

Abstract

Doing an ERP? Here's how to project manage the data conversion

If you are doing an ERP project, then you probably have a business case for improving operational efficiency, reducing the friction among business units, and proving a rich source of business data for the executive team. Although most ERP projects follow a familiar project pattern beginning with process evaluation and then leading to a rollout of an application package, the underlying imperative for success is business data. In this paper, we will examine the WBS of the data conversion project within the ERP project, take a look at the level 1 project plan, and briefly discuss management techniques proven to be successful in software projects like data conversion.

Author acknowledgement

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Doing an ERP? Here's how to project manage the data conversion

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1. A little bit about ERP projects

If you are about to engage in an ERP project, then you know the acronym stands for Enterprise Resource Planning, and you know that an ERP is a business system typically sold as a software suite of interoperable functions, supported by a relational database, and run on a large scale computer environment.

The Business Case

More than likely, your project is supported by a business case that includes one or more of these benefits:

- A lower operating cost to the business that is brought about by the time and effort savings of seamless inter-working of data and function between business units;
- Savings in system maintenance and support on the part of the information technology [IT] unit brought about by lower integration cost of an application and database product from a single vendor;
- Discoveries in the business transactional data that give rise to discriminators that can be exploited to attract and retain customers, and
- Consistent reporting of business results across many different business units that share the ERP, largely a benefit of having one data model for the whole organization.

The Project Outline

To deliver successfully on the business case, most ERP projects follow a familiar outline. First there is conceptualization and requirements gathering:

- Process analysts characterize the existing business processes and design the future state processes, incorporating the advantages of an ERP.
- Function analysts decompose process maps and descriptions into functional goals and requirements, and specify the roles, responsibilities, and skills of the end-users, administrators, and maintainers.
- The benefit capture manager develops a formal benefits capture plan, without which, experience shows, the benefits of an ERP will be much harder to achieve.
- Architects fit the goals and requirements to the native capability of the ERP, and any gap is prioritized into a set of development requirements.

And, then requirements are acted upon in the design, implementation, and rollout:

- IT plans and acquires the test and operational environments

- Data owners in the business and project data modelers conceive and execute a business data conversion plan for loading the ERP with business data, validating the data with the business users, and training the business users in the use of the data in its new model.
- Functional experts train the business users in the new processes, their new roles, and their new responsibilities.
- The technical teams design, implement, and rollout the ERP, complete with its custom objects and go-live data load.

After go-live, support teams swing into action:

- An ERP support team responds to missed or misunderstood requirements,
- The benefits team begins execution of its capture tasks.
- The training and data teams coach the business through the initial periods.

Business Data is the Foundation

Obviously, there is a lot of scope in an ERP project, but looking back at the business case, business data underlies every benefit, and business data enables nearly every function and process. The most fundamental idea in an ERP is that many business users, inside and outside the company, as employees, suppliers, and customers, participate in a shared cross-functional environment that, in turn, depends upon and shares a common data model and data repository. Consequently, the importance of data to the future-state benefit stream justifies project managing the data readiness of the system.

2. A little bit about the database

If you find yourself the project manager responsible for the data conversion, a working understanding of the database is a great advantage.

The relational database is the common architecture of the database in ERP systems. Relational databases are conceptually constructed of tables of data in such manner that relationships other than just the hierarchical parent-child can be represented. This ability to represent a commonality among, and shared quality between different values is the power behind the relational database. For instance, there might be a table for customer name and a table for telephone numbers, and those tables could share a common customer identifier to link the name and number.

Tables are populated with records [rows] of data, and the records are subdivided into fields [columns], not too much different than the familiar spreadsheet grid of columns and rows. Data within a field on a record has a value; the value type is commonly either text or numeric, but other data value types are also frequently encountered, such as dates. There are checks and constraints imposed by the database system on the data values to make sure they conform to the requirements of the field and record. The tables, links, and validations can be configured and customized in many ways to meet business requirements.

All ERPs come out of the box with a database configured for specific business purposes, but the tables are pretty much empty of data. Each business-purposeful table has its own unique configuration with pre-defined fields, user-definable fields, and a set of links with other tables that manage relationships among the data values.

3. Level 1 WBS for the ERP data conversion project

All data conversion projects involving the ERP have a work breakdown structure, WBS, which has four basic deliverables for the project manager to manage. These deliverables make up the Level 1 WBS, as shown in the table that follows. They are: a set of extract files of the source data, a record set of transformed data, a record set of data loaded into the production database, and the validation results that prove the data quality. Restated as tasks, their dependencies are typically finish-to-start in the sequence of extract → transform → load → validate, sometimes shortened to ETL&V.

Level 1 WBS for ERP Data Project	
WBS	TASK SCOPE
Extract file set	<ul style="list-style-type: none"> Identify the source systems that contain the data to be loaded into the ERP. Sources could be another operational system that is being replaced by the ERP, or local databases and spreadsheets that are stand-alone data sources within the business, or data from customers and suppliers Locate the data to be extracted with a data map of the source system or files Extract the data to be loaded from business sources into an extract file.
Transform record set	<ul style="list-style-type: none"> The database interfaces and the production data tables impose certain constraints and requirements on the data values. The extracted data may have to be transformed to meet these constraints and requirements. For example, calendar dates often have to be transformed from one format to another in order to properly be loaded Transform the extracted data into a record set form and format that can be accepted by the ERP database. Usually, the transformed record set is stored temporarily in staging tables.
Load record set	<ul style="list-style-type: none"> All ERPs come with application programming interfaces [API's] that have the functional purpose of receiving and loading data. It is sometimes necessary to modify or extend the API with programming code, or make changes to the data after the API loads it. Sometimes, the API can't be used at all, and a custom load program is needed Load the extracted and transformed data into the database using the APIs or load programs.
Validation results	<ul style="list-style-type: none"> Data is validated with the data owners and data custodians in the business Validation is concluded when there is a complete and proper copy of the source data, after formatting

4. Managing the data conversion

Level 1 Plans¹

The project manager begins with the level 1 WBS and develops the Level 1 project plan. The Level 1 project plan extends and expands the Level 1 WBS. Like all software projects, the Level 1 project plan for the data conversion has these task elements:

- Gather requirements for the ETL&V deliverables. Typically, a software requirements specification, SRS, is the capture document.

¹ "Level 1" is used in this paper to denote a summary level sufficient to convey the concept to the reader. Project managers typically work day-to-day with a more detailed plan that is an extension and expansion of the Level 1 summary

- Design the data maps, extract programs, load programs, and validation reports. Provide design documentation that records all the decisions made about how the data will be treated by the programs.
- Implement the designs in a test environment; run tests according to a set of test plans. The tests confirm the accuracy of the data maps, the completeness of the extracts, the quality of the data loads, the overall timing of the ETL processes, and the validity of the loaded data compared to the sources.
- Execute the implementation at go-live, validating and confirming all results

Techniques for Success

Software projects are notoriously tricky for reasons that have been amply described in the literature, and an ERP data conversion is no different. The leading cause of difficulty is the nature of software requirements. Software is conceptual, intangible, and by nature subject to the vagaries of imagination and foresight.

Fortunately, business data conversion requirements are largely non-functional, having no users, and are mostly requirements for procedural interfaces. Nevertheless, the prudent project manager takes advantage of techniques proven by experience to reduce the risk in software projects, some of which are described briefly below.

First, risk-adjust all the estimates provided by work package managers. This is most effectively done by developing an 'expected value' of their resource and schedule demands. Expected value is a risk-weighted average which is computed by evaluating the likelihood of best and worst cases, evaluating the impact of the best and worst case outcomes, and then summing the products of likelihood x outcome.²

Second, recognize that among the extracts, transforms, and loads there are many dependencies. Dependencies stretch the schedule, a phenomenon that is to be accounted for in the risk adjustments. But if there are milestones where tasks join their results, then the tendency for the milestone completion to 'shift-right' to a later date is particularly acute.³

Third, address the agents, beneficiaries, constraints, obstacles, and triggers or contracts among all requirements and designs. The agent is the system or function that does the work, typically the API. To have the agent be successful, there are pre-requisite conditions and needs that must be met. Are these complete and accounted for?

The beneficiary receives the outcomes of the agent or is enabled by the actions of the agent. In most cases tables in the database are the beneficiaries. The data models in most ERPs are devilishly complex, and therefore understanding the data model details is a must-do.

Constraints impose conditions or limitations, and therefore they may drive schedule, particularly at load-time. Obstacles are consequences of failures: what if a condition is not met and therefore the extract,

² If all cases are equally likely, and there are N cases, then the summation is the arithmetic average: (sum outcomes) x 1/N

³ The shift-right tendency at a joining milestone is called 'merge-bias'. There is additional information about merge bias at the author's website, www.sqpegconsulting.com

transform, or load is incomplete or inaccurate, or can not be executed? Triggers or contracts are consequences of success: because X occurred as planned, then Y must be true, or Y must then occur.

And, fourth, manage results with a pipeline dashboard. Pipelines are graphical presentations of the flow of deliverables or results by time bucket. Typically the project manager pipelines the baseline plan, working plan, and the actual results.

A pipeline for requirements might look like the following chart. The project manager has planned a six week baseline for accumulating and documenting 50 requirements. Requirements analysts have adopted a working plan that is a little bit at variance with the baseline. The actual working results are shown as of the end of Week 3.

Requirements						
PLAN	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
Baseline	5	10	20	30	40	50
Working Plan	5	8	15	25	38	50
Actual Results	5	10	17			

5. Summary and Conclusion

ERP projects are large-scale undertakings that require a carefully documented business case and execution plan. No ERP project can be successful if the data conversion of source data from the business into the ERP system is not successful. Treating the data conversion like a software project, and managing it with the tools and techniques normally afforded to software project managers is a recipe for success. Although the WBS is deceptively simple at the Level 1 abstract, data conversion is a project of much detail. Being mindful of not only the task enablers, but also the constraints, obstacles, and triggers will pay benefits in the data validation with data owners and data custodians