Winning the Data Migration Challenge:

*Proactive, business-driven planning reduces cost, controls risk and optimizes results*

Things change. Companies grow, merge, or are acquired. Innovative business strategies are adopted. New applications promise competitive advantages. Regulatory requirements evolve. New competitors emerge. While the impact each of these has on your business varies, many, if not all, could be the catalyst for a large-scale data migration effort.

With business-driven planning, a well-managed data migration process can produce significant business gains across the enterprise. The benefits can include:

- An accelerated project timeline
- Increased overall project quality and “right-the-first-time” performance
- Reduced waste, downtime and total cost of implementation
- Improved stakeholder confidence in data
- Improved audit preparedness
- Mitigated regulatory and compliance risks
- Decreased likelihood of observations and warning letters

Alternatively, a poorly managed migration process will likely result in significant time and cost overruns and lack of integrity in the resulting data.

In many cases, data migration has not received the level of attention it deserves. Always a subset of a larger effort, data migration is often relegated to the back burner. Few organizations have data migration experts on staff and most assigned data migration team members lack the experience and appreciation of the importance of and intricacies involved in a large-scale effort.

Industry studies show that data migration projects commonly exceed projected costs by a factor of 10, while 75 percent fail to come in on time and a significant percentage fail altogether. In addition, completed data migration projects routinely earn failing grades in terms of their contribution to overarching business goals.

Considering all the ways a data migration project can potentially go wrong, it’s an ominous situation when even a single error occurs. For example, improper field mapping during data migration for a pharmaceutical manufacturer could create a product labeling error that derails an entire quality system. The rippling effect could touch everything from packaging, to materials management and production, to laboratory controls, facilities and equipment operations. Errors in migrating financial data can have severe implications on business decisions, financial reporting, and Sarbanes-Oxley (SOX) compliance.

If not detected during data verification/validation, such an error could compromise quality assurance for all products originating from the system. Validation, audits, lot release, regulatory submissions and compliance would all be at risk. In a pharmaceutical company, the consequences of data migration errors can be as far-reaching and severe as product recalls, license revocation, costly litigation, loss of reputation or even patient illness or death. Errors in migration of financial data can cause reporting errors that result in significant fines and actions against corporate executives.
With a carefully thought out and well executed plan, you can not only meet your cost and schedule requirements, but also achieve your business goals in terms of data quality, business intelligence, and efficiency gains. In short, we recommend taking a proactive approach to your large-scale data migration efforts.

Corporations spend more than $5 billion on data migration activities each year. By certain estimates, 50% to 60% of the time spent on enterprise application implementations involves some aspect of data migration. The best way to capitalize on this investment is to treat data migration as a separate project, with its own resources, its own budget and yes, its own plan.

**Your Data Migration Plan – The Core Principles**

When it comes to a data migration effort, lack of planning most certainly spells disaster. That’s because successful data migration is less about knowing the technology, and more about defining and managing the process.

Like any other large-scale implementation, it must be driven by business needs, goals and opportunities. As data migration veteran Ashish Nadkarni states, “Data migration is no longer [simply] about knowing the technology, but about managing the process properly, in a manner that meets the requirements of your internal and external customers.” It demands taking a proactive, business-driven approach.

Whether or not a proactive approach is taken is in the hands of the business managers who must take a leadership role in the data migration process. These data stakeholders must assume responsibility for answering the questions “What data will be migrated?” and “When will it be migrated?” before the technical team can effectively address how it will be migrated.

In addition, any technical solution applied to data migration must enable the business to review and control the process. Equally important, knowledge transfer must be built into the service deliverable to enable internal stakeholders to understand and optimize use of the migrated data.

With these thoughts in mind, every effective data migration plan should be based on these core principles:

- **Prioritization**: Prioritizing and rationalizing source data based on business needs (including regulatory requirements) is crucial. Involving business stakeholders—data owners, compliance and audit teams—during this and other planning steps increases the acceptability and usability of migrated data at all levels.

- **Policies and Procedures**: Existing site/organizational policies and procedures for data migration and validation must be fully applied. If there are no documented policies and procedures, they must be created—either internally or with the assistance of a qualified outside resource. These policies and procedures will provide consistent guidelines for the migration process.

- **Source Definition**: A thorough understanding of the source(s) and target database structures and business rules—including data compatibility and schema definitions—is required. This level of understanding cannot be reached without significant involvement and commitment of the business stakeholders.

- **Data Extraction**: Some source systems contain extraction tools. If no extraction tools exist, new ones should be created, subject to a needs assessment by the migration team.

- **Methods for Quality Checks**: Controls for checking the quality and accuracy of migrated data must be identified and applied. It is also important that your overall data migration strategy balances the risks associated with data quality/quantity against your current business needs and regulatory requirements. This is an important step in assuring stakeholder acceptance of migrated data and, therefore, these business-based strategic judgments should be clearly set forth and documented in your plan.

**Your Data Migration Plan – A Blueprint for Success**

According to one industry expert, “Planning is the number-one success factor for any migration project, independent of complexity. Not only does upfront planning help shorten the duration of the migration process…it reduces business impact and risk…” As noted earlier, to succeed, your data migration plan must be driven by enterprise business needs and opportunities. It also must be proactive and anticipatory—based on uncovering problems rather than encountering them.

A complete data migration plan establishes the structure, strategy, deliverables, responsibilities and procedures to be followed for identifying, extracting, transferring and validating data.

Specifically, it should include the following components:

**1. Risk Analysis**

This typically includes identification, assessment, mitigation, and a report of the findings. Consider using a risk-assessment matrix that defines areas of vulnerability and quantifies their risk quotient within such categories as monetary loss, productivity loss, loss of customer confidence, etc.

**2. Data Analysis/Data Rationalization**

Because the architecture and storage methods differ between the source system and the target system, legacy data is commonly unfit for transfer to the new system. This requires data cleansing—an intermediate process that prepares legacy data so that it meets the requirements of the target system. This step will determine the nature and extent of data cleansing required.
Data analysis will define:
• Source and target systems
• Objects to be migrated
• Mapping of source objects
• Conflicting objects.
• Any issues that might affect the referential integrity between objects
• Objects that must be rationalized before loading

3. Design Specification
Data migration design specification and data analysis overlap and can be combined in one document. The design specification defines the data structure and dependencies of each object in the source system. Extracted data must be reviewed against the design specification before loading. All systems and software required for data retrieval and maintenance must be documented.

4. Procedure
Data migration and transfer methods vary considerably, depending on source and target systems involved and the characteristics of the data being migrated. Although most migrated data can be expected to originate in one or more source databases, it can also come from spreadsheets, text files, paper documents and other sources.

5. Data Extraction
Actual transfer of data is generally accomplished using either extraction tools resident in the source system or custom programs created specifically for the task. Data can also be migrated by manual entry and other methods. Before migration begins, benchmark information must be obtained from the source database. Prior to loading, external tools can be used to clean/transform extracted data based on information gathered during the data analysis and the data design specification phases. All data changes and modifications must be documented and reviewed by the appropriate business owner/subject matter expert. After uploading data to the development environment, but prior to migrating to the QA environment, reports must be generated to verify data integrity between the two.

6. Validation of Migrated Objects
The validation section of your plan establishes the roles and responsibilities of the validation implementation team. It also defines the validation approach, processes, deliverables and procedures for accessing the migrated historical data objects. Validation objectives typically include:
• Obtaining a high degree of confidence that objects migrated to the target database will perform in a consistent and reproducible manner
• Establishing documented evidence that objects deployed in the target database have been validated in accordance with corporate standards for computer systems validation and applicable regulations

The validation effort should focus on critical risks associated with the migration of the objects from source database(s) to the target database, while providing for:
• Retention of all hardware, operating systems, applications, and data necessary for retrieval of migrated data
• Access to the historical data by appropriate authorized individuals
• Preservation of the integrity/accuracy of the source data/object structure
• Retrieval of migrated data by all authorized users

Details describing how each of these validation factors will be accomplished should be specified in the plan document.

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**Decision Point: Should you go it alone?**

It’s been our experience that many companies have credible planning and technical resources. However, they often lack the specialized expertise and/or available resources to organize, plan and implement integrated business-driven data migration initiatives on their own.

If you fall into this category, you may want to consider bringing in a trusted advisor to help you through the process. The right outside resource will help you develop a comprehensive strategy and roadmap equal to your most demanding data migration challenges. In addition, a strong external partner can be pivotal in winning consensus from various stakeholders, particularly during the critical planning stage.

If you do choose to go this route, here are three things to keep in mind:

1. Make sure the company’s credentials include demonstrated experience in your industry.
2. There are many companies whose first order of business is pushing their own particular piece of technology, thus limiting them to a one-perspective solution. Seek out a partner who understands the success drivers and business challenges specific to your business.
3. Technical competency is a must. But most importantly, work with a partner who understands that data migration is, above all, a business challenge in search of a business solution.

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**Conclusion**

To win the data migration challenge and avoid the following hurdles, ensure that your business managers assume a leadership role so they can provide process oversight. Also ensure that your data migration plan is proactive and driven by both necessity and opportunity. As a result, you’ll control costs, mitigate risk, and maximize your business benefits.

**Top Data Migration Hurdles**

1. Data migration lacks the attention it deserves because it is always a subset of a broader effort.
2. A single data migration miscue can have dramatic and far reaching consequences.
3. Each data migration project is unique, with its own set of business drivers, technical challenges and operational issues.
4. More than 60% of data migration projects have time and/or cost overruns.
5. More than 75% of data migrations fail to meet established timelines, and a significant percentage fail.
6. Most organizations lack a data migration expert often because data migration is regarded as a lackluster, dead-end job that nobody wants.
7. Data structures in target systems are evolving during the design and development of the migration process. Data migrations are often performed in conjunction with a new system being developed and deployed in the enterprise, and the migration processes must be adapted to these changes in target system.

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**About the Author**

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**References**


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