lumenia

Data Migration in ERP Projects



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1. Data Migration in ERP Projects

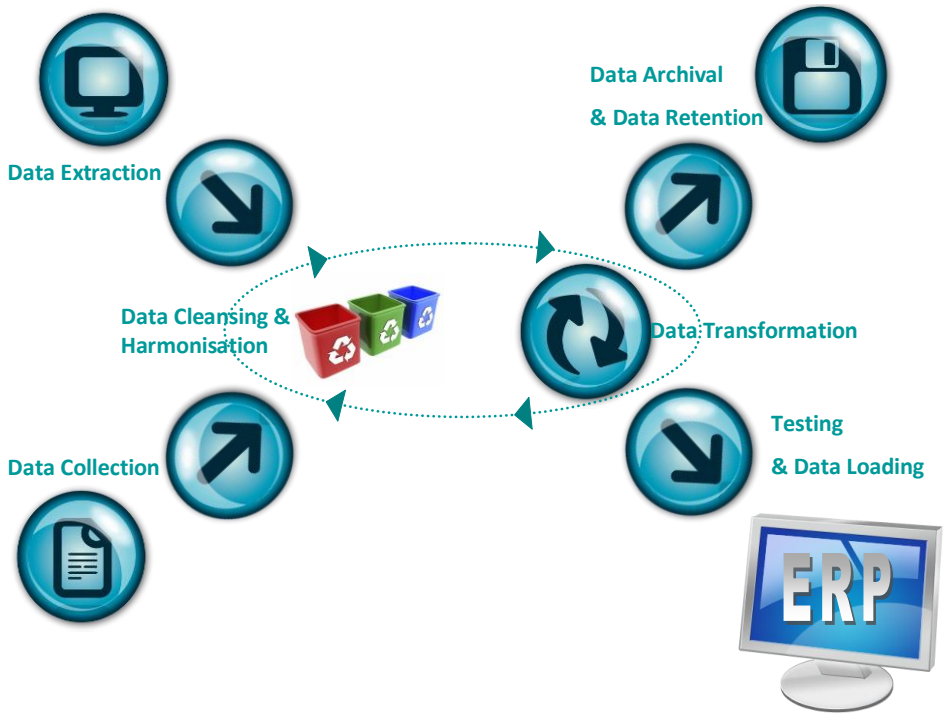
A key value proposition of ERP (Enterprise Resource Planning) systems is the efficiency to be gained from the integrated processes they support. These integrated processes are dependent on accurate and well maintained data. Any ERP implementation will involve the migration of data from one or more legacy systems. Depending on the scale and complexity of the implementation this can range from keying in small amounts of data to electronically migrating large volumes of data. Most implementations will involve the latter and a significant effort in preparing and cleansing the data for the migration. This white paper:

- Explains what data migration is and the key activities that form part of it.
- Describes what is involved in a migration project, from planning through implementation.
- Explores some specific challenges to be considered on migration projects.

2. What is Data Migration?

2.1 Key Activities

The diagram below highlights some of the key activities that will form part of the data migration process. These are addressed individually below.



2.1.1 Data Collection

Some of the data to be loaded to the ERP system may not exist in legacy systems in the organisation. Data collection may include collecting whole data entities relating to areas that are being automated for the first time in the organisation (e.g. implementing a fixed assets module for the first time) or specific attributes relating to existing data entities (e.g. new parameters relating to existing items that will drive new supply chain planning functionality). Typically this type of data collection will be manual and will involve key stakeholders populating spreadsheets with the required data.

2.1.2 Data Extraction

Data Extraction involves programmatically extracting data from legacy systems for further manipulation before loading to the new system. This is likely to involve technical extraction of the data by analyst developers with subsequent verification of the extracted data by business users.

2.1.3 Data Cleansing & Harmonisation

Data cleansing is the manipulation of extracted and collected data into the formats required by the new system as well as removal or correction of out of date or incorrect data before it is loaded. This can be carried out in a number of stages. The first is to cleanse the data in the legacy system before extraction. Examples could include closing open purchase orders or deactivating obsolete products. A second stage of cleansing is to manipulate the data subsequent to extraction (legacy systems may not have enforced the data accuracy that the new ERP will demand).

Data harmonisation is the standardisation of data, often from different sources, into a single format. An example of where this may be particularly relevant is where a single ERP system is being implemented across a number of organisations currently running different systems. In such cases product, customer and supplier codes may be in very different formats in the existing systems and will need to be standardised in the new system. Also, different records referring to the same product, customer or supplier may exist in different systems and these will need to be harmonised into a single record.

2.1.4 Data Transformation

Data transformation refers to the programmatic manipulation of data using a data integration and ETL (Extract Transform Load) technology (discussed below). Such technologies may be applied to high volume structured cleansing and harmonisation tasks as well as to the aggregation of disparate data sources.

2.1.5 Data Loading

Data loading involves loading the prepared data files into the new system. Typically this will be performed by the ERP vendor or implementation partner. However it will be the responsibility of the customer to prepare the data in the required format at the required time. Many iterations of test cycles should be performed around this activity to ensure smooth transition during the system cutover.

2.1.6 Data Migration – Testing

Testing is a critical activity in an ERP data migration project and can be manual or programmatic. Typically a combination of both will be employed. Manual testing may involve manual checking of a defined sample size of records or of specific fields. Programmatic testing may include checking data formats or searching for specific errors.

A set of test cycles should be defined and followed. This may include unit testing of individual data conversions, end-to-end test cycles of all conversions in sequence and in tandem with any related manual steps, and transactability testing (running transactions through the system using the loaded, converted data).

It is critical to get sign-offs from stakeholders at agreed stages in the testing cycle. This will ensure buy in to the activity and will be required for audit purposes.

2.1.7 Data Archival & Data Retention

Historical data may not be included in data migration to ERP – for example only open transactions or active customers/suppliers/items may be selected for migration. This does not mean that this data should be lost to the business. A method for retention of historical data should be defined to satisfy the various requirements in the organisation. Key consideration will include:

- **Regulatory Compliance:** Typically data will need to be retained to satisfy various regulatory requirements. This may be done by retaining legacy systems or by migrating data to a separate data store.
- **Reporting / Business Intelligence:** Once ERP is up and running, typical reporting requirements may include the ability to run comparison reports against legacy data (e.g. current year sales performance vs. last year). Any gaps in visibility of data that will exist immediately following ERP implementation may erode any goodwill and confidence that exists in the organisation towards the ERP.

Considering this, it is worth looking seriously at implementing a reporting solution in tandem with the ERP. This will involve archiving and retaining data to drive historical reporting. Your Migration strategy (see section 3.1) should address this as the archival and retention activity may fall squarely within your migration implementation using the same resources, tools and techniques.

3. Planning & Implementing

The previous section described the key activities involved in data migration. This section describes some of the key concerns for the project manager of a data migration project. Some are specific tasks and some are considerations unique to ERP data migration projects.

3.1 Migration Strategy

One of the first steps in data migration is developing a strategy. This should define what is to be migrated. The strategy should cover both breadth and depth of scope – i.e. what entities are to be migrated and how much data. An example in master data might be that Suppliers will be migrated (breadth of scope) but only those that we have purchased from in the past three years (depth of scope). This may be more problematic in relation to transactional data – typically the depth of scope in transactional data will mean only migrating open transactions (for example unpaid sales invoices). Users may object to such restrictions in depth of scope due to the limitations to historical reporting and analysis capability that may result (refer to section 2.1.7 Data Archival and Retention above). A Data Migration strategy should also cover such topics as technologies to be employed, testing approaches and team makeup.

3.2 Data Migration Teams

Building a data migration team with the appropriate skills for your project will, to a large extent, determine the success or failure of the project. Key roles are likely to include:

- **Project Manager:** The project manager should ideally be experienced in data migration and ERP as well as project management.
- **Analyst Developers:** These technical resources will perform programmatic data migration tasks and ideally will be familiar with the legacy systems.
- **Business Owners:** Key business stakeholders will be required to sign off various stages of the migration process.
- **Business Analysts / Process Leads:** The ERP process leads should be involved at various stages in the data migration process, from the definition of data fields to be migrated to testing and validation.

3.3 Enabling Technology

Spreadsheets, data integration tools and ETL applications are some if the key technologies that are used in preparing data to be loaded to an ERP system.

- **Spreadsheets – Best Friend or Worst Enemy?**

Spreadsheets are typically used for data collection and data verification. They have the advantage of being easy to use and widely understood. The risk inherent in using spreadsheets is their flexibility. Data is frequently rendered meaningless by users sorting individual columns independent of their adjacent columns. Time is often wasted on projects by users entering unstructured data into spreadsheets during data collection. It is advisable that data validation rules are used to make data collection as foolproof as possible and that verification of the data is performed prior to it being accepted.

- **Data Integration and ETL (Extract Transform Load) Tools**

There are many integration and ETL tools available on the market and the decision on which to use may be driven by what expertise exists in the organisation. ETL tools simplify the task of extracting data from source systems and allow analysts to perform programmatic data cleansing, transformation and harmonisation tasks. These applications can provide powerful graphical data modelling tools which can simplify complex data transformations.

3.4 Data Migration & Accounting

A cornerstone of ERP is the integration of processes in each module or subsystem with accounting processes. This interaction with accounting processes is specific to ERP and adds greatly to the complexity of ERP data migration versus data migration in other systems. Because of this it is critical that accounting expertise is involved at the design and testing phases of ERP. Strategy and design should ensure that transactional data being migrated to one module is compatible with the data being migrated to other modules. For example, transactional data being loaded to one module may generate sub-ledger postings that must tie to balances in the general ledger. If this is not the case differences between sub-ledger balances and general ledger balances will cause problems during month end processes following go-live. The end-to-end testing mentioned earlier, ideally carried out by an accountant familiar with the transactions, should verify all of these accounting links.

3.5 Planning for Audit

Something often forgotten until the end of an ERP implementation is the requirement for the implementation to be auditable. Auditing the data migration activity will be a key component of this. Documentation should be maintained from the beginning of the project in a manner that will facilitate a future audit. The project manager should put in place standards and procedures to enable this.

3.6 Dual Maintenance

There is always a time-lag, often a matter of weeks, between taking data from the legacy systems and uploading it in a different format to the new ERP system. The very nature of data is that it is constantly changing and there will invariably be changes made to the data on the legacy system after an extraction. It is important that these changes are reflected when the newly formatted data is being uploaded.

To address this, some project teams decide to cleanse the data within the legacy system and prepare scripts for harmonisation and new data. Any changes are therefore noted automatically. However, cleansing the data in the legacy system can be very time consuming in comparison to using faster (but more error-prone) spreadsheets.

If the data is not cleansed at source, protocols must be put in place to ensure that changes to 'legacy' data are reflected in the interim spreadsheets and/or the databases that are holding data prior to go-live.

3.7 Planning for Cutover

One of the most difficult tasks in Data Migration is the planning of data migration and manual data entry during the time of go-live. The closing position (stock; debtors; creditors; accounts; etc) of the legacy system must obviously be the starting position of the new system. However in addition to the opening and closing balance, there will be many incomplete transactions in the legacy system at the time of go-live that have to be completed in some shape or form on the new ERP system. Hence the sequence of migration and entry is very important. One also has to take into consideration the amount of resource required in a very short space in time.

There has to be an opening stock position for example but there will be some raw material in the warehouse for which invoices have not been received and some for which invoices have been received but not yet paid. A decision has to be made as to how these will be processed through to payment on the new system. If they are going to be treated as part of the standard 3-Way invoicing approval process (Purchase Order – Goods Receipt – Invoice Matching), the original purchase order and goods receipt note will have to be re-entered or migrated. This will affect stock positions and underlying accounts such as accruals as they are effectively being entered for a second time (the first time was on the legacy system). The entered balance for the opening position of stock and the various accounts must therefore be altered before re-entering the incomplete transactions. Obviously, this is a very arduous process and some companies use manual processes and systems to tackle these issues during changeover.

Other examples of incomplete transactions may include sales orders, despatches awaiting Proof of Delivery documentation, unpaid sales invoices; stock transfers and logged complaints. It is essential that the project team consider all such transactions from a complexity and resource perspective and create a very detailed plan well in advance of the cutover period.

4. Some Other Things to Consider

This section highlights some other considerations that may have a bearing on how specific ERP data migration projects are executed.

4.1 Tier 1 and Tier 2 Data Migration

The complexity of the migration project will be affected significantly by the sophistication, scope and complexity of the ERP solution being implemented. Tier 1 ERP systems like SAP and Oracle will typically have much more flexibility of design (and hence complexity of implementation) than Tier 2 systems. As a result:

- Design decisions may not be made until later in the project.
- Static migration design and data templates will not be available until later in the project.
- The technical complexity of migration procedures will increase.
- The level of testing required may increase as vendor conversion programmes will be less "standard".
- The level of module integration will be more complex resulting in more complex end-to-end data testing requirements.

4.2 Data Migration in Regulated Environments – Computer Systems Validation

Organisations in the Life Sciences sector are often constrained by the need to comply with regulations specified by the US Food and Drug Administration (FDA) or similar standards-based organisations from other countries. Where such constraints exist, a formal Computer Systems Validation (CSV) process must be put in place to ensure that all aspects of computer system design, implementation and maintenance adhere to the relevant regulations.

CSV best practice requires the preparation of a Data Migration Protocol document. This performs some of the same functions of the strategy discussed in 3.1 above but addresses the data validation process more formally. The protocol identifies the scope and benefits of the data migration process and clearly states who is responsible for the validation of the data. It contains a detailed description of the data migration process and should include technical specifications.

Before preparing a Data Migration Protocol, it is advisable to refer to the relevant regulatory frameworks, which may include the following:

- The Good Automated Manufacturing Practice (GAMP) Guide for Validation of Automated Systems, GAMP 5;
- EU GMP Guideline, Annex 11;
- Code of Federal Regulations 21 part 11;
- General Principles of Software Validation; Final Guidance for Industry and FDA Staff.

A key point in a regulated environment is that the validation of programming is completed in advance of the data migration work. For example, if a script is developed to harmonise data from different sources, this script must be validated well in advance of its use. It is important to have software controls in place to ensure that if changes are made to the script after validation, the validation must be repeated. Similarly, in relation to manual data migration, it is important to clarify beforehand how many records are going to be extracted; and how many records are expected to be uploaded to the new system and to agree in advance what the level of data checking will be.

The level of validation is very thorough in the Life Sciences industry but is well proven and effective. Consequently, data migration project managers would be well advised to adopt many of the formal practices from CSV, even in non-regulated environments.

5. Conclusion

Data Migration in ERP can be a very complex project in itself. A clear appreciation and experience of the activities discussed in this paper is critical when undertaking such a project.

As already pointed out, the quality and expertise of the migration team, and in particular the project manager, is key to a successful migration project. Because of this it is fundamental to the success of the ERP system.

Few organisations are likely to have the required level of expertise in-house. ERP vendors or implementation partners will only be interested in loading the data, not planning and preparing it. In most cases this expertise will need to be externally sourced. The cost of this should be taken into account when budgeting for ERP. Given the overall cost of ERP implementations and the criticality of data to the system, it will be money well spent.

6. About Lumenia

Lumenia is a leading independent ERP consulting organisation and is not aligned with any ERP or other vendor of business software.

We provide objective advice and experienced project resources to organisations that are planning to upgrade or change their ERP systems. Specifically, we provide services in the following areas:

- ERP strategy development
- ERP product and vendor selection
- ERP project management
- ERP change management
- ERP data migration management
- ERP systems validation.

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