Best Practices for ERP Data Migrations/Conversions

Data Migration

Overview

ERP data migrations are one of the most challenging aspects of any new system implementation. This is particularly true when the old system is written in legacy code, for which there is little or no support. And it is doubly true when the old system has been installed on proprietary hardware, or on an operating system that is no longer commonly used.

We’ll discuss all the hidden traps and give you a set of guidelines for Tier 2 ERP system data migrations that will help you navigate these waters safely.

Primary Success Factors

There are many factors that can contribute to the success or failure of your data migration. Some of those factors are completely within your ability to control, if you create a solid plan and execute it. But some of those factors are not in your control, and it’s unrealistic to expect that everything will go as planned. So, having a backup plan is strongly recommended, for those areas in which you have the least amount of control.

The Primary Success Factors that govern the outcome of any data migration are shown below. For each of these factors, I have included three indicators of likely success – control, predictability, and backup. “Control” simply predicts how much...
control you will likely have over this success factor (High/Medium/Low). “Predictability” is a measure of whether or not random variations could affect this success factor (High/Medium/Low). And “Backup” simply indicates whether or not a reasonable contingency plan can be developed for this success factor, in the event that things don’t break your way (Yes/No). For all those factors whose “Backup” indicator is “No”, you better get it right the first time!

The Primary Success Factors are:

- Getting the active support of your Executive Management Team (EMT). The best way to get their support is to let them know what failure would mean to their ability to conduct business. Control: High Predictability: High Backup: No.

- Quality of your Data Migration Team (DMT). Make sure that they each have skin in the game, that they are motivated to achieve a successful outcome, and that they are the most knowledgeable people in their department, concerning their department’s data needs. Control: High Predictability: High Backup: No.

- Quality of the working environment of the DMT. A separate, dedicated environment should be built for the DMT. It must include access to both the legacy and the new system, and it should be isolated, as much as is practical, from interruptions. Control: High Predictability: High Backup: No.

- Data quality on your legacy system. This might be the single weakest link in your data migration effort. On older systems that have been in use for a decade or more, data corruption can be a significant problem, particularly if reliable tools aren’t available for fixing that corruption. Control: Low Predictability: Low Backup: Yes (but they’re not good).

- Completeness of your Data Migration plan. Consider the effects on your staff, and on your business activities. Construct the plan in a way that optimizes conversion costs, data quality, and downtime. Control: High Predictability: High Backup: No.

- Quality of execution of the plan. The important thing is to know in advance that things will go wrong, and to develop a backup plan for the least predictable areas. Control: Medium Predictability: Medium Backup: Yes.
EMT Support

You must have the unequivocal and active support of your Executive Management Team. They likely appointed you, but that doesn’t mean that you have their support. It only means that you have their endorsement.

Let them know in advance that you’ll need to assemble a Data Migration Team, consisting of one knowledgeable staff member from each department in the company, and that you’ll need to be a high priority for each of the DMT members.

Also let them know in advance where the areas of least predictability will be, and what a bad outcome could mean, in terms of business activities or in terms of the new system’s implementation schedule. The areas of least predictability are:

- Data quality on the legacy system. Is there corruption in those old files?
- Hardware on the legacy system. Will it keep running long enough for all the required downloads?
- Operating system and ERP software on the legacy system. Will they allow you to produce reliable data downloads?
- Quality and speed of the communications link between the legacy and new systems. You will conceivably be transferring millions or even billions of pieces of information. If this is not a reliable and fast connection, your data migration can and will be a nightmare.
- Quality of testing. The staff members of each of your departments must test the “Conference Room Pilot” system, after the preliminary data migration, in order to determine if the converted data meets the requirements of the new software. Lazy testing can completely negate the most careful planning and execution.

The Data Migration Team

Your DMT should consist of the legacy system administrator, a representative from your new ERP provider, and one representative from each major function in your company. For instance, you might have one person from your Accounting and Finance Department, one person from HR, one from Sales and one from Production. Keep the size of your DMT to a minimum, as long as all functions are represented.
Each of your team members must be conversant with the historic, current and future data needs of the department(s) they represent. You need these team members to be strategic thinkers as well as tactical thinkers. These will likely be persons of high responsibility in their departments, so you can’t waste their time. Make your meetings efficient and goal-oriented.

Each of your DMTs must be able to sound in authoritatively on these issues:

- Which data should be migrated and which can be left behind.
- How the migration process can be done in a way that minimizes the impact on their department’s business activities. This applies to the Conference Room Pilot (i.e. test) system, as well as to the final Go-Live system.
- Which of the new system’s features will be used, and which won’t.
- How the Conference Room Pilot must be tested in order to ensure each department’s data integrity.

**Legacy System Data Quality**

There are four aspects of “data quality” on your legacy system. They are:

- Physical data quality
- Logical data integrity
- Financial data integrity
- Data cleanliness

Physical data quality simply refers to the old operating system’s ability to access and export records from its database. On older systems that have been in use for a decade or more, data corruption can be a significant problem, particularly if tools no longer exist that can fix that corruption. If tools exist on your legacy system to scan the disk drive and report and fix errors, then those tools should be run prior to a data conversion.

Logical data integrity refers to the integrity of file structures. There may be tools for cleaning and linking data that exist on the legacy system. These tools might rebuild sort files, scan data for basic integrity (i.e. adherence to record formats, etc.), rebuild ISAM file links and even relink “line” files. Run all the
available legacy data integrity tools prior to the data export. Don’t make the mistake of thinking that data integrity is OK, just because the utilities were run a week ago. If it has been more than 24 hours since the last data integrity check or rebuild, then you should run them again, right before the export.

Financial data integrity refers to whether or not your general ledger is in balance, if all the journals and sub-ledgers balance to the general journal, and if transaction history detail matches the history totals. In order to measure financial data integrity, your conversion team should agree in advance which reports are necessary to print, in order to ensure that all ledgers and sub-ledgers are balanced correctly prior to the export. These reports must be run directly before an export, and the corresponding reports in the new system must be run directly after the data import, in order to confirm that financial data integrity has been maintained.

Data cleanliness refers to the consistency of the data. Are some of your vendor names in all uppercase, or do they contain special characters that might cause a data conversion to hiccup? Your staff should weed through all your most important records and make sure that there’s a great deal of consistency in all the records, and that there’s no “junk”.

Doing as much as possible to ensure legacy data integrity and cleanliness will be an important part of the Data Migration Plan.

**Which Files?**

One of the first steps in creating any data migration plan is determining which data must be migrated, and which can stay.

In any ERP database, you’ll find these types of files:

1. Master files (AKA static files): These are account files, such as the customer or vendor account files, the inventory item file, the employee file, etc. These files contain links to history files, and to current transaction files. These are the files that are accessed when the user prints a Customer List, or a Vendor List, etc.

2. Unposted data entry files: These are files that contain transactions that are currently being processed. These files are typically accessed during the day by
data entry staff, and are generally empty at the end of the day, assuming that transactions have been updated in real time, or in batches, to the system.

3. History files: These files contain transaction history, and are generally among the largest files in your system. These files contain old sales orders or work tickets, old invoices, check history, etc.

4. System configuration files (AKA setup files): These files contain the settings for each of your application modules. For instance, there might be one file for each of your product lines, one for each of your warehouses, a configuration file for your A/R module that holds all your A/R settings, etc. There will generally be a number of system configuration files, possibly as many as 20 or 30, for each of your application modules.

5. Custom forms and reports files: These files contain the settings for your custom reports, and the settings for your forms printing, and for any screen customizations that you’ve made to your system.

6. System files: These files contain system-wide information such as security settings, multi-currency settings, etc. These are generally located in the same folder as your system program files.

The challenge for you is to decide which files to ignore, which files to upload into your new system, and which files to manually enter into your new system. This is a team effort, and you should rely on the expertise of your ERP provider for assistance.

You’ll need to make a decision for each of the files on your system. Before you have this conversation, you should have your current legacy system administrator create a list of each of the files in your current system, and the list should contain this information:

a. Filename
b. Brief description of the file
c. File type (1 through 6 above)
d. Multiple record types? If so, list them. i.e. An inventory transaction file might have one record type for a warehouse transfer, another record type for a sale, and yet another record type for an inventory receipt.
e. File size in bytes
f. Number of used records
g. Physical data quality (from Part 1). Rank as 1–10 with 1 being unreliable, and 10 being a file having no known data integrity issues
h. Data cleanliness (from Part 1). Rank as 1-10 with 1 being unreliable, and 10 being a file that has been cleaned thoroughly and has perfectly consistent records.
i. Disposition. Leave this blank for now. It will eventually contain an “I”, an “E” or a “M” for Ignore, manually Enter, or Migrate, respectively.
Additionally, for each of these files, you’ll need the current record layout for your legacy system, and for the new system. Remember that it is quite likely that the new system will contain more fields than your old system currently stores, and your new system may actually have two or more files where your old system only had one. You’ll have to rely on your ERP provider to get you the new system’s data schema (file and record layouts).

So, your Data Migration Team (DMT) must sit down to discuss the disposition of each of these files. Your DMT doesn’t have to get into the nuts and bolts of the data mapping process. You can leave that to your system administrator and your ERP provider. But you must determine which of these files to ignore, which to upload and which to manually enter into the new system, based on what will produce a combination of the lowest cost and highest accuracy, while still meeting your need for access to historic information.

Here are some suggestions, grouped by file types 1 – 6 above:

1. Master files: Unless these files are unusually small (for instance, some companies only have a few very large customers) you will almost certainly benefit from migrating them to your new system. Recommended disposition: “M”.

2. “Unposted” data entry files: There are virtually no circumstances under which you would benefit from migrating these files over to your new system. You will simply clear them out (i.e. post or update them) right before your data transfer, so that the effects of those files have been felt throughout your system’s master files, history files, etc. Recommended disposition: “I”.

3. History files: That’s a complex question. In a perfect world, you’d want your end-users on the new system to benefit from the many year’s worth of history that your old system accumulated. But there’s a large cost in migrating that data in terms of the time it will take to upload what could be millions of records. I’ve seen this process take days to complete, and I’ve seen it fail after many hours, due to file and data corruption. Remember that a data migration is not just one single process. It is two separate processes, a download from the legacy system, and an upload into the new one. Either one of these processes could hiccup, based on physical data quality, data cleanliness, or logical data integrity. In order to determine the disposition of each of these history files, your DMT should determine:
a. How important the information in each file to the ongoing operations of your company.
b. Can just a portion of the data, say the last two years’ worth, be migrated, and the rest left behind? There may be compliance, regulatory or business intelligence issues involved in this decision.
c. Will the legacy system be available for a period of time, in order to do inquiries if the need arises?
d. Can the new system be brought online without all or some of the history, and the remaining history added later?
e. Would it suffice to dump the contents of the file out to hardcopy, so that it’s available offline to your end-users?
f. Would it suffice to make the contents of the file available online, but not in your new ERP system, for user inquiries? In other words, it might be loaded into a standalone SQL database.

Based on the answers to these questions, and the specific needs of your end-users for the data in each of these files, a unique disposition decision should be made for each file. There are five possible dispositions:

1. Migrate the file in its entirety. Disposition: “M”
2. Migrate just a portion of the file, using a transaction cutoff date. For instance, migrate only the past two year’s worth. Disposition: “M-”
3. Don’t migrate the legacy file to the new system, but transfer the file to a standard database file on the new system, so that it is available for inquiry on an exception basis. Disposition: “I++”
4. Don’t migrate the legacy file to the new system, but keep the old system running for a period of time, for inquiries on an exception basis. Disposition: “I+”
5. Don’t migrate it, and don’t make it available for inquiries. Disposition “I”

Your DMT will have to determine which of these disposition types to assign to each history file.

4. System configuration files: You generally don’t want to migrate this information over to your new system. You’ll use this info during the configuration portion of your new system implementation. Recommended disposition: “E”.
5. Custom forms and report files: You likely won’t migrate this information over to your new system. You’ll use the info in these files when you create your new forms and customize your new reports, but the information will not be migrated. Recommended disposition: “E”.

6. System files: These will have to be created by your new system, so they should be ignored. Recommended disposition: “I”.

Once you’ve made all these decisions, you’ll need to “map” the data, in all files whose disposition is “M”. This must be done carefully, and it should be done by the current legacy system administrator, working in concert with the new ERP provider. The challenge here is that the new system is more capable than the old one, which means that, among other things, it stores more information than the old system. In other words, the new system might want to know what the hat size is of a current customer, but the old system didn’t care.

Some of these additional fields are required to have a value, and the value must conform to one of a number of specific choices. This means that the DMT will have to choose the default selection for any such field, and there may be many of them. Your DMT member, for the appropriate department, should be consulted when making decisions concerning field defaults.

Once all of these decisions have been made, the DMT has a complete data mapping of the old data to the new. This data mapping can be saved in the migration utility, and the data cleaning and migration process is now ready to begin.

**Cleaning the Legacy Data**

Here is the recommended sequence of steps to ensure data cleanliness and integrity:

a. Backup your legacy system NOW, and keep the backup.

b. If tools exist on your legacy system to physically scan the disk drive and report and fix errors, then those tools should be run now.

c. Using the list of files marked as disposition “M”, designate data cleaners in each department, who are responsible for accessing each record on the legacy system, and making sure that the data is accurate and consistent. Are some of your vendor names in all uppercase, or do they contain special characters that might cause a data conversion to hiccup? Your staff should weed through all your most important records and make sure that there’s a great deal of
consistency in all the records, and that there’s no “junk”. This could be a weeks-long process, and progress should be reviewed weekly by the DMT. The most important files to clean are the Master Files (type 6). You may want to limit your cleaning to just those files.

d. When data cleaning has been completed, backup your legacy system again, and keep the backup. Don’t overwrite the backup from step a.

e. If there are tools for cleaning and linking data that exist on the legacy system, they should be run now. These tools might rebuild sort files, scan data for basic integrity (i.e. adherence to record formats, etc.), rebuild ISAM file links and even relink “line” files. Don’t make the mistake of thinking that data integrity is OK, just because the utilities were run a week ago. If it has been more than 48 hours since the last data integrity check or rebuild, then you should run them again, right before the export.

f. Print the reports that your conversion team has agreed are necessary in order to confirm the financial data integrity of the legacy system.

g. If there is an out of balance condition in any of your journals, ledgers or history files, then fix them now by making adjusting entries. Run the reports again, and make any additional entries, until the system is in balance, or until you’re resigned to the fact that you can’t get it into balance.

**Determining the File Migration Sequence**

You cannot simply migrate files over to the new system in random order. Your DMT must determine the data dependencies of all the files based on the requirements of the new system. For instance, you cannot transfer customer invoice history until you have migrated the customer master file, and all associated files. And before you can do that, your new system must be setup, and the system setup and configuration files must be created.

It is rare for files to be nested to more than three or four levels of dependency, which means that you can generally segregate files into two or three or four groups. The first group will be the system files (created upon setup of your company data), and any setup or configuration files. Those might be product lines, inventory classes, warehouse files, etc. It has been recommended that these files by entered manually into the new system, and this must already be complete before any master files or history files are uploaded.

Group two files are master files. These are customer files, inventory item files, vendor files, etc.
Group three files are history files. These are invoice history files, inventory history files, vendor check files, etc.

Group four consists of any files whose data dependency required groups 1, 2 and 3 to have already been uploaded.

**The Entire Data Migration Plan**

Here is the entire Data Migration Plan, including steps that we’ve already discussed:

1. Have your Executive Management Team endorse a Mission Statement for the Data Migration, and communicate it to the entire organization. The Mission Statement should describe what the goals are for the migration, when it should be completed, who the owners are, and what the importance is of a successful migration to the company’s operations.

2. Designate your Data Migration Team.

3. Determine which files will be migrated and which will not. For those files that will be migrated, create the data mappings to the new system’s files.

4. Cleaning the legacy data
   a. Backup your legacy system NOW, and keep the backup.
   b. If tools exist on your legacy system to physically scan the disk drive and report and fix errors, then those tools should be run now.
   c. Using the list of files marked as disposition “M”, designate data cleaners in each department, who are responsible for accessing each record on the legacy system, and making sure that the data is accurate and consistent. Are some of your vendor names in all uppercase, or do they contain special characters that might cause a data conversion to hiccup? Your staff should weed through all your most important records and make sure that there’s a great deal of consistency in all the records, and that there’s no “junk”. This could be a weeks-long process, and progress should be reviewed weekly by the DMT. The most important files to clean are the Master Files (type 6). You may want to limit your cleaning to just those files.
   d. When data cleaning has been completed, backup your legacy system again, and keep the backup. Don’t overwrite the backup from step 4(a).
   e. If there are tools for cleaning and linking data that exist on the legacy system, they should be run now. These tools might rebuild sort files,
scan data for basic integrity (i.e. adherence to record formats, etc.), rebuild ISAM file links and even relink “line” files. Don’t make the mistake of thinking that data integrity is OK, just because the utilities were run a week ago. If it has been more than 48 hours since the last data integrity check or rebuild, then you should run them again, right before the export.

f. Determine which reports, from the legacy system and from the new one, are necessary in order to confirm the financial data integrity of both systems. Print the legacy system reports.

g. If there is an out of balance condition in any of your journals, ledgers or history files, then fix them now by making adjusting entries. Run the reports again, and make any additional entries, until the system is in balance, or until you’re resigned to the fact that you can’t get it into balance.

5. Create any necessary system files (created upon setup of your company data), and any setup or configuration files. Those might be product lines, inventory classes, warehouse files, etc. It has been recommended that these files by entered manually into the new system, and this must already be complete before any master files or history files are uploaded.

6. Determine the migration file sequence, based on the data dependencies. Designate group 1, 2 and 3 files, and migrate them in that order.

7. Backup the new system. It is essentially an empty receptacle, waiting for master files and history. You can use this copy of the new system as a restore point, when the live data is ready to be migrated. Go to step 9.

8. If you are coming back to this step as the result of testing and repairs, then restore the data from step 7.

9. Perform a test migration. This is a download of data from the legacy system, and an upload into the new system. In essence, you are creating a “Conference Room Pilot” system which can be tested by all the users.

10. Verify the financial data integrity of the new system, by running the corresponding financial reports and comparing them to the financial reports run as part of step 4(f). If there’s no correspondence, fix the problem and re-run steps 8 through 10 until the results are satisfactory.
11. Test the new system thoroughly. All departments should test daily transaction entry, and should perform load testing. Departments should perform period end processing. Monthly and quarterly processing, and end-of-year processing. If there was custom programming supplied as part of the implementation, it should be thoroughly tested. Also, test custom reports, dashboards and screen panels. When software or setup problems are encountered, fix them. If you encounter problems with the system or application configuration files, be sure to make those same fixes when they are restored (from the backup made in step 7) in preparation for the live data. One of the key tests of the new data is confirming that the number of records in the new files is the same as the number of records in the corresponding legacy system files.

12. Set the Go-Live date.

13. In preparation for the Go-Live (i.e. a day or two in advance) perform any legacy system cleaning that you think is prudent, based on the type and extent of system activity since the cleaning from step 4.

“Deltas” are any user-entered transactions that are made during the migration process, if the migration process cannot happen in its entirety, during off hours. If all data can be migrated at once, during off hours then there are no “deltas”, and step 14 can be ignored.

14. Determine if there are any deltas, which parts of the system they are located in, and how they will be handled. They can be handled in one of two ways, and it is up to the DMT to decide which is preferred:

a. Ask end-users to continue to perform transaction processing in the legacy system. Once the bulk of the data (particularly the large history files) is migrated into the new system, then the deltas will have to be migrated over separately, just before the Go-Live.

b. Deltas must be entered into both systems.

15. Restore the new system, from the backup made in step 7, or use the publisher’s utilities to initialize the databases.

16. Run the legacy system financial reports (see step 4(f)).

17. Perform the Go-Live migration.
18. Verify the financial data integrity of the new system, by running the corresponding financial reports and comparing them to the financial reports run as part of step 16.

19. Handle the deltas.

The last piece of advice is to check with your CPA or auditor, concerning what records they want you to keep, concerning the data conversion. This is particularly important if you’re a publicly traded company.

You’re good to go. Good luck with your new system, may it live long and prosper.