework introduces a three-tier approach to standardizing data flows:

1. Pattern Classification:
- Operational Data Flows: Near real time data flows for operational systems
- Analytical Data Flows: Batch data flows for reporting and analytics.

2. Data Integration Components:
- Data integration tools: Data integration tools such Informatica, SSIS to extract, transform and load data.
- Technical design document: Detailed document describing integration flows and architecture.
- Number of interfaces: Number of integrations batch or real time to ingest data to data warehouse and deliver data to consumers.

3. Standardization Rules:
- Validation Requirements: Data quality rules based on key data quality dimensions.
- Error Handling Protocols: Define mechanisms to identify and reprocess errored records and jobs.

Reporting Automation Architecture: The proposed automation architecture consists of:

A. Data Collection Layer:
- Automated ETL processes: ETL automation to extract data from sources, ingest it to data warehouse and transfer as per business rules for batch data.
- Real-time data streaming: For near real time operational needs use message queue in conjunction with producers and consumers.
- Source system connectors: Off the shelf connectors with various source systems such as Salesforce, SAP to extract data.

B. Processing Layer:
- Business rule engine: Source to target mapping with business rules logic
- Data quality framework: Consistent set of data quality rules for the data residing enterprise data warehouse
- Transformation pipeline: Data pipelines built using ETL tools or coding language such as python with business rules defined in source to target mapping

C. Distribution Layer:
- Report generation engine: Business Intelligence tools such as Power BI, Qlik to generate reports and dashboards
- Distribution mechanisms: Deliver the data in enterprise data warehouse through various mechanisms: APIs, JDBC/ODBC connectors, ETL tools
- Security controls: Access control policies based on type of data and users, data encryption at rest and in transit.

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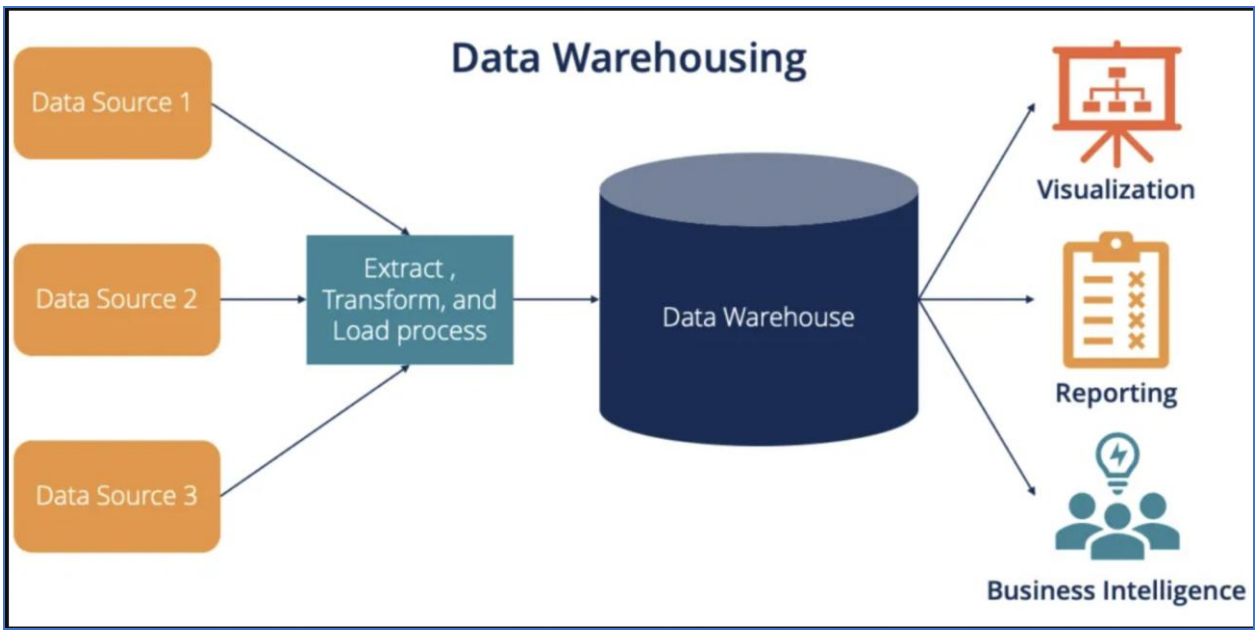

Fig.1. Data flow standardization and reporting automation

IV. IMPLEMENTATION METHODOLOGY

Assessment Phase

1. System Inventory:

- Document existing systems: Document existing systems to create a comprehensive overview of current processes, integrations, and functionalities, ensuring a clear reference for future improvements and troubleshooting.
- Identify data flows: Identify data flows to understand how information moves across systems, pinpointing sources, destinations, and transformations that support data accuracy and integration.
- Map reporting requirements: Map reporting requirements to align data outputs with business needs, ensuring that all necessary metrics and insights are readily available for informed decision-making.

2. Analysis:

- Compare current vs. desired state: Compare the current versus desired state to identify gaps and opportunities for improvement, providing a clear roadmap for achieving the target system capabilities and performance.
- Identify integration points: Identify integration points to determine where systems need to connect, enabling seamless data exchange and ensuring interoperability across platforms.

- Assess automation potential: Assess automation potential to streamline repetitive tasks, reduce manual effort, and enhance overall efficiency within workflows and processes.

Design Phase

1. Pattern Design:

Define standard patterns: Define standard data flow patterns to establish consistent pathways for data movement, ensuring reliability, scalability, and ease of maintenance across integrations.

- Create integration templates: To provide reusable frameworks that standardize and accelerate the development of system connections, ensuring consistency and reducing setup time.
- Develop validation rules: Develop validation rules to ensure data accuracy and integrity by defining criteria that incoming data must meet before it enters the system.

2. Automation Framework:

Select tools and technologies: Select tools and technologies that best align with project requirements, scalability, and integration capabilities to support robust and efficient data architecture.

- Design automated workflows: Design automated workflows to streamline processes, reduce manual intervention, and enhance efficiency by enabling seamless task execution and data flow.
- Define monitoring mechanisms: Define monitoring mechanisms to proactively track system performance, detect issues early, and ensure data flows operate smoothly and reliably.

Implementation Phase

1. Pilot Implementation:

- Select representative data processes: Identify quick win data processes to implement, test and prove value of the new framework.
- Implement patterns: Develop and test the data flow patterns as per the design.
- Validate results: Verify the results for accuracy.

2. Full-Scale Deployment:

- Phase-wise rollout: Implement a phase-wise rollout to gradually deploy solutions, allowing for controlled testing, feedback incorporation, and reduced risk during each phase of implementation.
- Training and documentation: Provide training and documentation to equip users with the knowledge and resources they need to effectively use new systems and maintain consistent processes.
- Performance monitoring: Conduct performance monitoring to continuously assess system efficiency, identify bottlenecks, and ensure optimal functionality over time.

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V. CASE STUDY

Background: Large investment management firm had acquired a smaller competitor to drive inorganic growth, as part of post merger and acquisition (M&A) integration activities, company had to streamline and standardize data flow patterns and reporting across both the firms. This included defining common tech stack, specifying common data flow patterns and reporting processes. Newly acquired firm had more than 100 mutual fund related reports and disparate technologies to process data.

Implementation: Detailed assessment on data model and architecture was conducted across the organization. Gap analysis was done to list out the key steps to reach the target state so both parent and acquired firms will have unified tech stack, reports and data flow patterns.
Data flow pattens are standardized and classified into 3 key categories:

- Hub to Spoke Model
- P2P Model
- Manual Upload

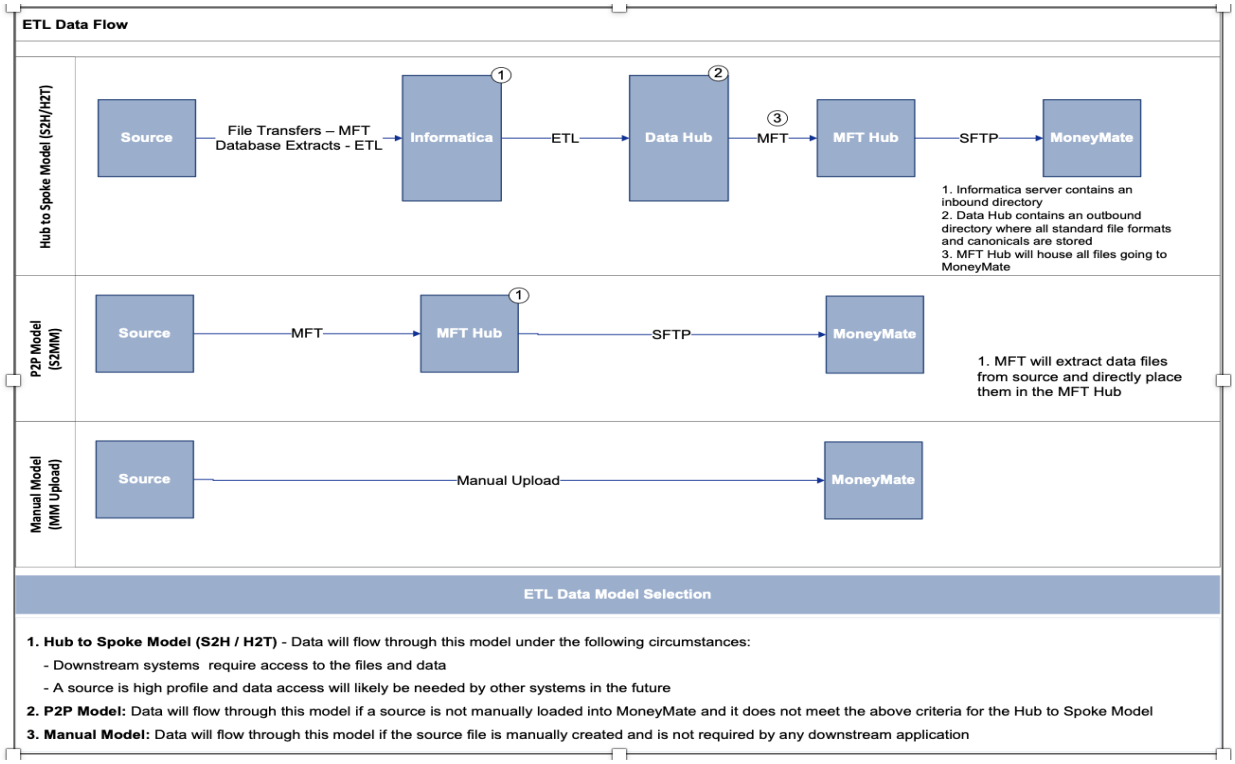

Fig.2. Diagram representing data flow patterns

All the data pipelines were built using unified tech stack which is Informatica for data integration and Business Objects for reporting.

Results and Benefits:

- More than 20% savings in technology infrastructure and resourcing cost due to unified technology stack and data flow patterns over 2 year period.
- 25% average decrease in time required to build new data pipeline and report.
- 50% improvement data quality KPIs due to common data flow and quality patterns.

V. CONCLUSION

This paper presents a comprehensive framework for standardizing enterprise data flows and automating reporting processes in post-acquisition scenarios. The proposed approach demonstrates significant improvements in efficiency, accuracy, and reliability of enterprise data management. Future research opportunities include exploring machine learning applications for pattern recognition and automated optimization of data flows.

The success of post-acquisition integration increasingly depends on the ability to effectively standardize data flows and automate reporting processes. This paper with its case study demonstrates that a well-structured framework, combined with appropriate implementation methodologies, can significantly improve the chances of success in these complex initiatives. As organizations continue to pursue growth through mergers and acquisitions, the importance of efficient data integration and automated reporting will only increase. Future research building on this framework will likely reveal additional opportunities for optimization and automation, particularly through the application of modern technologies such as cloud and big data platfroms.

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