

# 11 ways to migrate Lotus Notes applications to SharePoint and Office 365

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## Abstract

Migrating your Lotus Notes applications to Microsoft SharePoint is a two-step process. First, you must move the application content, and then work to migrate over the application design.

Correct content migration is often considered the most business critical aspect of the migration process, as failing to preserve the legacy content with adequate fidelity and completeness will result in unhappy end users and potential disruption to the business.

This white paper will outline 11 ways to migrate your application content.

## Introduction

Migrating Lotus Notes applications to SharePoint is a two-step process. First, you must move the application content, and then work to migrate the application design. This white paper will outline 11 ways to migrate your application content. You should begin your migration in one of these ways as well for several reasons, including:

- Correct content migration is often considered the most business critical aspect of the migration process. You can always tweak the design of an application later, but if you fail to preserve the legacy content with adequate fidelity and completeness, your users may be very unhappy.
- Some legacy content is very sensitive for compliance reasons or other business reasons, so the stakes are very high to get both the content and access permissions right.
- In many cases, there is no need for design migration. You simply migrate the old content into one of the new SharePoint site or list templates and you're done.
- In some cases, you will want to take the time to rethink the application design to take advantage of all the great new features of SharePoint and SharePoint Online. This would also eliminate the need for a design migration.

To read the full story about application migrations and, specifically, best practices for migrating your Lotus Notes applications to Office 365, read the paper [Migrating Lotus Notes Applications to Microsoft Office 365 and SharePoint Online](#).

## Lists, libraries and pages

First, you should understand that there are three basic ways to store content in SharePoint: lists, libraries, and pages. Each of these has a number of interesting variations, but it is important to understand the differences between these three fundamental types so you can best decide what you want to migrate to. Each type is described briefly here; the sections that follow explain in detail how to migrate content to each.

There are three basic ways to store content in SharePoint: lists, libraries, and pages.

### Lists

Lists are similar to tables in a relational database. A list is a flat collection of data records (called items in SharePoint) with a fixed set of data fields (called columns). Each data column has a fixed name and type. Lists can have one or more binary attachments and may have one or more views, which allow users to select and sort the items in various ways.

All of this should sound pretty familiar to Notes customers, because a list is actually the closest thing in SharePoint to a Notes database. The biggest difference is that SharePoint lists are highly structured with a fixed schema (like a relational database), whereas Notes databases can be very unstructured, with every document having a different set of data items.

### Libraries

Libraries are collections of binary files, such as images, Word documents, or audio clips. While lists and libraries are very similar internally, the metaphor is very different: in a list, the document may contain several binary file attachments; in a library, the binary file is the document. The emphasis in libraries is the document management functionality, including versioning and check-in/check-out. As with lists, libraries can have many additional data columns defined for capturing additional information about each document.

In the Notes world, the closest thing to a SharePoint library is a Domino.Doc file cabinet. (Domino.Doc was a popular

document management system built on top of Notes.) Many organizations also built custom Notes applications that attempt to implement document management functionality. Any time you see a Notes application where the file attachment is “the document,” consider migrating it to a SharePoint library. It is also common for Notes “team site” applications to have a document library section as part of the overall application.

### Pages

Pages are the building blocks of all SharePoint sites. These are the web pages you actually see in the web browser every time you click on a link to view a site, open a document, enter some information, or do just about anything else. Most people do not realize that the same pages that make up the sites themselves can also be used as data documents. SharePoint actually allows you to create several types of content pages, including basic pages, wiki pages, web part pages, and publishing pages.

While content pages have no exact equivalent in the Notes world, they can be a great way to migrate certain types of Notes applications. Any time you see a Notes application in which the main intent was to publish a library of rich text pages to a large number of users, consider migrating it to a SharePoint page library or a publishing site. This includes the many Notes applications that implemented public web or extranet sites.

## 1. Migrate to standard lists

Lotus Notes came with many standard application templates that were widely used (with or without customization) by many customers, including discussion databases, calendars, task lists, team sites, contact lists, and document libraries. Happily, in all these cases there is an out-of-the-box SharePoint template designed for you by Microsoft to serve the same purpose. The user interfaces of these new templates may be a little different, but all of the functionality should be there.

This means you can migrate the content to the right template and you are done! Any good migration tool should understand how to map from the Notes version of a standard template to the equivalent SharePoint version. For example, the following figure (as well as all of the illustrations throughout the paper) was created using a high-end migration tool, Notes Migrator for SharePoint, and shows the default mapping from a Notes task list to a SharePoint task list, plus an example of a resulting SharePoint document. The migration team did not have to do any special configuration or design of the new task list on SharePoint.

Even this simple example illustrates many important issues to consider when migrating content and choosing tools:

- Your migration tool should give you a good set of defaults, but should be flexible to allow you to customize as needed.
- Rich text fidelity is extremely important. Notes rich text documents created by end users can be very sophisticated, even if the database design is simple. Few tools on the market can handle nested tables, embedded objects, and other advanced rich text constructs in ways that will be satisfying to your end users.
- Notes rich text documents may contain in-place images and attachments. Your migration tool should not only display these elements in-place in SharePoint, it should also be smart about how it handles attachments that are blocked by SharePoint Online (such as .exe files or files over 250 MB).
- Notes rich text documents may contain “doc links” that cross-reference other Notes documents. Few tools correctly preserve links between documents in different databases, especially if they are migrated at different times.
- Notes documents contain metadata such as Created By, Created Date, Last Modified By, and Last Modified Date. Most migration tools drop this metadata during migrations to SharePoint, resulting in a major loss of business data.

Your migration tool should give you a good set of defaults, but should be flexible to allow you to customize as needed.

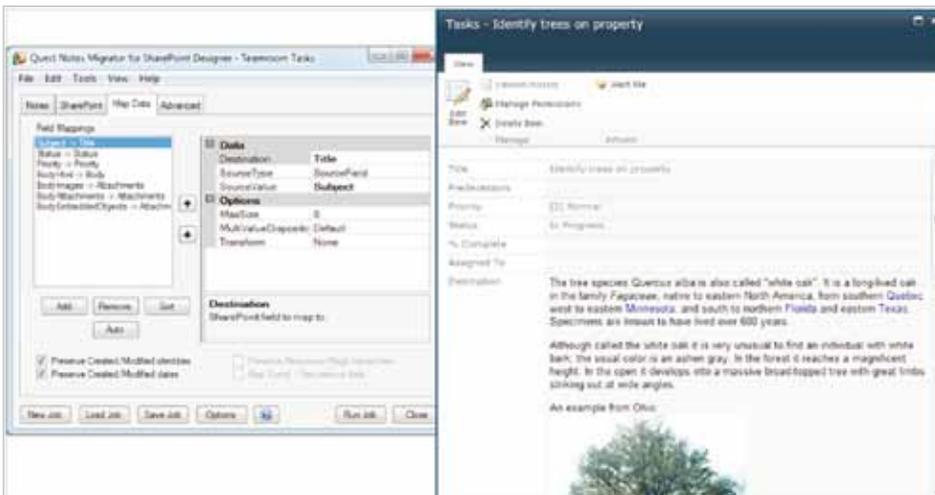


Figure 1. Notes Migrator for SharePoint migrates content from a Notes task list to a SharePoint task list.

When migrating a custom Notes application to a custom list, your main job is going to be to map all the fields in your Notes database to the columns in your custom list.

- Most Notes databases contain access control lists, which determine what specific users can do in a particular application. In addition, individual documents can contain access restrictions such as Readers lists and Authors lists. Access definitions may leverage groups in the Domino Directory as well as roles defined for the database. Preserving all this information correctly in SharePoint may be critical to a successful migration of sensitive data.

These issues are actually not limited to migrations to standard SharePoint templates. All of the issues listed above may apply equally well to the other types of migrations discussed below.

## 2. Migrate to custom lists

Custom lists in SharePoint are just like lists based on standard templates, except that you define all the data columns (and possibly other list settings). When migrating a custom Notes application to a custom list, your main job is going to be to map all the fields in your Notes database to the columns in your custom list.

There are two main scenarios you may encounter here:

- In some cases, your job will be to provision a new custom SharePoint template that has all the important data fields that the old Notes application had, with the proper column names and data types. Your migration tool should help you quickly generate a SharePoint list schema that mirrors the schema of your Notes application.
- In other cases, your SharePoint developers may have already designed a great new application to reproduce the functionality of the old Notes application using new SharePoint constructs. In this case, your job is going to be to map one to the other. If you have built a custom SharePoint template, the migration tool should also be able to use it when provisioning new lists.

The following figure shows the mapping of many fields in a custom Notes application to a custom list in SharePoint, plus an example of a resulting SharePoint document:

When migrating to custom lists, you can use any of a number of powerful SharePoint 2010 options:

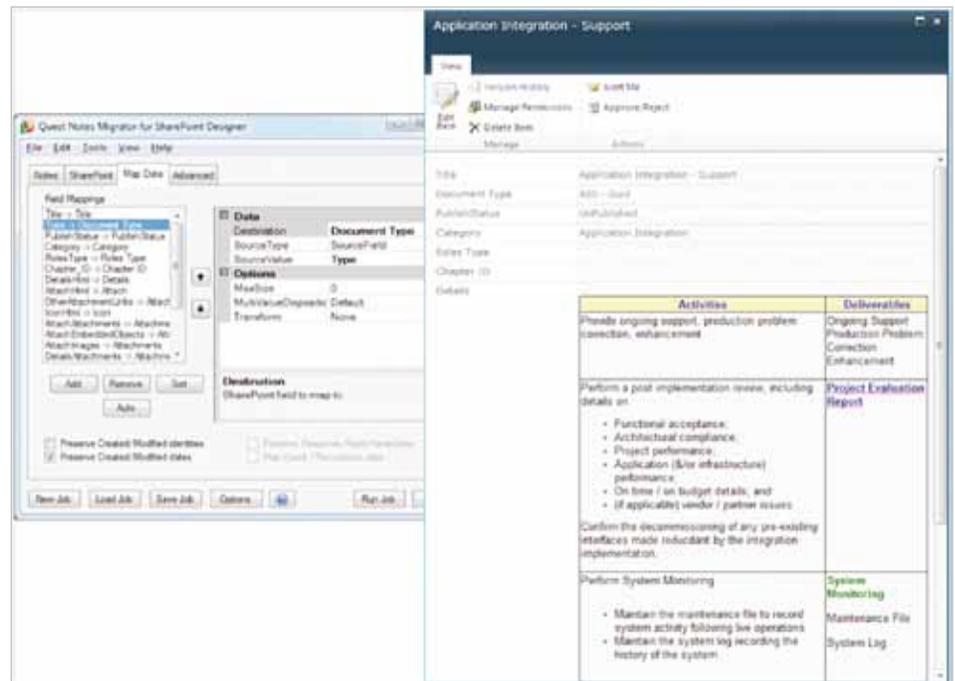


Figure 2. Notes Migrator for SharePoint migrates content from a custom Notes application to a SharePoint custom list.



- SharePoint offers over a dozen data column types, including User, Boolean, Choice, and Lookup columns. Make sure you have a good understanding of these column types and use them in your migrations as appropriate.
- Managed Metadata columns are a powerful new column type that allows you to draw from terms in a centralized term store. These column types support term hierarchies, aliases and translations. Few migration tools support them well, so be sure to understand in advance whether your migration team will want to use them. In particular, the tool should be able to automatically add new terms to the term store as they are encountered in migrated content.
- Mapping the Notes schema to a SharePoint schema may be as simple as doing a one-to-one field mapping, but in more complex cases you may need to significantly transform the data between the two systems. A sophisticated migration tool will allow you to write formulas, perform lookups, and apply other data transformation techniques.
- If you want to enable the standard approval process functionality in your SharePoint list, your migration tool will need to be able to map whatever mechanism was used to express approval status in your custom application to the equivalent SharePoint functionality.
- If you want to mix multiple document types in one list, you may need to define content types. Your migration tool should be able to assign the appropriate content type to each document as it is migrated.

- You can design multiple views for your lists that select, sort, categorize and subtotal information in different ways.
- If the default single-column form that SharePoint generates for you (as shown in the figure above) is not good enough, you may need to design a custom form. This is discussed in more detail below.
- If you have many Notes applications that share a similar design, your migration tool should support the re-use of both your migration job and your list design work in SharePoint.

### 3. Migrate to document libraries

From the perspective of a migration specialist, a library is very similar to a list. The main difference is that in a library, each “document” is an actual binary file with various data properties associated with it. Therefore, migrating a Notes database to a library typically involves extracting binary file attachments out of each Notes document and placing them in the library. This really makes sense only if the Notes application itself was designed to manage binary files— that is, if each Notes document is really just a wrapper around a binary file attachment.

Below we have extracted the attachments from each Notes document and placed them in a document library. You can also extract various metadata items about each document and map them to SharePoint properties.

Be aware that several things can go wrong with this type of migration job. If

A sophisticated migration tool will allow you to write formulas, perform lookups, and apply other data transformation techniques.

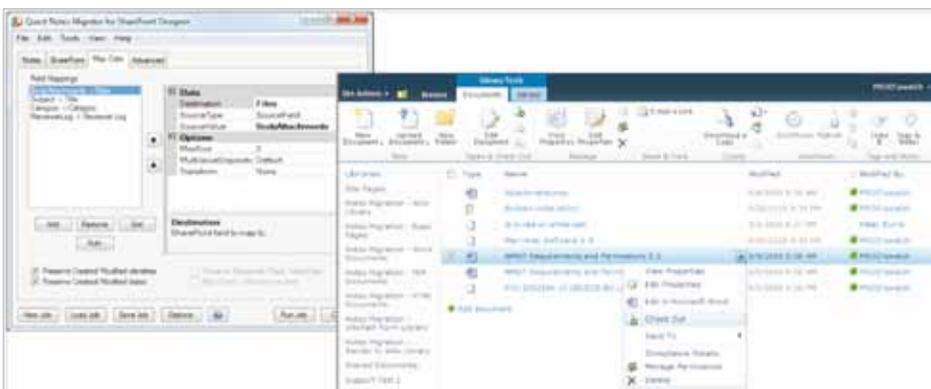


Figure 3. Notes Migrator for SharePoint migrates content to a SharePoint library.



Migrating a Notes database to a library typically involves extracting binary file attachments out of each Notes document and placing them in the library

there are no attachments in a particular Notes document (i.e., if it is just a normal rich text document), nothing will be migrated to the library. If there are multiple attachments in a particular Notes document, they may all be migrated to the library but they will no longer be one self-contained document. In either case, you have probably misinterpreted the way the Notes application was used, and it should not have been migrated to a library in this manner. Even if it was called a "document library" in Notes, it may be more appropriate to map it to a custom list in SharePoint.

Additional considerations for migrating to SharePoint libraries include:

- As stated above, Notes documents contain metadata such as Created By, Created Date, Last Modified By, and Last Modified Date. Many migration tools drop this metadata during migrations to SharePoint, resulting in a major loss of business data.
- Again, most Notes databases contain access control lists, which determine what specific users can do in a particular application. In addition, individual documents contain access restrictions such as Readers lists and Authors lists. Access definitions may use groups in the Domino Directory as well as roles defined for the database. Preserving all this information correctly in SharePoint may be critical to a successful migration of sensitive data.
- If your Notes application has a concept of document versioning, make sure your migration tool allows you to correctly map the versioning to SharePoint versioning. All versions of a given document in Notes should appear to be versions of the same document in SharePoint.
- It is common to want to assign folders during a migration. You should be able to dynamically generate folder names in SharePoint based on data extracted from Notes.
- Instead of folders, you may want to use a powerful new SharePoint feature called Document Sets. This feature is discussed in more detail below in the section "Use Document Sets."

## Generating documents

In addition to migrating file attachments to a SharePoint library, your migration tool may allow you to generate new binary files to place in your library. Three very popular choices for migrating certain types of documents are Microsoft Word, PDF, and InfoPath.

### 4. Convert to Microsoft Word

Microsoft Word is a popular choice in environments that have standardized on Microsoft Office for document creation. The integration between Microsoft Office and SharePoint libraries is very good and can enable you to build a variety of powerful applications. Users can open documents from libraries, edit them and seamlessly save them back again. If a version control, check-in/check-out, or approval process or workflow has been enabled for the library, it will all work automatically.

Office documents in SharePoint libraries are easy to search and you can even generate an instant SharePoint workspace to enable teams to collaborate on a particular document. Multiple users can open the same Word document and edit it at the same time, and users can see the changes being made by other users almost instantly.

When migrating Notes documents to the Microsoft Word format, you should be able to migrate to simple unadorned documents or to custom Word templates. You should also be able to migrate Notes data items to Word document properties or even to content controls in your custom template.

The following figure shows a Notes rich text document that was converted to a Word document on a custom letterhead template and checked into a SharePoint document library:

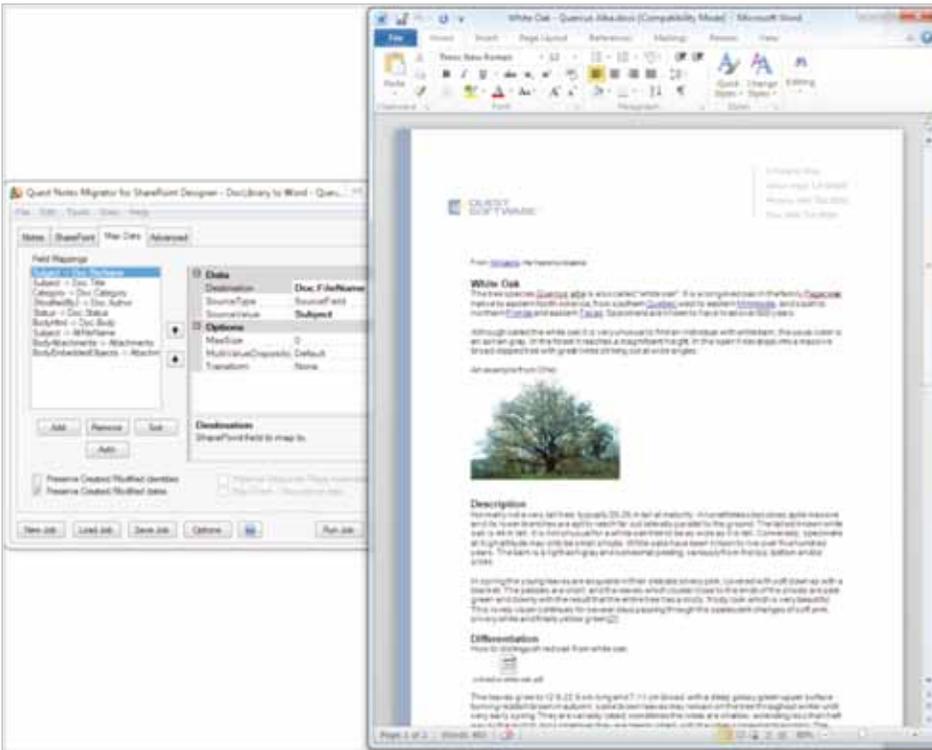


Figure 4. Notes Migrator for SharePoint converts a Notes document to a Word file in a SharePoint library.

In addition to migrating file attachments to a SharePoint library, your migration tool may allow you to generate new binary files to place in your library.

**5. Convert to PDF**

PDF is another popular choice for migrating rich text Notes documents. Many organizations, especially in Europe, use PDFs to archive old content. Since PDF is now an open standard, the assumption is that there will always be a PDF reader such as Adobe Acrobat available in the future. An organization that has a large number of Notes databases with rich text documents may find that PDF is an ideal target format for many of them.

When PDF documents are placed in a SharePoint library, the integration is not quite as tight as it is with Office applications, but the user experience is still reasonable. Even though PDF readers and editors are not generally “SharePoint aware,” the experience of opening PDF documents is similar to downloading them from any web site. PDF documents can work with SharePoint’s search features, but you need to install a free add-on from Adobe

for SharePoint’s full-text search indexer to read the content.

A word of warning about migration tools: a number of tools advertise the ability to convert Notes documents to PDF documents, but deliver poor results. If you plan to use this feature, it is strongly recommended that you test the tools with your user’s most complex documents. Watch for how nested tables, embedded images, links to attachments and doc links are handled. The following figure shows a Notes rich text document that was converted to a PDF document and checked into a SharePoint document library:

**6. Convert to InfoPath**

People sometimes choose the InfoPath document format when they want to migrate complex Notes applications to SharePoint, usually for one of two reasons: either the applications have complex data structures that do not lend themselves to being stored in a SharePoint list, or the applications have



If you plan to convert Notes documents to PDFs, it is strongly recommended that you test the tools with your user's most complex documents.

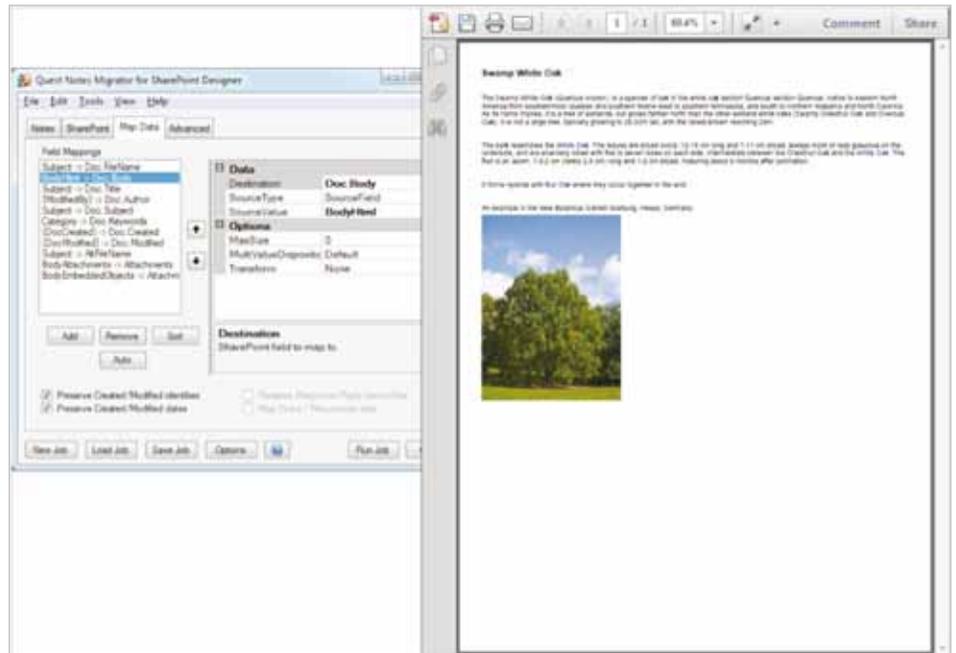


Figure 5. Notes Migrator for SharePoint converts a Notes document to a PDF file in a SharePoint library.

complex form designs that contain dynamically hidden sections, input validation rules, buttons, form events, or other sophisticated form logic.

InfoPath data documents (traditionally called "InfoPath forms") are really XML files that you edit using the InfoPath client (part of Office) or perhaps in a browser if your SharePoint server is running InfoPath Form Services. You specify the layout and behavior of your InfoPath form (and associate it with your desired XML schema) by creating an InfoPath form template. Typically you would store your XML data documents in a special type of SharePoint library known as a form library. This library is associated with one or more form templates in such a way that end users get a fairly seamless experience of creating, viewing and editing complex documents right from the library.

When performing a Notes migration, your main job is to convert Notes documents to InfoPath XML data documents according to a particular XML schema and check them into a form library. A high-end migration tool should

make this fairly straightforward. All you need to do is load in an InfoPath form template and specify how you want various Notes data elements to map to the various parts of your new XML schema. These elements might include not only simple data fields, but also rich text, embedded images and attachments, links to external attachments, and links to other documents. As XML schemas are not necessarily one dimensional, you may need to map one-to-many data items as well (for example, a product description document might contain multiple distributor names).

The following figure shows a Notes rich text document that was converted to an InfoPath document (associated with a specific InfoPath form template) and checked into a SharePoint form library:

## 7. Use Document Sets

Document Sets are a great way to keep multiple related files together as one logical document group in a SharePoint library. In many respects, one can think of a Document Set as a new, more powerful type of folder. Documents in the same Document Set may be secured,

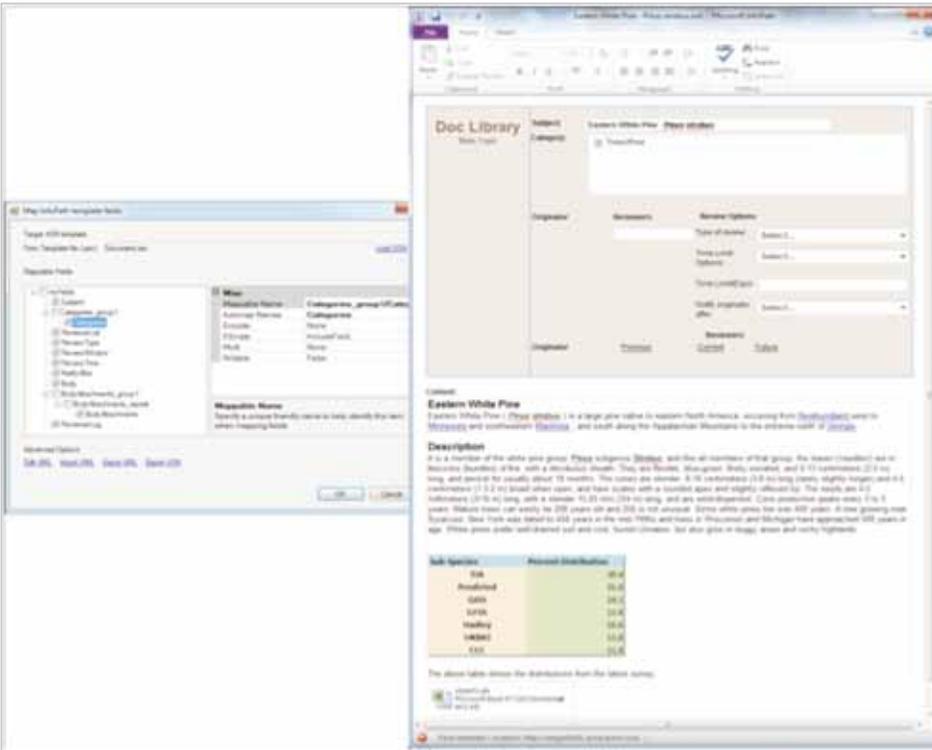


Figure 6. Notes Migrator for SharePoint converts a Notes document to an InfoPath document in a form library.

approved and versioned together, and the Document Set as a whole is displayed with a nice, customizable user interface. You can assign custom properties to the Document Set as a whole, or to each document within the Document Set.

The following figure shows a document set named "Notes Migrator for SharePoint" that contains six documents:

There are two ways to think about migrating Notes content to document sets:

- Map multiple Notes documents into the same Document Set. Typically you would use some Notes data item (for example:

When performing a Notes migration, your main job is to convert Notes documents to InfoPath XML data documents according to a particular XML schema and check them into a form library.

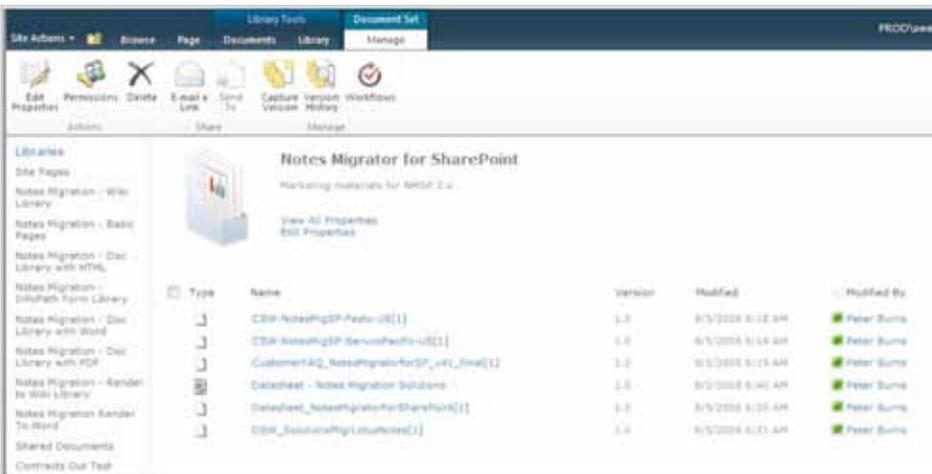


Figure 7. Sample Document Set containing six documents



The wiki page is probably the most popular page type for migrating Notes content.

the Category field, the Product Name or the Binder fields) to define the Document Sets. In the figure above, "Notes Migrator for SharePoint" was actually a Domino. Doc binder name and the six files were the documents inside the binder.

- Map each Notes document to a unique Document Set. Each attachment, image, or embedded object can now become a document inside the Document Set. In addition, you can map the rich Notes document itself to a document in the Document Set. The following figure shows a Word document that was generated to contain all the Notes rich text content, with all the attachments migrated as siblings inside the Document Set:

### Migrating content to SharePoint pages

There are at least five ways to migrate Notes documents to web pages in SharePoint. Each of these page types gives a slightly different editing experience for content authors and a slightly different viewing experience for end users:

- HTML pages
- Basic pages
- Wiki pages
- Web part pages
- Publishing pages

### 8. Migrate to wiki pages

The wiki page is probably the most popular page type for migrating Notes content. The wiki page has been greatly improved in SharePoint 2010 and is now central to the design of many SharePoint site templates. For example, when you create a new "page" using the Create menu in a team site, you are creating a wiki page.

Migrating Notes documents to wiki pages is very easy in a high-end migration tool. As with the Word and PDF document generation examples shown above, you would typically map the rich text "Body" field to the wiki page content area and map whatever additional Notes data items you wanted to preserve to page properties. The following figure shows a Notes rich text document that was converted to a wiki page and checked into a SharePoint page library. Since images and attachments cannot be contained in a wiki page, these elements were migrated to a separate library and then linked into the main page.

### 9. Migrate to web part pages

Web part pages give you additional control over how elements are laid out

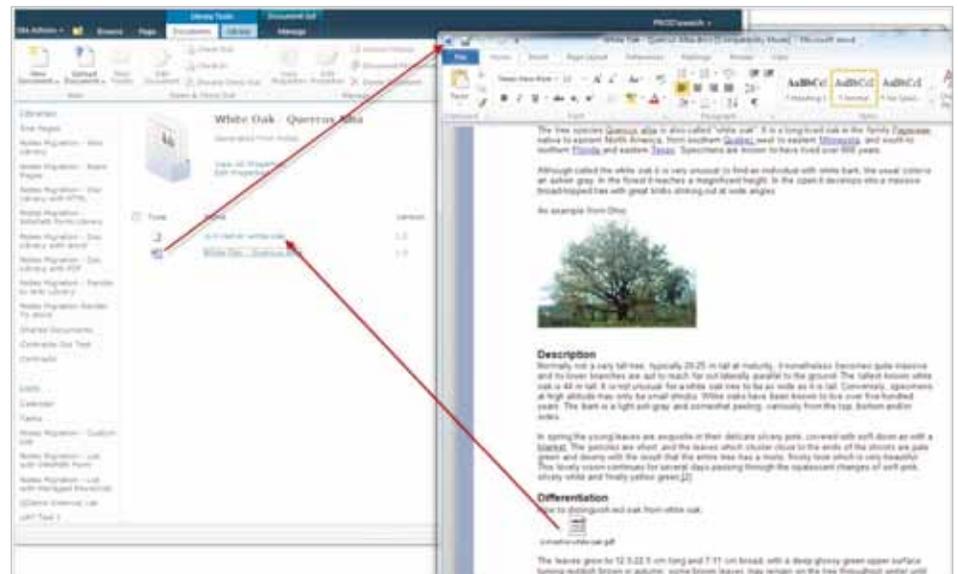


Figure 8. Notes Migrator for SharePoint migrates Notes rich text content and attachments to a Document Set.



in a web page, which may consist of multiple web parts that you direct Notes content to.

### 10. Migrate to publishing pages

Publishing pages implement a similar concept, with a cleaner separation between the documents created by the content authors (or the migration tool) and the visual layout and styling of the pages. Publishing solutions also typically include a concept of checking content in and out, submitting it for approval, and managing the workflow for publishing the content to the intended audience.

### 11. Archive legacy content through document rendering

If you have a lot of Notes databases to migrate, a good number of them are likely no longer being actively used to create new documents but still contain valuable reference data. With applications like that, you don't always want to invest time and energy to rebuild the forms and functionality. You simply want a good way to archive the content in SharePoint so that it looks good and is searchable by users.

Earlier we showed how to extract rich text fields and convert them into Word documents, PDF documents, wiki pages, and so on. In some cases, this is the perfect solution for archiving legacy content in SharePoint. In other cases, this is not good enough because it does not capture the rich form layout that Notes users are used to. Without the form layout, you really haven't captured all the information.

This is where an advanced concept known as document rendering comes in. With this technique, the migration tool "renders" each document with its original Notes form to generate a new rich text document that includes the entire form layout you had in Notes. To visualize this, compare the generated PDF document in the following figure with the PDF example provided earlier in Figure 5:

In addition to the rich text body, we captured the information that was presented with the original Notes form. Most significantly, we did not have to redevelop the form in SharePoint to accomplish this, nor did we have to explicitly map all the data fields that are displayed in the form header.

If you have a lot of Notes databases to migrate, a good number of them are likely no longer being actively used to create new documents but still contain valuable reference data.

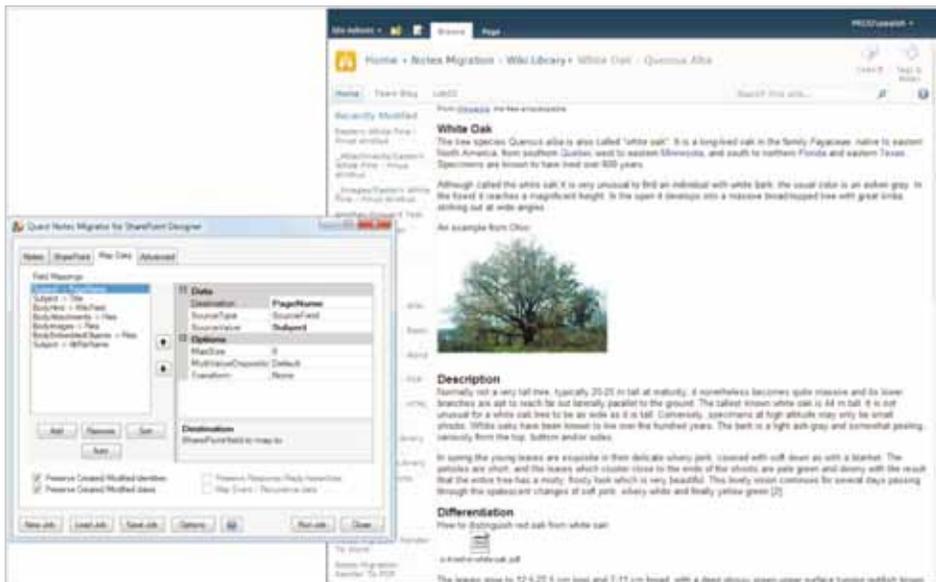


Figure 9. A Notes rich text document that was converted to a wiki page by Notes Migrator for SharePoint.



We used PDF in this example, but the same concept of rendering documents with forms applies equally well to Word documents, InfoPath documents, pages and even lists.

### Conclusion

As you can see, there are many different ways to go about migrating your applications to a new platform. Whichever methods you choose, it is always important to select a migration tool that ensures the legacy content is preserved with high fidelity and completeness.

For more information on applications migrations, read the paper Migrating Lotus Notes Applications to Microsoft Office 365 and SharePoint Online.

### About the author

Steve Walch is a senior product manager at Quest Software. He has been a Lotus Notes and Microsoft technologist since 1993. In 2002, he founded Proposion Software with the mission to connect Lotus Notes with the emerging Microsoft .NET development platform. Over time, Proposion focused on Notes-to-SharePoint migration and integration tools, and became the leading vendor in that market. In 2007, Proposion was acquired by Quest Software. Walch developed Quest Notes Migrator for SharePoint, which has been used by organizations of all sizes around the world to execute successful migrations. His Notes 2 SharePoint blog (Notes2sharepoint.org) is highly regarded by industry experts and analysts.

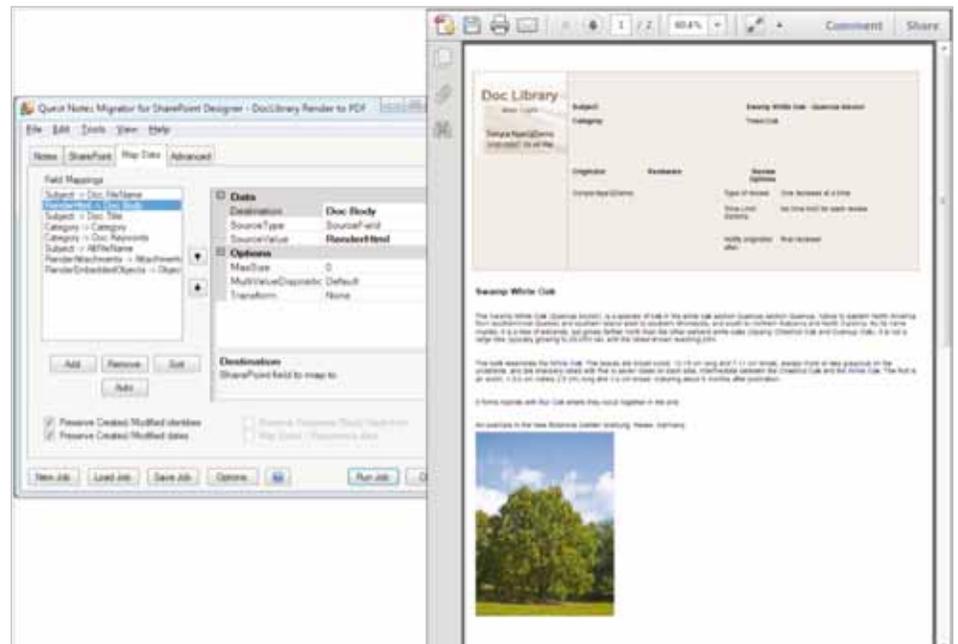


Figure 10. Using document rendering to capture the Notes form layout using Notes Migrator for SharePoint.



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