



Make the Switch! A Realistic Journey into Data Migration, Survival Strategies, Risk Factors, Cloud Optimization, & Indium's Expert Insights

A Whitepaper



Executive Summary

In the modern business landscape, enterprises are navigating a critical juncture marked by two profound growth trends. First, there is an escalating demand for actionable insights derived from data, essential for gaining and maintaining a competitive edge. Second, the volume and variety of data sources, both internal and external, have surged exponentially, adding to the imperative of deriving valuable insights from this burgeoning data deluge. However, the strain placed on traditional in-house and on-premises data platforms constructed decades ago is palpable. Once thought to be scalable, these legacy systems have reached their limits in terms of storage capacity, processing power, and analytical capabilities, constraining the realization of these data-driven business ambitions.

In response to this critical challenge, the cloud has emerged as the solution of choice for enterprises. With its virtually infinite storage capacity, formidable processing power, and modern, scalable, high-speed data and analytics platforms, the cloud represents a transformative paradigm shift for data storage and analysis. This whitepaper, “Make the Switch! A Realistic Journey into Data Migration, Survival Strategies, Risk Factors, Cloud Optimization, & Indium’s Expert Insights,” dives deep into the nuances of data migration to the cloud.

Key Takeaways

- **Business Challenges:** Address data migration agility, scalability, and cost-effectiveness to meet rising data demands.
- **Cloud Migration Use Cases:** Showcase industry examples of cloud data migration enhancing innovation and efficiency.
- **Solution Tenets:** Emphasize core principles aligning data migration with business objectives.
- **Solution Architecture:** Explore technical aspects for a successful cloud migration.
- **Best Practices:** Learn expert tips for a smooth data migration journey, avoiding pitfalls and minimizing disruptions.



This whitepaper is your comprehensive guide to navigating the complex landscape of data migration to the cloud, providing insights, strategies, and best practices to ensure a seamless transition and unlock the full potential of your data assets. With Indium's expert guidance and a strategic focus on cloud optimization, enterprises can meet the growing demands for data-driven insights, maintain their competitive edge, and prosper in the age of digital transformation.

Business Challenges Prompting the Need for the Right Data Migration Strategy

As organizations migrate from legacy systems to the cloud, one essential truth becomes apparent: no universally applicable solution exists. Each migration case is unique, and the path chosen depends on a multitude of factors, including:

- **Current source systems and data growth rate:** The foundation upon which data is currently stored and the rate at which data accumulates.
- **Future source systems and data growth rate:** Anticipating the needs of tomorrow and ensuring scalability.
- **Business needs and use cases:** The specific purposes for which data is harnessed, including the variety, frequency, and recency of analytics required.

Business Challenges

In data migration, cost and time have become primary challenges for enterprises. Delays and escalating expenses are often rooted in poor data quality and a lack of visibility into associated issues. An additional hurdle lies in selecting the right platform for migration. To address these challenges, organizations must craft a well-planned migration strategy. This necessitates close collaboration with business and technology stakeholders to delineate the scope of data migration, establish realistic timelines, and ensure the availability of resources in the new system. This strategic approach aligns with overall business objectives, facilitating a seamless and punctual migration.



Here are several key areas that demand meticulous attention as organizations traverse their data migration journey:

Platform Selection: Choosing the right migration tool becomes critical, particularly in hybrid or multi-cloud migration solutions. This choice necessitates a thorough impact analysis concerning cost and compatibility.

Data Quality and Cleansing: Identifying appropriate data cleansing rules can be challenging, requiring a deep understanding of the data and robust business knowledge.

Monitoring and Predictive Maintenance: Large-scale migration programs across hybrid environments introduce complexity to the monitoring and maintenance process, often necessitating specialized tools.

Security and Compliance: Implementing data encryption/decryption at rest and in motion, alongside robust authentication and authorization procedures, can become cumbersome. Craft a clear roadmap for policy demonstration, pinpoint sensitive data for private clouds, set sharing parameters, and establish multi-cloud rules for data safety. Partner with top-tier migration services, adhering to compliance for seamless alignment with your governance.

Program Management: Given the diverse nature of stakeholders involved in data migration, it becomes a highly intricate task. A well-conceived strategy should govern project management, communication, and risk mitigation.

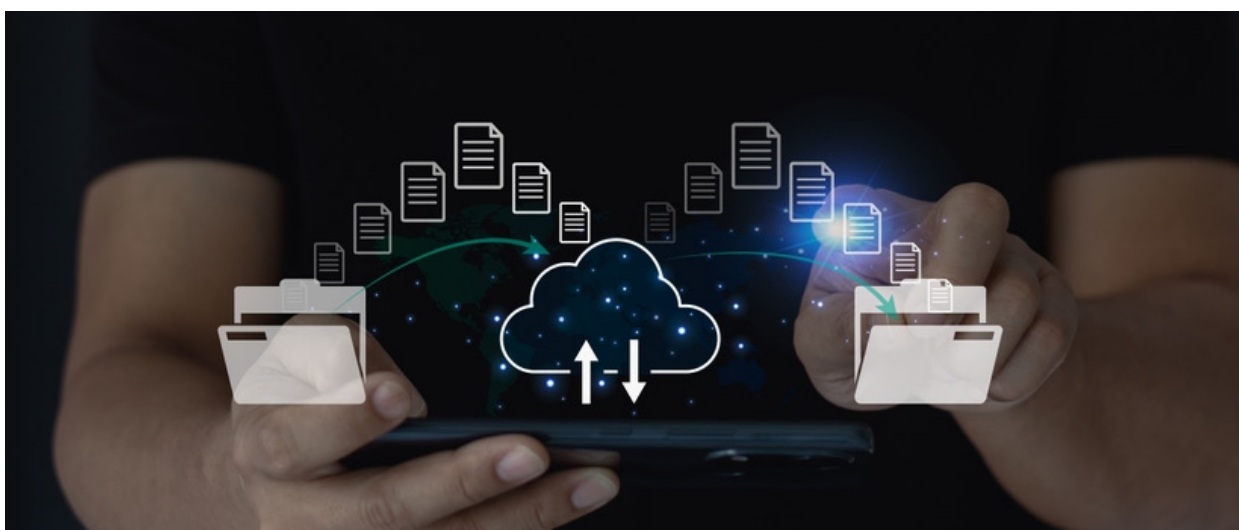


System Performance and Data Throughput: Ensuring optimal system performance and data throughput calls for specialized job planning and architecture considerations, often involving accelerators that require additional investment.

Data Transformation and Conversion: Extracting common metadata from unstructured and semi-structured data presents complications due to the diversity of data sources, sometimes necessitating specialized tools for conversion.

Verification and Validation of Data: In scenarios involving large volumes of data, verification and validation emerge as significant challenges. Automation may be imperative to enhance productivity and reliability.

Addressing these challenges is vital for organizations seeking to seamlessly migrate data to the cloud. By recognizing the complexity of the data migration landscape and implementing a thoughtful and strategic approach, enterprises can position themselves to unlock the full potential of their data assets while minimizing disruption and cost overruns.





Data Migration Use Cases

Data migration is a multifaceted process that serves various organizational purposes, responding to specific business requirements and situations. This section explores some of the common use cases and scenarios that prompt the need for data migration:

Digital Transformation:

- **Moving Database/Data Warehouse to the Cloud:** Organizations pursuing digital transformation initiatives often need to migrate their existing databases or data warehouses to the cloud. This shift allows them to leverage cloud-based solutions' scalability, agility, and cost-effectiveness for data storage and analysis.
- **Setting Up Future-Proof Data and Analytics Platforms on the Cloud:** To stay competitive, businesses are moving towards cloud-based data and analytics platforms. This use case focuses on establishing a modern, cloud-native infrastructure that can accommodate evolving data and analytical needs.
- **Identification of the Right Migration Tool:** Selecting the appropriate migration tool is crucial to the success of digital transformation. The right tool ensures efficient data transfer and minimizes disruption during migration.
- **Building an Automation Framework:** Automation is key to streamlining the migration process and reducing manual effort. Developing automation frameworks is essential to ensure data consistency and accuracy during migration.

Merger and Acquisitions:

- **Bulk Migration for M&A Data Merge:** Organizations often need to consolidate data from different sources into a single, unified repository during mergers and acquisitions. This involves bulk data migration to facilitate seamless integration of data.



- **Data Audit:** Data audits play a pivotal role in M&A activities, ensuring data integrity, accuracy, and compliance. This step is essential to identify and address discrepancies or issues in the merged data.
- **Address and Revenue Validation:** Post-M&A, validating customer addresses and revenue data is critical for businesses to maintain the quality and reliability of their data assets.

Migration-as-a-Service:

- **Leveraged for Migration Factory Model:** Organizations may adopt a migration-as-a-service approach to establish a migration factory that operates in parallel across multiple geographical locations. This model enhances efficiency and consistency in migration processes.
- **Creating a Common Data Model:** Migration-as-a-service can involve creating a standardized, common data model and exposing services from this model to consuming systems. This approach offers flexibility in data migration based on consumer needs, with built-in data quality and governance.

Transformation & Application Migration:

- **Heterogeneous Database Migration (OLTP/OLAP to NoSQL):** Organizations may need to transition from traditional relational databases to NoSQL databases to meet evolving data requirements. This use case involves creating a transformation layer to map and migrate data to the target NoSQL database with automation.
- **Data Migration for Applications such as ERP, CRM, and SAP:** Besides migrating data, businesses often need to consider migrating business processes and logic associated with enterprise applications. This use case encompasses a comprehensive approach to ensure that applications run seamlessly in the new environment.



These diverse data migration use cases reflect organizations' varying needs and objectives as they adapt to a rapidly evolving data landscape. Implementing intelligent frameworks, solutions, and intellectual properties (IPs) are essential to support these strategies. These tools enable organizations to adopt cost-effective and modern migration approaches that align with their unique business goals, ultimately empowering them to harness the full potential of their data.





Solution Tenets - Indium's Pillars

Accelerators, Frameworks, Automation, Indium Data Migration

At Indium, we adhere to a set of core principles and tenets to ensure that our data migration solutions deliver maximum value to organizations. These principles form the foundation of our approach to data migration, encompassing accelerators, frameworks, and automation. Our goal is not just to move data but to transform it into a valuable product, enabling ease of consumption and future readiness for the organization.

Productizing Data:

We consider data not merely a set of records but a valuable product. Our approach focuses on how data will be consumed and how we can seamlessly deliver it to its point of consumption. Our solution encompasses a framework that facilitates data discovery and accessibility for our customers, ensuring the data is readily available and easy to use.

Error Resolution Framework:

Our solution includes a comprehensive error resolution framework that addresses every possible failure scenario during data migration. It provides proper mitigation strategies and reconciliation plans, which may even include self-healing mechanisms, to maintain data integrity and minimize disruptions.

Data Quality and Issue Identification:

We emphasize the importance of addressing existing data issues and identifying process glitches. Doing so prevents these issues from migrating to the new system. Our solution establishes the necessary data cleansing and reporting processes, enabling automated, governed, and report-based manual data cleansing by users.

Use Case-Based Data Product:

We organize data according to specific business and consumption system-based use cases. This approach ensures consistent governance and quality while delivering the data to different parts of the organization.



Data Availability:

Our solution makes data discoverable and shareable based on critical filtering elements such as country and language. This is achieved through tagging and lineage with a robust data access and security framework.

Error Handling & Reconciliation:

We have established an error framework at each point of failure to ensure proper mitigation and reconciliation. This includes the implementation of self-healing mechanisms to address issues efficiently.

Data Cleansing and Data Quality as a Service:

Our solution includes the establishment of the necessary data cleansing and reporting processes. This enables automated, governed, and report-based manual data cleansing by users, combining business requirements with industry best practices to provide high-quality data.

Multi-Platform, Multi-Format Usable Framework:

We've developed a flexible framework that seamlessly operates across various platforms and accommodates multiple data formats. This framework is designed to handle delta loads through APIs, ensuring adaptability and efficiency.

Optimized & Robust Cut Over Execution Plan & Mock Load:

Our approach focuses on decoupling data availability from data sharing, guaranteeing a smooth and robust transition during cutover. To elaborate further, our optimized execution plan includes mock data loads, enabling a more comprehensive understanding of the process and its reliability ensuring a seamless and robust transition during cutover.

Accelerators:

We leverage [ibriX](#), [teX.ai](#), and [iDAF](#) for metadata management, profiling, mapping, transformation, and filtering, including data assurance for all your migration needs. These accelerators enhance the efficiency and effectiveness of our data migration processes.

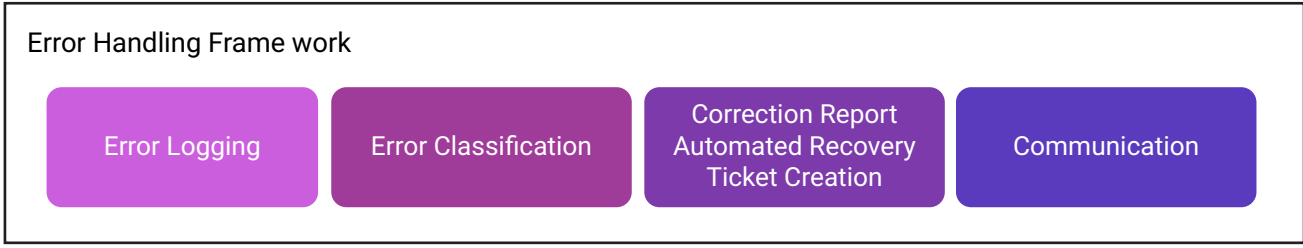
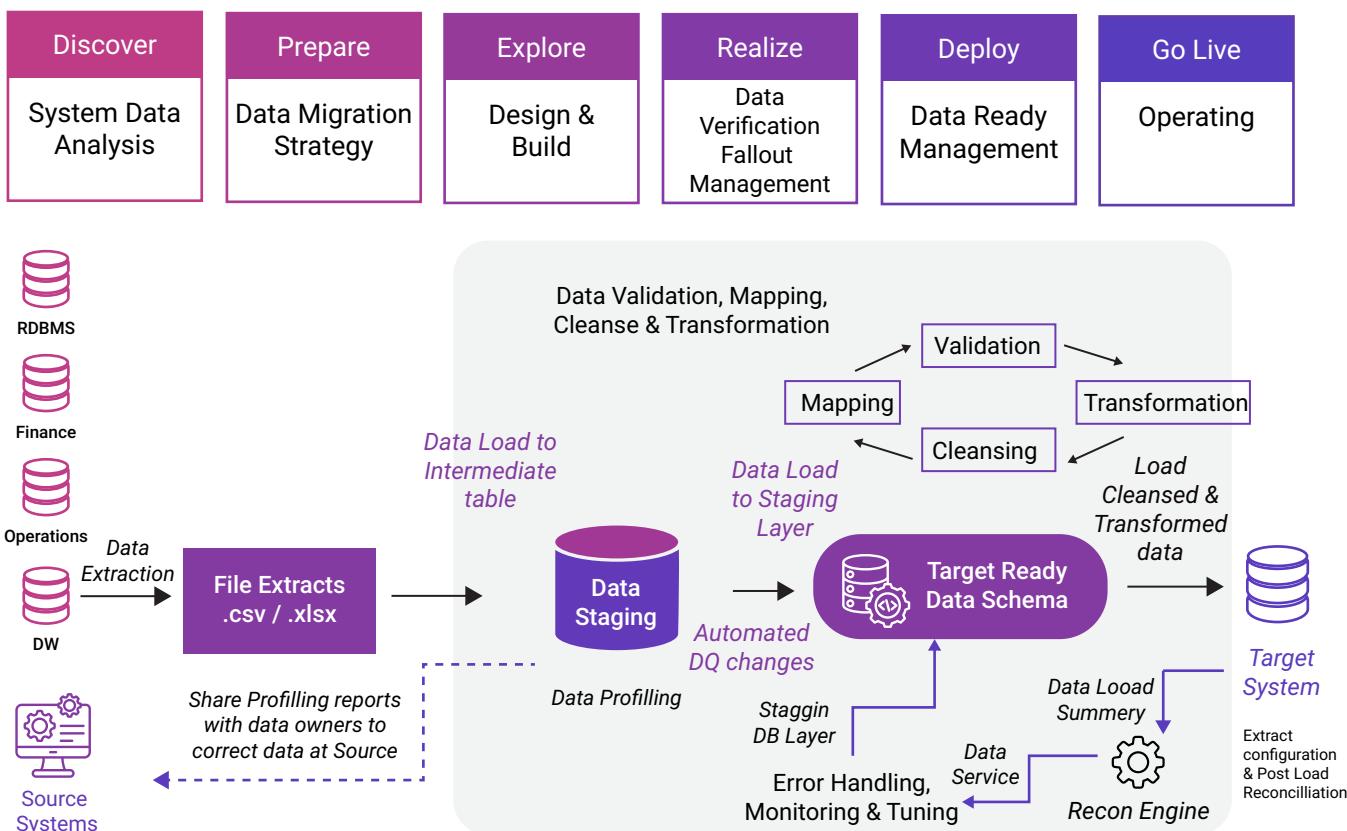


Verification and Validation:

We automate test script execution for data validation and verification based on sample test data management, security, and use cases. This ensures that the migrated data meets quality and compliance standards.

Indium's solution tenets provide clarity and efficiency in the data migration process and position organizations to be future-ready, fostering business agility and alignment with modern technology trends. Our approach is designed to transform data into a valuable asset, ensuring data is moved and delivered with ease, quality, and governance.

Solution Architecture





Case & Point: Big Data Processing for Real-Time Consumer Engagement

Business Challenges:

The client, a pioneer in mobile marketing, faced challenges due to rapid growth in data volume and increased analytics demands. The existing infrastructure was strained, causing errors, slower analytics, and rising maintenance costs. Indium Software was tasked with upgrading the infrastructure to ensure low latency, superior responsiveness, seamless integration, and cost-effectiveness.

About the Client:

The client developed a Mobile Engagement Platform that enables enterprises to drive marketing outreach through mobile messaging technology. They are a US aggregator with direct connectivity to major wireless carriers and a campaign management platform.

Business Requirements:

Lowest Latency

Powerful Integration

Superior Responsiveness

Cost-effective architecture



Solution Delivered:

1. Enhance the ETL Process Solution: Migrated the customer from a pentaho-based tool stack to Hadoop ecosystem, centralizing data in Big Data containers for flexibility, scalability, fault tolerance, and cost benefits.
2. Merge Log Database into Big Data Ecosystem: Migrated the log database into Hadoop clusters, enabling distributed processing and easy generation of real-time reports.
3. Remove Data Insertion Bottleneck: Introduced HBase on top of HDFS and Phoenix (SQL on Hadoop) to enable real-time data loading and effortless access to reports.

Business Impact:

1. ETL nightly process duration was reduced from 11 hours to 2 hours.
2. Users gained access to daily reports each morning.
3. Reduced infrastructure costs.
4. Historical report generation time reduced to minutes.
5. Big Data Hadoop architecture is capable of handling 500 million messages per day.

Read more [Click Here!](#)



Case & Point - 2 Real-Time Data Replication From Oracle On-Prem Database To GCP Using Striim

Business Requirements:

The client is the global banking and financial services provider needed a more cost-effective and efficient data storage solution. Their existing on-premises database was costly and cumbersome. The goal was to migrate all data to Google Cloud while securing direct database access.

Solution Highlights:

1. Data migrated from Oracle on-premises to Google Cloud's Postgres database.
2. Real-time data replication using change data capture for instant updates.
3. Striim Agent enabled secure third-party data access.
4. User-friendly Striim minimized the need for extensive programming knowledge.

Business Impact:

90%

reduction in
data migration
time.

87%

increase in
data replication
efficiency.

95%

improvement in
data access
security.

This implementation using Striim streamlined data migration, saving time and costs while enhancing data security, making it an optimal solution for the client's banking and financial services needs.

Read more [Click Here!](#)



The Way Forward - Indium's Best Practices for Data Migration

Data migration is an indispensable component of an organization's journey towards becoming data-driven. However, the road to successful data migration is fraught with challenges. Without a carefully devised strategy and the right deployment model, even the most promising mission can falter, hindering an organization's digital transformation efforts. Selecting a deployment model that aligns seamlessly with business requirements is essential to ensure that data migration is smooth and successful and adds tangible business value.

Data Discovery:

- In the initial stages of data migration, the focus should be on entity-level analysis, not just field-level mapping. Identify the master data entities required for the target application, encompassing essential data sources, such as product, customer, and vendor information. Validation against other data sources is critical.
- Data profiling should be conducted to identify data quality issues, reducing testing and reconciliation efforts.
- Recognize data security requirements to ensure regulatory compliance and employ sensitive data tagging for test and production data.

Program Management:

Efficient program management is key to establishing a governance organization that identifies and manages dependencies across stakeholders, from the business to end consumers. This ensures effective coordination and collaboration throughout the migration process.



Data Movement and Reusability:

- Employ a flexible, metadata-driven architecture that standardizes and reuses data definitions across platforms and projects. For instance, a global ingestion framework can simplify data movement and enhance reusability.
- Establish an error framework at each point of failure to ensure proper mitigation and reconciliation, including the provision of self-healing mechanisms. This proactive approach minimizes disruptions and ensures data integrity.

Execution:

Develop an optimized and robust cutover execution plan, including mock loads, verification processes, offline versus online data loading decisions, and planning for parallel jobs. A well-thought-out execution plan is essential to minimize downtime and data loss during the migration.

Infrastructure Planning:

- Scalable infrastructure planning should be based on an organization's data growth rate, ensuring it can accommodate increasing data volumes over time.
- The selection of tools for hybrid and multi-cloud deployments should prioritize cost-effectiveness while maintaining data security and accessibility.

In conclusion, the success of data migration hinges on meticulous planning and execution, coupled with a deep understanding of an organization's unique business requirements. By following these best practices, organizations can navigate the complex landscape of data migration, ensuring that it not only proceeds smoothly but also delivers tangible value, empowering them to leverage data as a strategic asset in their journey toward digital transformation.



About the Authors



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