



Messaging, Directories, Groupware, Wireless – Technology Decisions that Make Sense

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Migration Strategies and Best Practices: IBM Lotus Notes and Domino to Sun Java Communications Suite

Last Updated July 28, 2008

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Introduction

Migration involves moving information and transitioning services from one or more systems to another system. First, it is necessary to determine what new system components and services will replace existing system components and services. Second, it is necessary to develop a well-defined, normally incremental process to deploy and integrate new components, move information and transition services with minimal interruption. Normally, an “e-mail migration” includes e-mail messages with attachments, calendar data, address books and directories as well as other information. Moving data involves extracting e-mail messages, folders, attachments, addresses, calendar appointments, and other information from source systems, converting the information into new formats, and inserting the information into the target system. Transitioning services means systematically modifying both the source and target systems so that users are moved to the target system without disruption while levels are maintained.

A considerable amount of planning is required to successfully carry out an e-mail migration. Selecting a migration strategy is the first step to transition data and services. The migration strategy will determine both the requirements and implementation processes for the migration. For example, different migration strategies may result in different requirements in terms of what data will be migrated, the degree of “coexistence” that will be supported, what, if any, migration tools used, and what staffing levels will be required to carry out and to support the migration.

Purpose of This Document

The purpose of this document is to provide a framework within which the best possible decision can be made regarding an e-mail migration to move users from legacy IBM Lotus Notes and Domino systems to a Sun Java Enterprise System (JES) solution.

The scope of this document is to define the considerations involved in formulating a migration strategy and approach. This document does not cover a particular migration plan, logistical concerns, or specific technical issues. Migration projects involve the following:

- Project structure and management
- Technical Requirements
 - Data fidelity requirements
 - Service fidelity requirements
 - Co-existence requirements
 - Other requirements
- Technical strategy
 - Data Mapping
 - Gap Analysis
 - Service Mapping
 - Technical procedures

This document provides considerations and recommendations based on extensive experience in previous migrations, and is intended to lay the foundation for a formal statement of requirements and for a the development of a detailed technical methodology and implementation plan.

Formulating a Migration Strategy

Implementation of an e-mail migration is a complex process requiring careful planning. A clear and uniform set of requirements must be developed and agreed upon. There must be agreement, for example, on the overall approach and methodology used to carry out the migration, and on exactly what information will be migrated.

At the strategic level a number of key decisions must be made and widely agreed upon prior to the start of technical implementation and logistical planning. These decisions include: (1) if information will be migrated, (2) whether migration of specific groups will take place over time or a “cut-over” approach will be taken, or a combination of both (3) whether training will be provided to end users, (4) what will be communicated to the organization regarding the migration.

At the tactical level there are several components in an e-mail migration including (1) exactly what information will be migrated, (2) how information will be extracted, converted and inserted into the new system, (3) how services will be transitioned, and (4) when various activities and communications will take place in terms of the order of operations and schedule.

Best Practices for Technical Strategy

Mapping Functionality and Service Levels

Users will be accustomed to a certain way of doing things, to a certain feature set and to current service levels. Meeting or exceeding what users are accustomed to is one of the main challenges in a migration. Careful attention must be paid to the comparative functionality of the old and new systems considering the end user experience and service levels and how different groups within a large organization use e-mail. For example, e-mail can be used as a simple communications tool, as a file transfer mechanism for files, as a means of storing and retrieving large amounts of information, as an automated transport between other software applications, etc. All of the above modes of use, if present, must be supported and the migration process itself must take them into account.

Coexistence

The migration strategy may require that multiple systems operate in parallel for periods during the migration. The systems must integrate seamlessly and migration must be transparent to end users while both old and new systems are in use simultaneously. Coexistence necessitates tools and processes not only to manage the two systems in parallel from a systems administration standpoint but also to manage the transition of users and services from the old system to the new system. For example, message delivery must be prevented during migration and each time a user moves from one system to the other directory information in both the old system and the new system must be modified simultaneously. Similarly, directory information in both the old system and the new system must be modified, in effect, simultaneously and subsequent changes must be detected and synchronized across systems.

Auditing Existing Systems

Both a comprehensive audit of existing systems and a data collection initiative is necessary and should precede any migration project. It is important to note that most upgrade problems, particularly those that

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cause delays and changes of plan, result from a lack of information about the systems that are being migrated. Performing a substantial audit is necessary and should be coordinated closely with other migration project components.

Pre-migration Cleanup

Often, legacy systems, particularly those that are to be phased out, have not been maintained and typically contain a great deal of extraneous or invalid data or corrupt data. This is a common technical problem in a migration that can interfere with the functioning of migration tools, slow the migration process and potentially impact the new system. Such problems must be identified through pre-migration auditing and must be dealt with before they can impact a migration project. Sites that have the most serious problems, for example, can be scheduled towards the end of the migration (to provide time for corrective actions) only if they are identified early on.

Migration Pilot

Once a migration strategy has been selected it should be developed and thoroughly tested well in advance of the start of the migration. Migration tools and methods, once proven, should be documented prior to deployment and the migration process must itself be piloted with a representative subset of users. Changes to technical plans and scheduling can be expected based on pilot results. Both from a technical planning perspective and from a project management perspective, the pilot provides an opportunity to identify dependencies and to analyze the migration process so that it can be broken down into manageable, scalable components.

Ramp Up

Normally a migration begins on a small scale and is ramped up over time to handle successively larger number of users. This approach allows problems in the migration process or tools to be resolved with minimal impact and provides experience for the migration technical staff with minimal risk. The schedule for the migration can be determined based on the peak number of users that can be migrated within a given interval, e.g., measured in 'users per day' or 'users per week'.

Roll Back

Both during the pilot phase and also during the actual migration it is necessary to have plans in place to back out of any given step in the migration. Formal "back out plans" should be prepared for each major migration process. If a process fails or does not produce an acceptable result it must be possible to revert particular components to their original state, e.g., returning a Domino server to production use after a failed migration, removing any data inserted into JES, and restoring the original configurations of both systems. The order of operations in such cases must be carefully designed so as to prevent any data loss or other problems, such as bounced e-mail.

Comparing Migration Scenarios

Although there are many grades, variations and details within each general approach, there are four basic approaches to migration:

1. No Migration (a cut-over)
2. Partial Migration (Servers Only)
3. Partial Migration (Workstations Only)
4. Full Migration (Migrate Everything)

Each of these scenarios has significant advantages, disadvantages and risks. The right approach depends on the organization, its requirements its user population and on the source and target systems.

1. No Migration

The simplest approach to migration is to deploy a new system, re-route new e-mail to the new system and mandate that users stop using the old system at a specific time and start using the new system thereafter. All new messages and calendar appointments and directory entries are created in the new system from the time of the cut-over forward.

For example, Lotus Notes users can be instructed to copy any messages they wish to retain to local e-mail database files and the Domino servers can be shut down. For archiving purposes the Domino servers can be backed up first. On the remaining servers, e-mail addresses would be updated in the Domino Name and Address Book (NAB) or Domino Directory when user accounts are enabled on the JES system. Users can still access messages and calendar information locally using the Lotus Notes client but can no longer receive new messages, schedule meetings with other users, or reply to old messages from Notes (if a user wishes to reply to an old e-mail message he or she must create a new message using JES addressed to the same person or persons). The total amount of data stored on workstations can be managed by "cleaning up" the Domino servers prior to migration, i.e., purging old messages. Domino servers can be phased out as quickly as users can be moved onto the new system.

Technical Complexity

This approach is the least complex from a technical standpoint. The majority of necessary tasks are routine administration activities that can be partly or fully automated in various ways. The only migration tool required is a mechanism for making bulk directory changes in the Domino Directory and for bulk loading user accounts into the new system.

Main Advantages

- Technically uncomplicated, simplest controlled migration strategy
- Fastest controlled migration method
- Lower cost than other approaches and lowest overall cost
- Results in a "clean" system with no legacy data
- Least risk of prolonged coexistence (having two systems indefinitely)

Main Disadvantages

- Most disruptive approach
- Difficult and inconvenient for end users
- Typically results in criticism by end users and IT personnel
- May rely on local storage of e-mail data, which is not typically backed up, or result in data loss

2. Partial Migration (Servers Only)

In a server-only migration, data (e-mail data, directory information, calendar information, etc.) is converted between servers but information on workstations, such as Lotus Notes e-mail Archive databases, is not migrated. The e-mail client application can remain the same, i.e., Lotus Notes, although reconfiguration may be required, or a desktop client program can be replaced with a browser interface.

For example, user accounts, mailboxes, calendar information, etc. can be extracted from Domino servers, converted, and inserted into the JES system. When the last user is removed from each Domino server, that server can be backed up and decommissioned. Coexistence is implied by a phased migration. The fact that entire Domino servers can often be migrated as the basic unit of migration (without having some users from a given server migrated while others stay behind), does not significantly simplify the requirements for coexistence. As with other approaches, the total amount of data to be migrated can be managed by “cleaning up” the Domino servers prior to migration, i.e., purging old messages.

Technical Complexity

A server-to-server migration is complex because there are many data objects that must be migrated for each user. Some type of provisioning and/or directory synchronization must also be in place to support the coexistence of the old and new systems. Migration tools are required in a server-to-server migration and for this purpose the free Sun migration tools may be adequate.

Main Advantages

- Relatively efficient since the Domino server is the unit of migration
- Reasonably predictable costs and schedules
- Avoids challenges of dealing with workstation data

Main Disadvantages

- Somewhat disruptive and inconvenient for end users
- Effective loss of functionality because client data is left behind
- Carries over large amounts of data to the new system
- Puts the burden of saving workstation data on end users
- May require additional end-user training

3. Partial Migration (Workstations Only)

In a workstation-only migration data (e-mail data, personal name and address book information, calendar information, etc.) is converted between one e-mail client program and another but the information on servers is not migrated. This means that either the server stays the same or it is cut-over, e.g., using DNS changes possibly aided by port redirection on old servers. For example, data residing on workstations such as locally stored e-mail archive files, calendar appointments and personal address are converted from one client, i.e., Lotus Notes, to another client such as Mozilla Thunderbird, Sunbird, or Lightning. Directory information must still be synchronized between servers but server-to-server mailbox migration is not performed.

In a cut-over scenario, new accounts are created in the JES system and when each workstation or client is converted server in the new system is used. This migration scenario is very appropriate when POP3 e-mail clients are used and when data has been fully synchronized at the client using IMAP so that legacy e-mail data continues to be available offline on workstations.

Technical Complexity

A workstation-to-workstation migration is relatively simple because a finite number of data objects are migrated for each user. Migration tools are required to convert local mail database files or mail archive databases, personal name and address books, calendar or PIM information (To-Do items, Memos, Journal entries and folders, etc.), and e-mail client settings such as server names, login IDs, etc.

Main Advantages

- Relatively simple because servers are not migrated
- Very low risk of technical problems impacting multiple users

Main Disadvantages

- Requires 'touching' every workstation and possibly re-training every user
- Possible data loss if (by design) any data is left behind on old servers
- Relies on local storage of e-mail data, which is not typically backed up, or result in data loss
- Puts the burden of saving server data on end users, e.g., moving messages and folders to local mail database files stored on workstations
- May require additional end-user training

4. Full Migration

The ideal outcome for end users is one where all of the functionality and data in the old system is present in the new system (assuming that the experience is intuitive and that all data have been migrated with a high degree of fidelity). A full migration incorporates all of the aspects of a server-to-server migration and workstation-to-workstation (or workstation-to-server/server-to-workstation) migration.

Technical Complexity

A full migration is the most complex case because an effort is made to bring all functionality and desired user data from the old system to the new system so as to provide a seamless user experience.

Main Advantages

- Near seamless migration
- Most intuitive user experience
- Virtually no loss of functionality (real or perceived)
- No loss of data
- High end user satisfaction

Main Disadvantages

- Relatively high cost and complexity
- Challenges and risks of dealing with end user (desktop/client) data
- Carries over large amounts of legacy data to the new system

Lotus Notes Client Integration

When deploying JES it is possible to deploy only a web interface (Communications Express) and not other modes of e-mail access (i.e., POP3 or IMAP4), but it is possible that a web interface will not meet the requirements of all users. Specifically, there is no off-line functionality in a web-based application such as Comm Express. If there is a requirement for a thick client one alternative is to support the Lotus Notes client while replacing Domino servers with JES. It is important to decide if Lotus Notes will be supported prior to the start of the migration.

Data Mapping: What will be Migrated

There are four basic migration scenarios for data that reside on servers or workstations:

1. Server-to-server
2. Client-to-client
3. Client-to-server
4. Server-to-client

In general, messages, directory information, calendar appointments and other data move from an old server to a new server. In some cases, certain client data will also be migrated from an old desktop e-mail client program to a new desktop e-mail client program (for example, message filters, personal name and address books and distribution lists, etc.). When moving to a web-based solution there is no desktop e-mail client program, therefore it may be desirable to migrate certain data, such as personal name and address books, from desktop e-mail clients (i.e., from Lotus Notes) to the JES servers.

Data Mapping

As a technical problem, migration can be viewed as a set of possible data sources and a set of data targets, each of which has an associated location, interface and data format. There are two general data sources: (1) server-based data such as Lotus Domino server based mail database files, and (2) data that reside on workstations such as Lotus Notes mail archive files. There are also two general data targets: (1) server data stores (JES Messaging, JES Directory, and JES Calendar), and (2) locally stored data on that reside on workstations such as BSD mail files, Berkeley DB address book databases, and iCalendar files (used by the Mozilla Thunderbird, Sunbird and Lightning clients). Note that the JES server target represents three different databases (mail store, LDAP database, and calendar database). When moving to a web-based solution there is no desktop target but there are still, potentially, desktop sources. For example the Personal Name and Address Book in Lotus Notes may be stored locally on workstations but in JES personal address books reside in the Directory Server.

A general outline of data sources and targets can be used to determine data mapping between Lotus Notes and Domino and JES and also as a guide to decide exactly what data will be migrated (see [Appendix A: Data Sources and Targets](#)).

Migration Tools

Once it has been determined what data will be migrated and what the data mappings are, the migration tool set can be determined. Important considerations for migration may include: (1) providing a high degree of fidelity including message address translation and message body conversion so that old messages work in the new system, for example when users reply to migrated messages; (2) supporting all of the desired data mappings for the chosen migration strategy (for example moving personal name and address books from Notes workstations to the JES Directory Server); and (3) supporting all of the desired deployment scenarios and operational requirements of the systems and of the organization.

Migration tools may be custom developed, provided by the vendor, for example the [Sun Groupware Migration Toolkit \(SGMT\)](#), or they may be commercial software products, such as Global System Services Corporation (<http://www.gssnet.com>) [GSS Migration Wizard](#). The functionality of migration tools

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varies thus the most important consideration is to select a set of migration tools that best fits the chosen migration strategy.

Note: Some migration tools use network protocols and ports that may not be available in JES depending on how it has been configured (e.g., if IMAP is disabled in JES), and the network ports used by some migration tools may not be open between the Domino servers and the JES servers (See “[Operational Checklist for Migration Tools](#)” below).

Data Source Checklist for Migration Tools

The following list of data sources can be used to evaluate the functionality of migration tools in terms of data “fidelity”. Fidelity means how much of the original data is converted and how accurately it is converted. High fidelity tends to create a seamless user experience while low fidelity creates real and perceived losses of data or functionality.

Type	Component	Object	Supported (Y/N)
Server	All	Domino R5	
Server	All	Domino 6	
Server	All	Domino 6.5	
Server	All	Domino 7	
Server	Directory	User accounts / passwords	
Server	Directory	Domino Directory (Name and Address Book)	
Server	Directory	Public mail groups (distribution lists)	
Server	Calendar	Group calendar appointments	
Server	Calendar	Recurring shared appointments	
Server	Calendar	Non-recurring shared appointments	
Server	Calendar	Group calendar events	
Server	Calendar	Recurring shared events	
Server	Calendar	Non-recurring shared events	
Server	Calendar	Group calendar reminders	
Server	Calendar	Recurring shared reminders	
Server	Calendar	Non-recurring shared reminders	
Server	Calendar	Private calendar appointments	
Server	Calendar	Recurring appointments	
Server	Calendar	Non-recurring appointments	
Server	Calendar	Private calendar events	
Server	Calendar	Recurring events	
Server	Calendar	Private calendar reminders	
Server	Calendar	Recurring reminders	
Server	Calendar	Non-recurring reminders	
Server	Calendar	Shared calendars	
Server	Calendar	Resource calendars	
Server	Messaging	Server based mail folders	
Server	Messaging	Hierarchical folder structure	
Server	Messaging	Server messages	
Server	Messaging	Plain text message bodies	
Server	Messaging	Formatted message bodies	
Server	Messaging	File attachments	
Server	Messaging	Addresses in message headers	

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Server	Messaging	Message header data	
Server	Messaging	Message metadata	
Server	Messaging	Message status (e.g., read/unread)	
Server	Messaging	Server-based rules and filters	
Server	PIM	(Private) Journal entries	
Server	PIM	(Private) Journal folders	
Server	PIM	(Private) Memos	
Server	PIM	(Private) To-Do items	
Server	Collaboration	Discussion Databases	
Server	Collaboration	ACLs	
Server	Collaboration	Mail-in Databases	
Server	Collaboration	ACLs	
Client	All	Notes R5	
Client	All	Notes 6	
Client	All	Notes 6.5	
Client	All	Notes 7 / Hannover	
Client	Directory	Locally stored Notes personal name and address book (PNAB)	
Client	Directory	Locally stored Notes personal mail groups (distribution lists)	
Client	Calendar	Locally stored Notes calendar appointments	
Client	Calendar	Recurring appointments	
Client	Calendar	Non-recurring appointments	
Client	Calendar	Locally stored Notes calendar event	
Client	Calendar	Recurring events	
Client	Calendar	Non-recurring events	
Client	Calendar	Locally stored Notes calendar reminders	
Client	Calendar	Recurring reminders	
Client	Calendar	Non-recurring reminders	
Client	Messaging	Locally stored Notes mail database files (local folders)	
Client	Messaging	Hierarchical folder structure	
Client	Messaging	Locally stored Notes mail archive database files	
Client	Messaging	Hierarchical folder structure	
Client	Messaging	Locally stored Notes mail messages	
Client	Messaging	Plain text message bodies	
Client	Messaging	Formatted message bodies	
Client	Messaging	File attachments	
Client	Messaging	Addresses in message headers	
Client	Messaging	Message header data	
Client	Messaging	Message metadata	
Client	Messaging	Message status (e.g., read/unread)	
Client	Messaging	Locally stored rules, filters and Lotus Notes agents	
Client	PIM	Locally stored Journal entries	
Client	PIM	Locally stored Journal folders	
Client	PIM	Locally stored Memos	
Client	PIM	Locally stored To-Do items	
Client	Other	Locally stored client preferences	

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Operational Checklist for Migration Tools

The following list contains deployment capabilities and operational features desirable in migration tools and can be used to compare different tools. In general, support for more of the features listed below means more flexibility to meet varying requirements, more performance and more reliability. Support for fewer of the features listed below tends to indicate reduced flexibility, performance and reliability.

Feature	Supported (Y/N)
Supports server-to-server migration scenarios (Domino to JES)	
Supports server-to-client migration scenarios (Domino server to Mozilla Thunderbird, Sunbird, Lightning)	
Supports client-to-server migration scenarios (Lotus Notes to JES)	
Supports client-to-client migration scenarios (Lotus Notes to Mozilla Thunderbird, Sunbird, Lightning)	
Ability to resume after a stopping point or after a failure during processing	
Ability to verify/validate inserted data	
Can be deployed on a network file server	
Can be invoked automatically (e.g., through network login scripts)	
Can be run against multiple Domino servers simultaneously	
Can be run on multiple Notes clients simultaneously	
Does not require network communication from Notes/Domino to JES	
Extract/convert and insert are separate steps (for network security)	
Leaves original data unaltered on Domino servers (for roll back)	
Leaves original data unaltered on Lotus Notes clients (for roll back)	
Logs all activities on clients	
Logs all activities on servers	
Logs all errors on clients (and show exactly what objects failed)	
Logs all errors on servers (and show exactly what objects failed)	
Performance scales linearly with hardware capacity	
Programmable automation (e.g., using script or configuration files)	
Provides meaningful error codes/messages	
Can run on Domino servers (for server migration)	
Can run on separate migration machines (for server migration)	
Runs on user workstations (for Lotus Notes client migration)	
Reconciles redundant data from server and workstation-based mail databases	

Service Mapping: How Services will be Transitioned

Once a migration strategy and a technical migration plan have been developed a plan for the transition of services must also be put in place. The most critical aspect of service mapping is to analyze all of the elements and dependencies of coexistence between the two systems. Service mapping includes client elements, server elements, and systems integration elements. All of these components must be detailed in specific technical plans with careful attention to the order of operation in which changes are to be made.

Client Services (End-user Functionality)

The client component involves ensuring that all features and functionality presented to the end user are moved and/or made available at the time of any given user's migration from the old system to the new system. In particular, the goal of service mapping is to ensure that the user experience is seamless and transparent by making sure that services are not interrupted and that users are not inconvenienced. For example, if a user attempts to access an old server they may be transparently redirected and the event may be logged and reported to system administrators, or a user may receive an appropriate message instructing them how to access the new system.

Server-to-Server Services

The server-to-server component comprises the exact steps of the migration processes as well as configuration changes that are necessary for individual user migration, partial migration of users from specific servers, and total migration of users from a server (followed by backup and decommissioning of old servers). For example once users are migrated off of a particular server and it is decommissioned, users of remaining servers should not be impacted or aware of the changes, i.e., users should be able to continue to interact as before.

Systems Integration

The systems integration element involves service provisioning, directory synchronization, changes in mail routing, capturing/redirecting any residual clients or server-to-server connections, and similar issues. For all of these service components it is very important to develop a detailed migration methodology including the exact order of operations for all changes.

Project Structure and Management

After a general approach has been agreed upon and a migration strategy is in place it is necessary to develop a detailed technical plan. In parallel with technical plan development, an initial project/logistical plan can be developed; migration tools can be evaluated and tested; a technical team can be assembled, the actual migration process can be worked out, and the auditing and cleanup of the source system can begin. From that point a migration pilot can take place followed by the main deployment.

Best Practices for Project Structure and Management

Common Approach

A successful migration depends on obtaining top level agreement and approval across the organization on issues such as phased migration versus a cut-over approach, training of end users versus not providing training, migration timetables for different user populations, when legacy systems will be decommissioned, etc. Having a common approach that is well understood by all stakeholders is essential.

Stake Holders

Stakeholders across organizational units both at the management and end user levels should be consulted because different groups may have different requirements and expectations. Universal agreement, for example, on what if any impact upon end users is acceptable and regarding what data will be migrated and what data will be left behind is vital to a successful migration.

Capturing Requirements

Migration related requirements must be accurately and completely identified. The requirements for the migration process and the requirements for data migration in terms of the end user experience should be enumerated, documented, and circulated for review, comment and approval.

Migration Experience

End user acceptance of the migration process and end user experience with a new system after migration are critical. Typically the main risks in a migration are not technical but rather related to end user behavior and perception. The relative ease or difficulty of migration and its success or failure may depend on end user acceptance of the new solution. The migration process from the end user's point of view is critical. The transition of the user must be easy and intuitive. Users must have the same functionality and data in the new system as in the old system. Ideally, users would be able to use the new system with no additional training, although providing training is normally recommended.

End-user Communications, Support, and Training

Migration project success and end user satisfaction are improved by keeping users informed as the day of their migration and/or training approaches, as well as by providing users with resources such as

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“Frequently Asked Questions” materials, and by making sure that specialized helpdesk support is available to migrated users. In addition, end-user training sessions may be conducted to educate end-users on the migration or on aspects of the new system.

Staffing Considerations

A large migration project requires substantial project management and technical oversight. Successful migration projects maintain continuity by assigning one or more project managers and a technical migration architect and possibly migration tools software engineers at project start. While the project management function is necessary throughout the project the technical migration architect role is necessary up to the point where the main deployment begins, assuming other technical resources are maintained until the end of the project.