

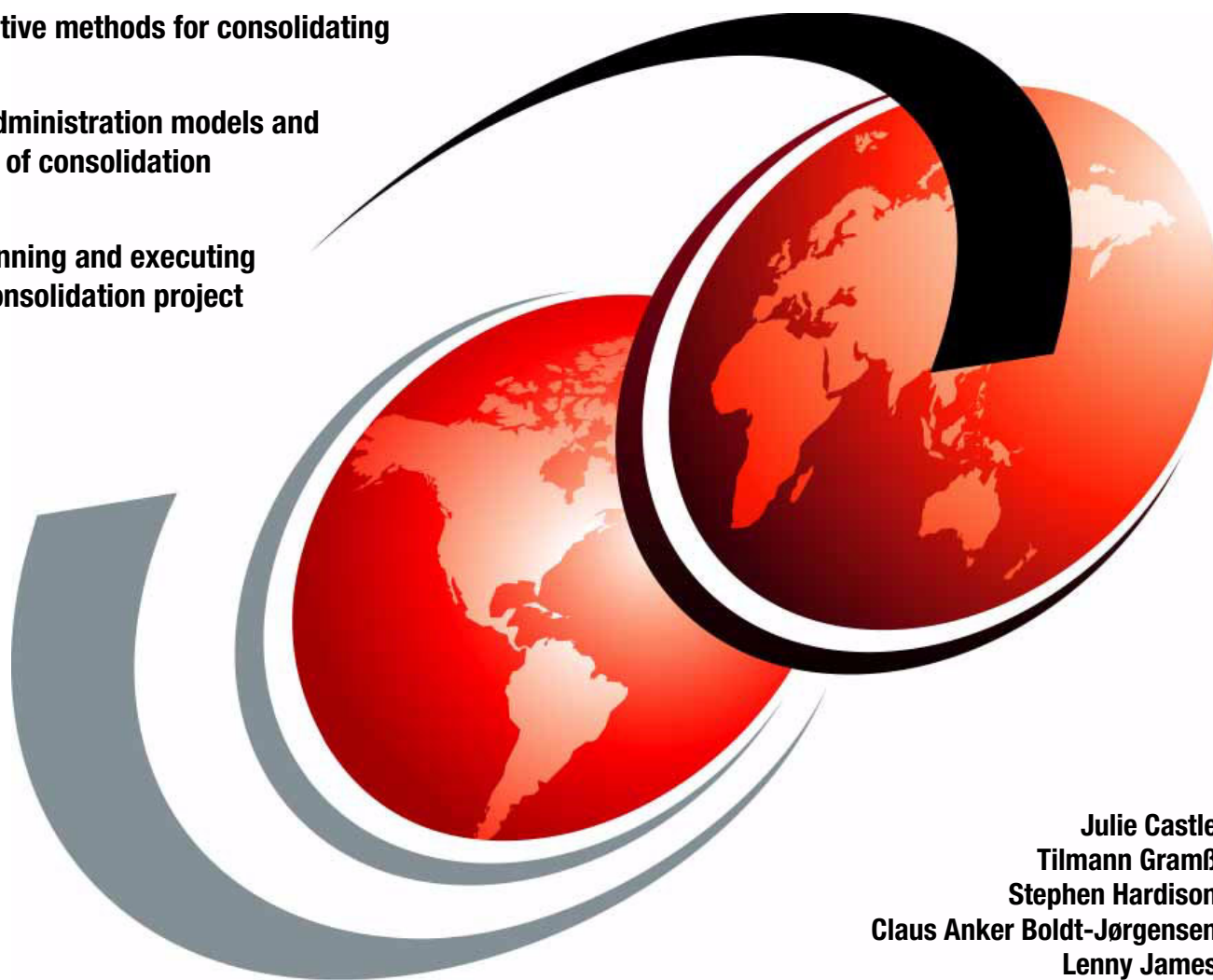
Domino 7 Server Consolidation

Best Practices to Get the Most Out of Your Domino Infrastructure

Includes an overview of benefits and representative methods for consolidating

Reviews administration models and the impact of consolidation

Shows planning and executing a server consolidation project



Julie Castle
Tilman Gramß
Stephen Hardison
Claus Anker Boldt-Jørgensen
Lenny James



International Technical Support Organization

**Domino 7 Server Consolidation: Best Practices to Get
the Most Out of Your Domino Infrastructure**

August 2006

Note: Before using this information and the product it supports, read the information in “Notices” on page vii.

First Edition (August 2006)

This edition applies to Domino 7, Release 7.0.x. Much of the content is also applicable to Domino 6, unless specifically noted.

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Preface

This IBM® Redpaper examines the issue of Domino® Server Consolidation as a way to maximize your investment in Domino.

Starting in the late 1980s, organizations began to invest heavily in distributed computing and client/server architectures. One key client/server environment that businesses deployed was Lotus® Notes® and Domino, which provided them with a robust messaging and collaboration environment.

Over time, as businesses grew in size, adding staff through expansions, mergers, and acquisitions, greater demand was placed on the messaging and collaboration services that Domino provided. This equated to adding servers to handle the increased user load, often in remote offices so the servers hosting those services would be closer to the user. Domino also matured and evolved as a product over the years. New collaboration capabilities were added, such as support for Web-enabled mail and applications. Domino services were exposed so they could be accessed using other standard Internet protocols, such as LDAP, IMAP, IPOP, and Web services. These additional capabilities and services increased resource demands on individual Domino servers, often mandating additional hardware to redistribute and balance system loads.

In many businesses, these changes led to significant growth in the number of Domino servers over time. *Servers are like children - they need attention, maintenance, and constant care.*

Since the introduction of Domino 7, IBM/Lotus has been highlighting the capabilities of Domino to now *do more with less* - ultimately using Domino 7 more efficiently to better leverage existing investment - and ultimately reduce the Total Cost of Ownership (TCO). For many companies however, the key issue remains about how and where to begin with a consolidation effort, and what are the best practices and specific steps to get started with this effort. This Redpaper addresses these questions.

The overall goal of Domino consolidation is to provide a better *Return on Investment (ROI)* for a business' environment while maintaining or improving the system's *Quality of Service (QoS)*. Depending on the current condition of a company's Domino environment, this goal might be reached in different ways.

Since there is no "one-size- fits-all" approach to Domino server consolidation, this Redpaper examines the issue from a best practices perspective. Specifically, it discusses Domino Server Consolidation in terms of the following topics:

- ▶ Reasons for consolidation: A detailed look at the benefits one should look for when planning or implementing a consolidation project.
- ▶ Approaches to consolidation: Examine various models and scenarios and give details about the architectural considerations and consolidation methodologies.
- ▶ Administration model: Define Domino administration models and give details about how those models impact consolidation decisions.
- ▶ General approach: Give details about techniques to define and execute an effective consolidation project
- ▶ Performing Server Consolidation: Step by step examples using a scenario based approach

Note: This Redpaper has a companion Redpaper, *Domino 7 Performance Tuning: Best Practices to Get the Most Out of Your Domino Infrastructure*, REDP-4182, that you may wish to read as well. It is available at:

<http://www.redbooks.ibm.com/redpieces/abstracts/redp4182.html>

The team that wrote this Redpaper

This Redpaper was produced by a team of specialists from around the world working at the International Technical Support Organization, Cambridge, MA, USA Center.



Julie Castle has worked in the IT industry for around 15 years in a range of consulting, project, and management roles in the software arena. Julie has been involved in many large Lotus Notes and Domino infrastructure planning and deployment projects in both a technical and project management capacity. She has been working for IBM Software Group in Melbourne Australia for around six years, the last four of which have been as a Premium Support Manager (PSM) working on IBM Premium Support Program accounts. Julie has a degree in Politics and Literature, and a Graduate Diploma in Computer Science.

Tilmann Gramß is a Technical Solution Architect at IBM's Strategic Outsourcing - Integrated Technology Delivery based in Frankfurt, Germany. He has been working in the e-mail and collaboration engineering team since 1998. He has a broad experience with the design, setup, and integration as well as the operation of complex and global messaging infrastructures. His clients, mainly financial enterprises, rely on quick, effective, and secure solutions. Additionally, from the outsourcing point of view, his projects and solutions claim to be operable and efficient. Tilmann also acts as a subject matter expert within the IBM European service line organization and has years of experience in e-mail security, Lotus Notes, and Domino security assessments and Internet mail encryption.



Stephen Hardison is a Consulting I/T Specialist with IBM Software Services for Lotus based in Texas. He has 25 years of IT experience, with over 12 years of experience implementing and managing Lotus Domino based solutions. He also worked extensively on implementing WebSphere® Portal and portal-based collaborative and business applications. He attended the University of Houston and the University of Texas at Austin majoring in Computer Science.

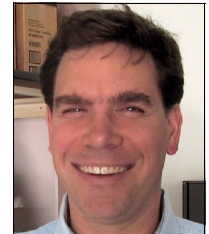
Claus Anker Boldt-Jørgensen has been working with Lotus Notes / Domino since Version 2. He has been working as a consultant for the past 10 years in the Domino arena (since Version 3). He started working with a Lotus business partner and later for Lotus Professional Services, which now is a part of the IBM Software Group Services organization (ISSL). He has been employed within IBM (Lotus) for the past seven years, where he has pursued a career path as a Certified Advisory IT Architect. His current focus in ISSL the organization is to assist clients in Consolidation, Migration, and Performance optimization of Domino infrastructures.





Lenny James is an Advisory Software Engineer in IBM Austin, acting as a technical lead for the Domino Core Server support team. In his eight years of supporting clients' Domino environments, he has specialized in replication, adminp, security, HTTP, SNMP, and server crash and performance troubleshooting. Lenny also has a strong OS background, including Solaris™ and Linux®, and Microsoft® Windows®. In addition to an MCSE, he holds multiple IBM Lotus Notes and Domino certifications in both System Administration and Application Development.

John Bergland is a project leader at the International Technical Support Organization, Cambridge Center. He manages projects that produce Redbooks™ about IBM/Lotus Software products. Before joining the ITSO in 2003, John worked as an Advisory IT Specialist with IBM Software Services for Lotus (ISSL), specializing in Notes and Domino messaging and collaborative solutions.



Thanks to the following people for their contributions to this project:

- ▶ **Suren Johanssen**, Lotus Notes/Domino product lead, Integrated Technology Delivery, Server Systems Operations, IBM, Portsmouth United Kingdom
- ▶ **Peter Mierswa**, STSM, Domino Server Team, IBM Software Group, WPLC, IBM, Westford, MA
- ▶ **Jane L. Wilson**, Technical Information Architect, IBM Software Group, WPLC, IBM, Westford, MA

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Introduction to server consolidation

This chapter defines Domino server consolidation at a high level. It also defines the scope of this paper, and identifies the audience. The following topics are covered:

- ▶ Domino growth over time
- ▶ What is consolidation?
- ▶ Goals of this Redpaper
- ▶ Target audience

Note: This Redpaper has a companion Redpaper, *Domino 7 Performance Tuning: Best Practices to Get the Most Out of Your Domino Infrastructure*, REDP-4182, that you may wish to read as well. It is available at:

<http://www.redbooks.ibm.com/redpieces/abstracts/redp4182.html>

1.1 Domino growth over time

Starting in the late 1980s, organizations began to invest heavily in distributed computing and client/server architectures. One key client/server environment that businesses deployed was Lotus Notes and Domino, which provided them with a robust messaging and collaboration environment.

Over time, as businesses grew in size, adding staff through expansions, mergers, and acquisitions, greater demand was placed on the messaging and collaboration services that Domino provided. This equated to adding servers to handle the increased user load, often in remote offices so the servers hosting those services would be closer to the user.

Domino also matured and evolved as a product over the years. New collaboration capabilities were added, such as support for Web-enabled mail and applications. Domino services were exposed so they could be accessed using other standard Internet protocols, such as LDAP, IMAP, IIOP, and Web services. These additional capabilities and services increased resource demands on individual Domino servers, often mandating additional hardware to redistribute and balance system loads.

In many businesses, these changes led to significant growth in the number of Domino servers over time. Some key growth factors included:

- ▶ Addition of servers to support larger user populations and increased demand for collaborative applications
- ▶ Integration of servers from other organizations as a result of mergers or acquisitions
- ▶ Distribution of servers to multiple locations or data centers to overcome geographic client/server networking constraints
- ▶ Separation of servers by function to optimized performance, and to reduce the potential for user impact
- ▶ Servers sized to support application or user loads for various Domino versions on specific operating systems

1.1.1 Cost impact of growth

Most companies view their Domino server infrastructure as overhead because it does not directly contribute to their financial bottom line, so cost containment is a critical business goal. Even for companies who sell Domino-based messaging or collaboration services to third parties, managing infrastructure and support costs is still crucial in order to maximize potential profits. These costs can include:

- ▶ Acquisition and maintenance of diverse hardware platforms and operating systems used to host Domino servers
- ▶ Additional hardware and network resources needed to route mail and perform replication among key system databases (admin4, Domino directory, and so on) among a large number of servers
- ▶ Supporting administrative expertise in multiple operating systems
- ▶ Server licensing and renewal for Domino, operating systems, and supporting products across a large number of physical servers
- ▶ Staff required to support Domino system administration and operation across a large or distributed server install base
- ▶ “Hidden costs” related to overall system complexity, and the difficulty for users to find or access the information they need

Server hardware and operating systems technologies have evolved over time, becoming much more powerful, and allowing businesses to run larger user and processing loads with lower cost per transaction. Although there remain many areas in the world where wide-area network infrastructures are relatively weak or expensive, high-speed networking technologies have generally made it easier to bridge geographically dispersed locations cost effectively. Also, the scalability of Domino has improved over time, allowing a single Domino partition to support larger workloads. As a result, there is increasing pressure on Information Technology groups to consolidate the business' Domino resources in order to contain costs.

1.2 What is consolidation?

The term *consolidation* has different meanings to different people. At a high level, the term can be used to denote one or more of the following models:

- ▶ *Centralization*: Moving geographically distributed servers to a central location
- ▶ *Server consolidation*: Replacing a number of smaller servers with a single large server
- ▶ *Storage consolidation*: Combining data files from several servers to a shared enterprise storage medium, such as a Storage Area Network
- ▶ *Data integration*: Taking information from several different sources and merging it into single logical repository with a common format.
- ▶ *Application consolidation*: Combining similar applications from different servers (such as Web-enabled Notes applications, or mail applications) onto a single application server
- ▶ *Workload consolidation*: Combining different application workload types on a single server

An overview of these models is shown in Figure 1-1.

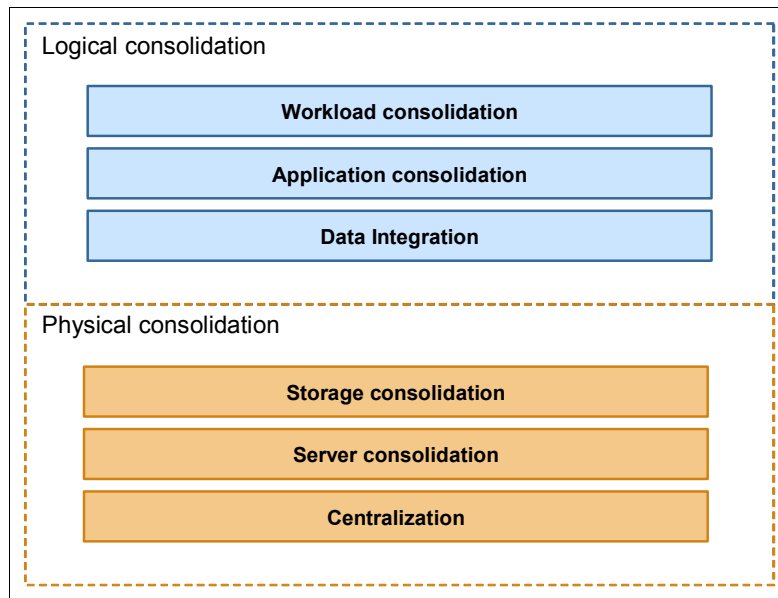


Figure 1-1 Types of consolidation

Centralization, server consolidation, and storage consolidation all deal with making changes to the physical infrastructure components of a system's architecture. Data integration, application consolidation, and workload consolidation deal with logically restructuring components of a system's architecture.

1.2.1 Consolidation: a Domino perspective

In most cases, when a business considers a particular consolidation model, they must, as a matter of course, consider applying other consolidation models in order to meet their goals. For example, if a company wants to centralize Domino servers from several locations across a continent, they will likely need to take into account:

- ▶ Server consolidation: Installing larger servers in the central data center instead of simply moving small servers from the other geographic locations
- ▶ Storage consolidation: Providing an shared enterprise data store to simplify management of Domino resources
- ▶ Data integration: Collapsing multiple Domino domains into a single domain to simplify mail routing and system administration
- ▶ Application integration: Co-locating mail or application files from multiple locations to a single server or a set of servers

Note: Domino server consolidation usually requires the client to combine more than one of the standard consolidation models in order to meet the business' cost containment goals.

1.3 Goals of this Redpaper

The overall goal of Domino consolidation is to provide a better *Return on Investment (ROI)* for a business' environment while maintaining or improving the system's *Quality of Service (QoS)*. Depending on the current condition of a company's Domino environment, this goal might be reached in different ways.

For example, a geographically dispersed company based entirely in North America might chose a centralization approach, given the relatively low cost of high speed networking. A similar company spread across the world might find it cost prohibitive to centralize servers in certain regions due to the lack of robust networking infrastructure or the complexity of inter-country communications regulations.

Likewise, a company that had grown by acquisition might have a large number of Domino domains and sets of differing organizational certificates. Such a company would likely need to focus more on data integration issues when planning and performing their consolidations than would a company that had grown through expansion and had maintained a single domain and organizational certificate structure during their growth.

Since there is no "one-size- fits-all" approach to Domino server consolidation, we chose to examine the issue from a best practices perspective. Specifically, we wanted to look at:

- ▶ Reasons for consolidation: A detailed look at the benefits one should look for when planning or implementing a consolidation project.
- ▶ Approaches to consolidation: Examine various models and scenarios and give details on the architectural considerations and consolidation methodologies.
- ▶ Administration model: Define Domino administration models and give details on how those models impact consolidation decisions.
- ▶ General approach: Give details on techniques to define and execute and effective consolidation project.

1.4 Target audience

This paper is focused primarily on providing best practices information about consolidation planning and techniques, rather than providing deep details on moving from one specific environment to another. It was written for professionals fulfilling the following roles:

- ▶ Information technology managers
- ▶ Consolidation project managers
- ▶ Domino system architects
- ▶ Domino system administrators



Reasons for consolidation

This chapter discusses various justifications for consolidating Domino servers. Examples are given of architectural, administrative, and cost benefits. It also compares the business view of cost management (ROI and QoS) with the technical view (TCO and SLAs). The following topics are covered:

- ▶ Advantages of server consolidation
- ▶ Common consolidation pitfalls
- ▶ Considerations and impacts
- ▶ Measuring costs and services
- ▶ Serviceability benefits
- ▶ Establishing baselines and measuring success

2.1 Advantages of server consolidation

The proliferation of servers in Domino environments over time has led to a cost impact to many businesses. However, different businesses interpret those costs in different ways. While some want to exclusively focus on managing capital and operating cost, others also view the costs from a serviceability perspective. Thus, when businesses choose to execute a server consolidation strategy, they may select different measures for success depending on their consolidation goals.

Organizations matching the following profile generally make good candidates for server consolidation:

- ▶ Have a directive to reduce IT costs
- ▶ Have no control over their IT costs
- ▶ Find that they need to integrate their distributed systems
- ▶ Find it hard to retain system administration personnel
- ▶ Have server management issues
- ▶ Need to reduce staffing costs
- ▶ Have backup and recovery problems
- ▶ Have had mergers or acquisitions
- ▶ Have vital data scattered and unsecured

2.1.1 Domino growth in small businesses

Small businesses often have very limited IT budgets, which leads them to limit the number of servers and operational resources they are willing to dedicate to Domino services. Over time, many of these businesses may begin to leverage Domino to provide a common platform for e-mail and collaborative applications, as well as provide Internet based services to their user population or external clients and partners.

Over time, issues related to Domino usage in small businesses display similar patterns:

- ▶ Very few production Domino domains.
- ▶ Domino servers located in a single office, sometimes tasked with multiple functions.
- ▶ Disparate hardware vendor platforms purchased over time.
- ▶ Servers sized to support workload profiles of older versions of Domino.
- ▶ Limited performance tuning and workload balancing due to over-tasking of administrator resources.
- ▶ Inability to manage orphaned or abandoned applications.
- ▶ Servers supporting both mail and application environments usually named mixed servers where load for each specific usage is difficult to predict. (Application usage and interactions with x-users is hard to size.)

Figure 2-1 on page 9 shows the typical Domino growth pattern in small businesses.

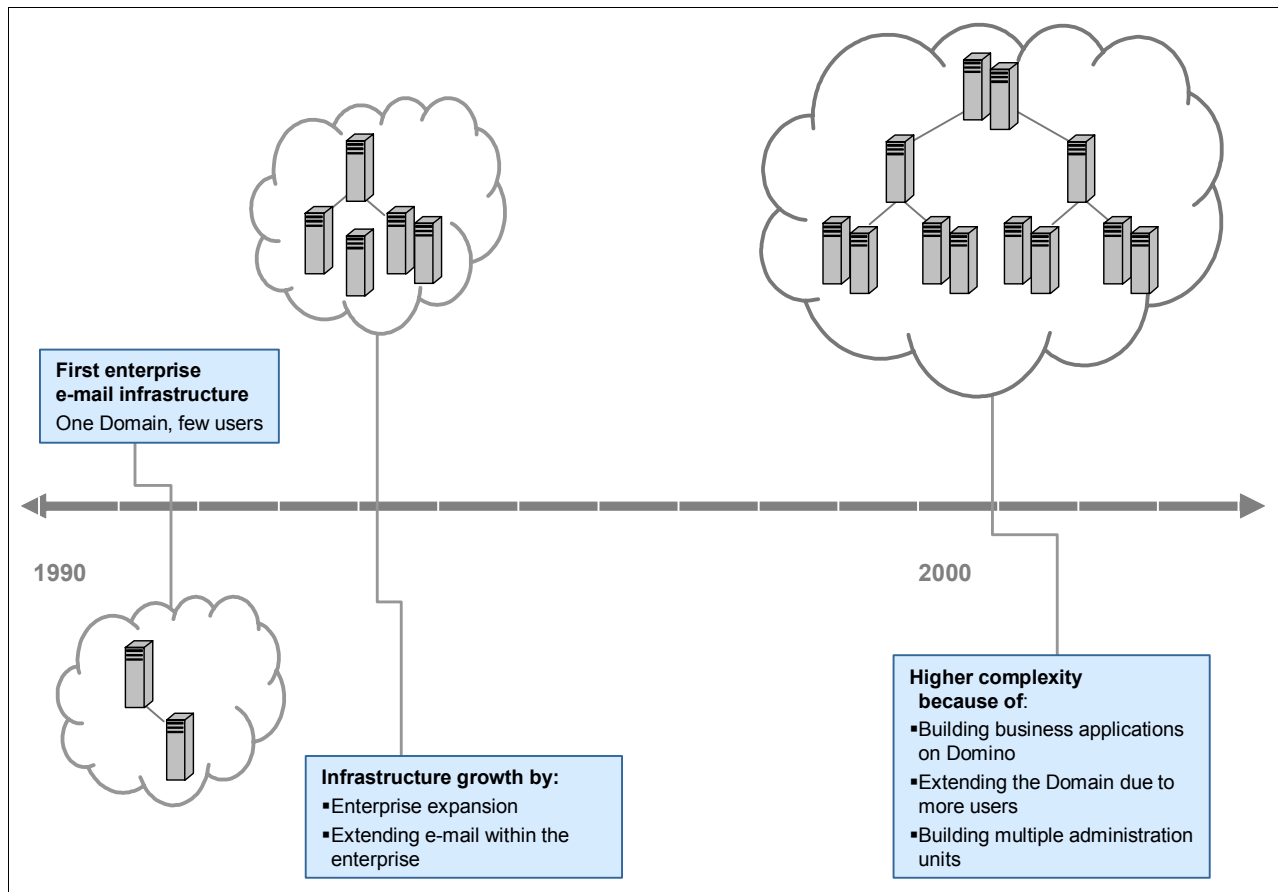


Figure 2-1 Typical Domino growth pattern in small businesses

Small businesses can generally benefit most from consolidation by:

- ▶ Reducing the number of physical servers supported
- ▶ Standardizing on larger hardware from a single vendor
- ▶ Working through the consolidation process to identify and eliminate abandoned or redundant applications
- ▶ Re-architecting system interfaces and administrative processes to simplify replication, mail routing, and user management

2.1.2 Domino growth in large businesses

Large businesses are also cost conscious, but due to their size they are required to define complex Domino architectures to meet the need of their businesses. Domino services tend to be distributed across multiple sites, and in many cases consist of multiple domains. Domino administration tends to be a specialization, but this function also tends to be distributed, not only among different sites, but also across different Domino domains and organization hierarchies.

Over time, issues related to Domino usage in large businesses also display similar patterns:

- ▶ Multiple production Domino domains segregating specific functions, such as:
 - Mail
 - Notes applications

- Web applications
- Application testing and staging
- Internet gateway
- External application services
- ▶ Domino servers located in multiple locations, mostly segregated by task or function
- ▶ Disparate hardware vendor platforms purchased over time
- ▶ Inability to rapidly deploy new versions of or updated to Domino server software
- ▶ Differing cost-performance ratios at different locations due to workload imbalance
- ▶ Inefficient Domino administration and support due to excessive administrative role fragmentation
- ▶ Uncontrolled growth of Domino-based collaborative applications
- ▶ Difficulty responding to major organizational changes, such as acquisitions or divestitures

Figure 2-2 shows the typical Domino growth pattern in large businesses.

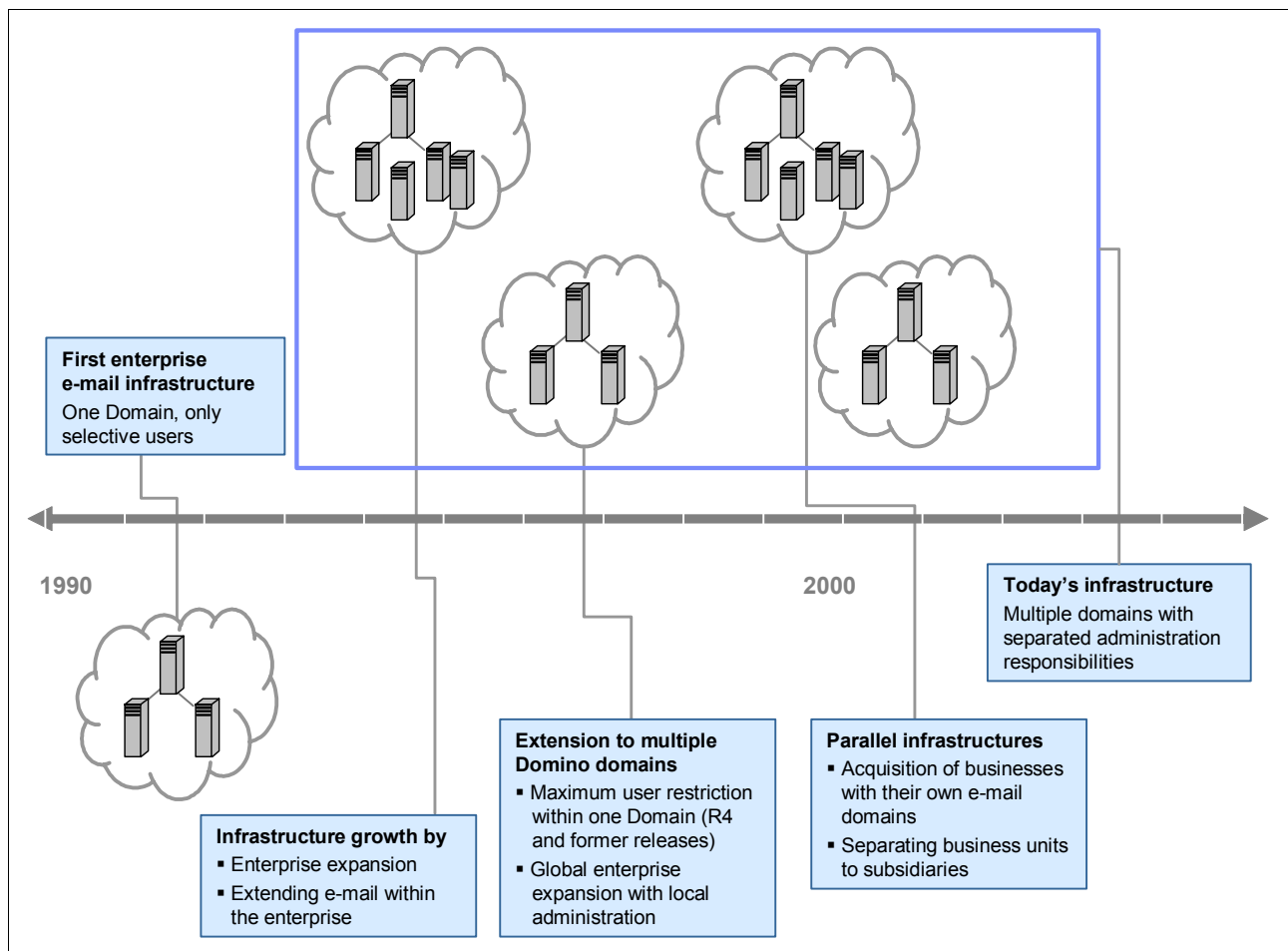


Figure 2-2 Typical Domino growth pattern in large businesses

Large businesses can generally benefit the most from consolidation by:

- ▶ Reducing the number of physical servers and the number of sites supported
- ▶ Upgrading server platforms to highly scalable systems, for example:
 - 32-bit systems to 64-bit systems
 - Workgroup server operating systems (such as 32-bit Windows or Linux) to enterprise operating systems (such as AIX®, Solaris, OS/400®, and so on)
- ▶ Implementing operational management processes for applications to fully control the deployment life cycle of application, including removing and archiving expired applications
- ▶ Reducing the number of Domino domains (especially mail domains) to simplify mail routing, replication, and systems management
- ▶ Reducing the fragmentation of administrative functions to allow better consistency and faster response to support requests
- ▶ Providing more effective system utilization of Domino resources through centralization and workload balancing

2.1.3 Reduction or control of IT costs

Controlling IT costs is the main reason most businesses give for consolidating servers. There are several dimensions that make up the total IT cost picture:

- ▶ Hardware costs: Reducing the number of server, storage devices, peripherals
- ▶ Software costs: Lowering software licensing and renewal costs for Domino, operating systems, and supporting software
- ▶ Support staff: Reducing the number of human resources needed to administer or manage the environment, as well as ongoing training costs
- ▶ Operational costs: Reducing costs of floor space, power consumption, cooling systems, and so on
- ▶ “Hidden costs”: Costs associated with inconsistent or incompatible hardware and supporting software, system failures, data loss, security exposures, and so on

2.1.4 Improved manageability and availability

Consolidation can help improve overall system control in the following ways:

- ▶ Enterprise management: Allow for a consistent tools, facilities, and systems management services through integrated operations.
- ▶ Continuous operations: Properly consolidated systems can provide businesses the ability to provide 24 x 7 access to mail and applications.
- ▶ Consistent performance: Systems consolidated onto similar hardware and operating system platforms are likely to have similar performance profiles, making it easier to perform workload balancing.
- ▶ Dependability: Problems related to distributed systems, such as frequency of outages or the need for manual intervention by remote support staff, can be reduced with consolidated systems.
- ▶ Minimize operational constraints: Increasing the number of servers and peripherals at multiple locations can strain a business’ ability to find sufficient floor space, power connections, and cooling capacity, especially in smaller offices.

2.1.5 Improved data access and protection

Businesses can protect distributed data resources through consolidation:

- ▶ Reduce data duplication and fragmentation: Access problems can be reduced by consolidating distributed collaborative applications with similar data, or containing only subsets of data due to the application of selective replication formulas.
- ▶ Apply enterprise data security: While Domino has a robust application security model, consolidating applications, domains, and certification structures can improve overall security administration.
- ▶ Improve security of physical assets: Reducing the number of data center locations can restrict unwanted or unauthorized access to server hardware and help ensure a more secure environment.
- ▶ Centralized backup, recovery, and integrity management: Consolidating servers and storage to allow for the development of effective disaster recovery plans, minimize business disruption due to severe data loss, and allow for the effective implementation of data retention and management policies to conform with business requirements and regulatory bodies.

2.1.6 Leveraging existing investments

Consolidation can help businesses leverage existing investments where excess capacity exists:

- ▶ Expand existing servers: Add new capabilities to existing installations rather than deploy to new dedicated servers.
- ▶ Optimize capacity utilization: Since many businesses manage performance and have a level of acceptable, consistent response times by typically running servers at 50 to 60 percent CPU utilization, consolidation can help minimize the number of underutilized servers. These underutilized servers are often found in a distributed environment and in those environments that use server platforms that cannot perform dynamic resource balancing across logical partitions.
- ▶ Optimize skilled resources: Within distributed environments, Domino administration and management is often fragmented, with many remote resources only fulfilling part-time Domino support roles. Also, sites may implement different vendor architectures and applications, requiring differing skill sets at remote locations. Consolidation to standard hardware and software can allow dedicated experts with in-depth training to support the environment and manage ongoing systems and architectural changes.

2.1.7 Reduced technical complexity

Client-server systems are usually seen as a three-tiered logical architecture. As implemented, Domino architectures tend to become multi-tiered systems over time, with broad networks of local servers, replication hubs, and so on. Consolidation can help reduce this technical complexity by reducing or eliminating the need for hubs and gateways.

2.1.8 Scalability and workload growth

Consolidation can help businesses handle scalability and workload growth issues in the following ways:

- ▶ System scalability: Centralization and server consolidation can make it more cost effective to:
 - Implement failover solutions
 - Provide the ability to manage peak usage without degraded performance
 - Provide for upgrade paths while minimizing the impact on operations or users
- ▶ Granular upgrades: Consolidation can ease the ability to grow the number of users, applications, system service, or data supported without causing major disruptions to the production environment.

2.2 Common consolidation pitfalls

During a Domino consolidation project, the teams' concentration usually remains on project tasks. It is possible for them to overlook some of the issues that may come up as part of consolidation activities. The following are a few pitfalls:

- ▶ Cutting over services from one system to another can lead to inadvertent user impacts, such as downtime due to cut over problems, and broken database or Web links that can have a significant impact on user and management satisfaction of the consolidation process. The consolidation team should develop a communications plan to identify and notify parties that could potentially be impacted by a particular cut over, and should provide for targeted support for those parties where possible.
- ▶ Network downtime and slow response have a huge effect on centralization. The effect should be clearly understood and expectations set appropriately. The consolidation team has to make sure the network infrastructure can provide the necessary bandwidth for the consolidated Domino environment.
- ▶ Changing the base operating system may have a significant impact on the behavior of custom Domino applications. Applications that access file system resources or call external libraries may break due to code that is written with assumptions related to file name conventions, operating system case sensitivity, or the names of external libraries on the target environment.
- ▶ A third-party application that is supported on one operating system and version might not be supported in the target environment. Even if the application is supported, there will possibly be changes in licensing costs (processor licensing restrictions, required upgrades, and so on) The consolidation team should inventory all third-party tools used on Domino servers, and develop related budgets, implementation/replacement plans, and contingency plans.
- ▶ Applications that are migrated from multiple servers to a single server must be compatible, and behave the same way in the target environment as they behaved before. It is a good idea to work with the software vendors and in-house developers to identify and resolve potential compatibility issues.
- ▶ A suitable development and test environment should be instituted to allow developers to revise and test all applications impacted by the consolidation effort. Rigorous change control should be implemented to ensure that any changes to application code are regression tested.
- ▶ Centralization can have a significant impact on user perception of the operational support model. Users who are accustomed to easy access to local support analysts or

administrators now have to deal with remote resources. Expectations about the new service model should be clearly communicated to the Domino user community.

- ▶ Moving servers to a location in a different time zone from that of the users can affect system availability and support availability, especially if there is a large separation between the location of the server and the location of users (for example, servers in Europe with users in East Asia). The operations support model and system maintenance policies should be reviewed and updated to ensure the consolidated system will meet the users' service expectations.
- ▶ The regulatory requirements of different countries may impact Domino operations as well as data access and retention. These regulations are often based on the location of the user of the system, not the location of the data center the users are accessing. This may lead to confusing or conflicting demands on administrators. Care should be taken to identify and mitigate potential regulatory impacts early in the planning of the consolidation project.

2.3 Considerations and impacts

When an enterprise decides to consolidate servers, it has to analyze what the expected benefits of the operation are and what success factors are involved. The factors that influence the choice are:

- ▶ Costs to consolidate
- ▶ Staffing
- ▶ Time to implement
- ▶ Future business needs
- ▶ Risks and contingencies

2.3.1 Cost to consolidate

The main reason to consolidate is to reduce costs. However, consolidation projects will incur cost from the time of inception to the time of deployment. Major costs include:

- ▶ Hardware costs

Consolidation usually mandates new servers, new storage, and new peripherals. Supporting infrastructure, such as network upgrades, may also need to be included to provide a stable, scalable environment that meets user service expectations.

- ▶ Software costs

Software license costs for applications and operating systems are different for different systems and different capabilities. These should be understood properly. Software costs may initially increase as systems are run in parallel during the consolidation process, and then decrease as the process is finished. Consolidation might involve upgrading some of the software, which would involve additional costs

- ▶ Prototype cost

Depending on the size and complexity of the consolidation, there might be a need to set up and test a prototype solution to make sure the solution provides the benefits and business value expected of it. This is especially relevant if there are significant changes in the base infrastructure, such as moving to different vendor platforms or new operating systems.

- ▶ **Contractors, consultants, and IT staff**

Consolidation usually involves the architecture, design, and implementation of a new infrastructure. It also involves a significant amount of analysis, testing, and cross-department coordination. Because the IT staff of the organization will be engaged in their current jobs, there is often the need for supplementary resources to execute the consolidation project. These may be contractors hired temporarily to supplement the IT staff, or consultants who may have specialized skills or consolidation expertise that is not available within the organization's IT organization.

- ▶ **Retention of old environment**

While the end goal is to eliminate old or redundant systems, it may be necessary to retain and manage the original environment for a period of time as a backup to support the business-critical applications in the event anything goes wrong with the consolidation. This involves some costs, which need to be factored in to the overall consolidation effort. If the consolidation process is properly tested before deployment, this cost may be reduced.

- ▶ **Disruption costs**

Some business may be lost due to disruption of service during consolidation. The question, "How long will the business be impacted and to what extent?" needs to be answered and the implications understood.

Consolidation involves many changes: new technology, possibly new applications, new infrastructure, integrating existing applications, moving data, changing data formats, and changing existing applications. Because these changes have costs attached, they should be kept to a minimum.

Disruption costs depend on the consolidation solution:

- Centralization: Hardware is not available during the transfer.
- Server consolidation: Business processes can continue to run on the source platform, and workload is transferred when testing on the consolidated platform is completed and it becomes deployable. The disruption cost is proportional to the migration time.
- Data integration: Disruption cost is proportional to the data migration time.
- Application integration: The best plan is to continue to work on the old platforms until the new solution is implemented and fully tested. In this case, disruption costs are proportional to the applications' migration time.

2.3.2 Staffing

As stated previously, it may be necessary to augment a business' IT staff with contractors and consultants to complete the consolidation effort. In addition, the roles and responsibilities of the IT staff in place will need to be modified to be ready to support the consolidated environment. The following are staff considerations:

- ▶ **Re-tasking**

In general, it is best to retain existing staff in administrative and support roles, given their institutional knowledge regarding the business and its organization structure and policies. However, consolidation projects often lead to a reduction in the number of resources needed to support the business' Domino environment, especially with centralizations. This will likely lead to cost savings in the long term. However, if the staff feels that their jobs are threatened by the consolidation, they are likely to take pre-emptive action and search for another job.

To minimize potential impact to user support or consolidation tasks:

- Define the staffing model for the consolidated environment as early in the project as possible.
- Identify and select key administration and support resources to be retained upon completion of the consolidation.
- Identify those staff whose jobs are most likely to be impacted and determine whether it is possible for them to be reassigned to other roles upon completion of the consolidation.
- If possible, provide incentives to those impacted by the consolidation if they agree to remain until their role in the consolidation process is complete.
- Develop a contingency plan to backfill positions that become vacant prematurely.

► **Retraining**

There are likely to be significant architectural changes from the original environment to the new consolidated environment, such as a changes in hardware or operating system environments, or major upgrades to the Domino version. Accordingly, it will be necessary to train administrators and support staff in new technologies. The following are some key considerations when defining a training plan:

- Moving to a new server operating system is often the most difficult transition for administrators to make, and it may take a few months for them to develop sufficient competency if they have never been exposed to the platform before.
- Administrators may need to take vendor-specific hardware training to be able to intelligently deal with architecture and performance tuning issues in the new environment.
- A full-time Domino administrator will likely require little time to adapt to the features and functions available in new releases of Domino after completing training. Part-time administrators and support staff will likely require more time to come up to speed.

Note: Retraining administrators and support staff is a critical success factor in the completion of a consolidation project.

► **Hiring new resources**

It may be necessary to hire new resources and additional support staff to administer the larger, more centralized environment, especially for centralizations where there may not be enough skilled resources at the cetralized location to handle the additional administrative responsibilities.

► **Supporting multiple environments**

It is possible that the IT staff may need to support both the original Domino environment and the new consolidated environment.

2.3.3 Time to implement

The time it takes to implement a server consolidation solution will depend on the kind of consolidation put in place. In addition the to time required to architect, design, and implement the consolidation infrastructure, plans need to take into account the amount of time needed to cut over servers or facilities to the new system. The following items describe ways to look at time-to-implement for various consolidation models:

- **Centralization:** Implementation time is the time taken to transfer the hardware and get it up and running again.

- ▶ Server consolidation: The time it takes for setting up the infrastructure, servers, installing software, testing the applications, and migrating the applications from the source servers.
- ▶ Data integration: The implementation time is the time taken to deploy the solution and migrate the data.
- ▶ Application integration: The time taken to install the new software in a server, test it, and migrate the business processes to the new application.

Although implementation time is important, disruption time is equally important.

2.3.4 Future business needs

When planning consolidation, the future growth of the organization should be an important consideration. A consolidation plan should include the ability to scale the infrastructure to meet future business goals, and not simply replace the existing environment. Some key issues to consider include:

- ▶ User growth: Expected change in user population due to company growth, mergers and acquisitions, or expanding to currently unserved users
- ▶ Application trends: Expected growth in the number of Domino-based applications or the amount of data stored in them
- ▶ Future services: Expected need to support access to Domino-based data and services from emerging technologies currently on the business' planning horizon

Note: Planning for future business needs should go three to four years into the future. It is usually impractical to try to accurately anticipate the business' IT needs more than four to five years out.

2.3.5 Risks and contingencies

Server consolidation projects are huge undertakings. As with any project, there are risks associated with it. You should prepare risk management and contingency plans to identify and deal with these project risks. The following are a few key risks associated with consolidation projects:

- ▶ Single point of failure

Consolidation is moving workloads from multiple systems to a single system. A failure in the consolidated system means all the applications running in that environment fail. Although new technology has many features that reduce hardware failure, care must be taken to avoid any human errors that might result in the server failure. To meet business availability requirements, it may be necessary to design and implement a high-availability solution, which might include the following:

 - Server redundancy
 - Network redundancy
 - Domino or Web clustering
- ▶ Failures immediately after deployment

Due to human errors and the maturity of the solution, it is possible that there will be failures in the first few months of the deployment of a consolidation solution. If required, the current environment must be retained as a backup to keep the business running while the failures are addressed.

- ▶ Time for backup

As the data from many servers are consolidated to a single server or storage systems, more data needs to be backed up on a daily basis. If it is not taken care of appropriately during deployment, backup time might overlap with the regular operational time of the server, which can dramatically affect performance. The capabilities of the backup software should be reviewed and tested to determine if the time allocated is sufficient.

2.4 Measuring costs and services

One of the challenges with IT projects is that there is often a disconnect between the business and IT regarding how costs and services are measured or communicated. It is important for a consolidation team to understand how these measures compare to one another. In this section, we will look at the following topics:

- ▶ Return on Investment (ROI) and Total Cost of Ownership (TCO)
- ▶ Quality of Service (QoS) and Service Level Agreement (SLA)
- ▶ Bridging business and IT metrics

2.4.1 Return on Investment and Total Cost of Ownership

TCO is a key financial measure with the goal of providing IT and business managers with estimates of direct and indirect costs on technology investments, such as hardware and software leases and purchases. It includes:

- ▶ Hardware costs: Lease or purchase, system upgrades, and vendor maintenance
- ▶ Software costs: Operating system, application, and user licensing and renewal
- ▶ Operational costs: Electricity, cooling, and floorspace
- ▶ Networking costs: Bandwidth charges, router/switch ports, cabling, and external access
- ▶ System administrators: Hiring, salaries and benefits, and re-training
- ▶ Support costs: Backups and offsite storage

TCO is usually calculated over at least a three year period in order to get a full understanding of the costs associated with implementing a new system. However, it is often important to calculate TCO on shorter cycles (for example, on an annual or semi-annual basis) for budget and planning purposes, and for use in calculating ROI.

Note: TCO is an average cost over time. For example, one system may have high initial acquisition cost, but low on-going maintenance and support costs over time. It may have the same TCO over time as a system with low initial acquisition costs, but high on-going maintenance and support costs.

ROI is a financial benefit analysis used to determine the value to the business of a particular investment of capital. It is calculated as a ratio of the amount of value gained or lost from the acquisition and use of an asset relative to its base cost. In its simplest form, ROI can be calculated as follows:

$$ROI = \frac{Value - Investment}{Investment}$$

Elements to consider when determining the business value of the use of a system include:

- ▶ User productivity
- ▶ Profitability
- ▶ Operational efficiency

Note: The difference between TCO and ROI can be summarized as follows:

- ▶ TCO: What does it cost to install and run a system over time?
- ▶ ROI: Is it worth the cost to run the system now, and if so, when will it become unprofitable?

Figure 2-3 compares ROI and TCO.

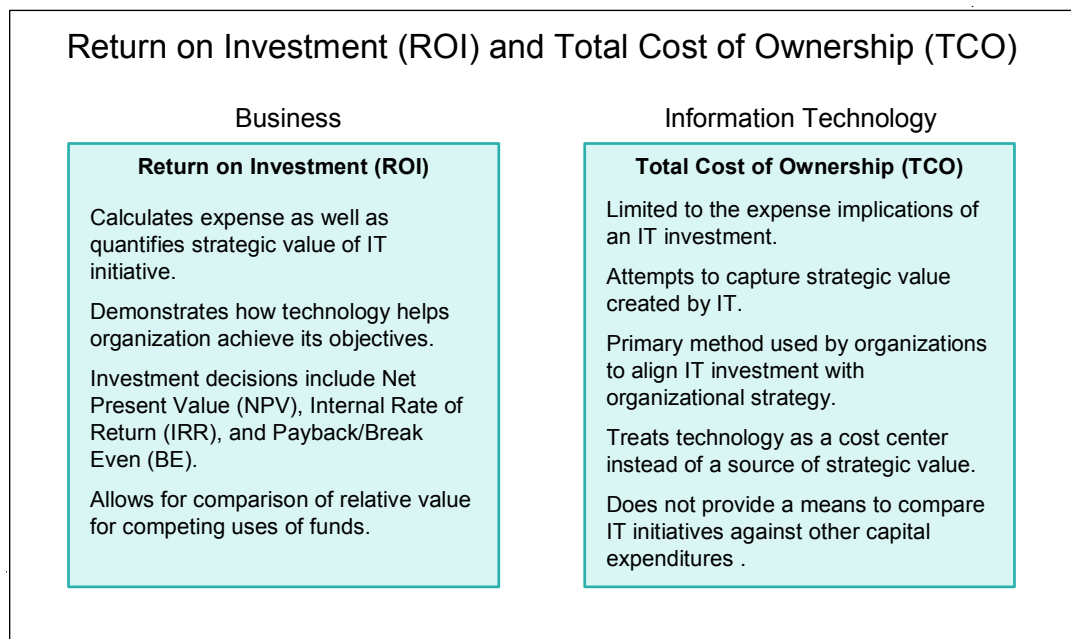


Figure 2-3 Comparison of ROI and TCO

2.4.2 Quality of Service and Service Level Agreement

Many business institute SLAs within their IT organizations to define an agreement between the administrators of a system and the consumers of that system's services. SLAs should include the following:

- ▶ A clear definition of the client's needs or expectations
- ▶ Services to be delivered to meet those needs
- ▶ Metrics used to measure the performance of that delivery
- ▶ Processes for dealing with problem management and resolution
- ▶ Processes for resolving disputes between the service provider and consumer
- ▶ Responsibilities and duties of the consumer
- ▶ Issues related to security and confidentiality
- ▶ Incentives for meeting service levels
- ▶ Penalties for not meeting service levels

An SLA is usually defined for a specific component or set of related components. For example, a Domino mail system may have its own SLA defining the level of services to users, which may be completely independent of the SLA defining network availability and bandwidth.

QoS is a term adapted from the network engineering field. In essence, it looks at service from an user's perspective. Users view technology as a *service chain* rather than as individual components. The following are service chain measures related to QoS:

- ▶ Accessibility
- ▶ Transaction speed
- ▶ Availability
- ▶ Connectivity
- ▶ System resilience
- ▶ Functional alignment

IT is often faced with the disconnect between users' QoS expectations and component SLAs. For example, a Domino system may have an SLA that defines a specific availability high target. At the same time, there may be various network SLAs with similar availability targets. It is possible for all of the component systems to meet their availability targets, but fail to meet users' QoS expectations due to availability failures occurring at different times for different components. From the consumers' point of view, the failure is with the application they are ultimately attempting to access, rather than with chain of supporting components or subsystems that make up the business solution they are accessing.

Figure 2-4 compares QoS and SLA.

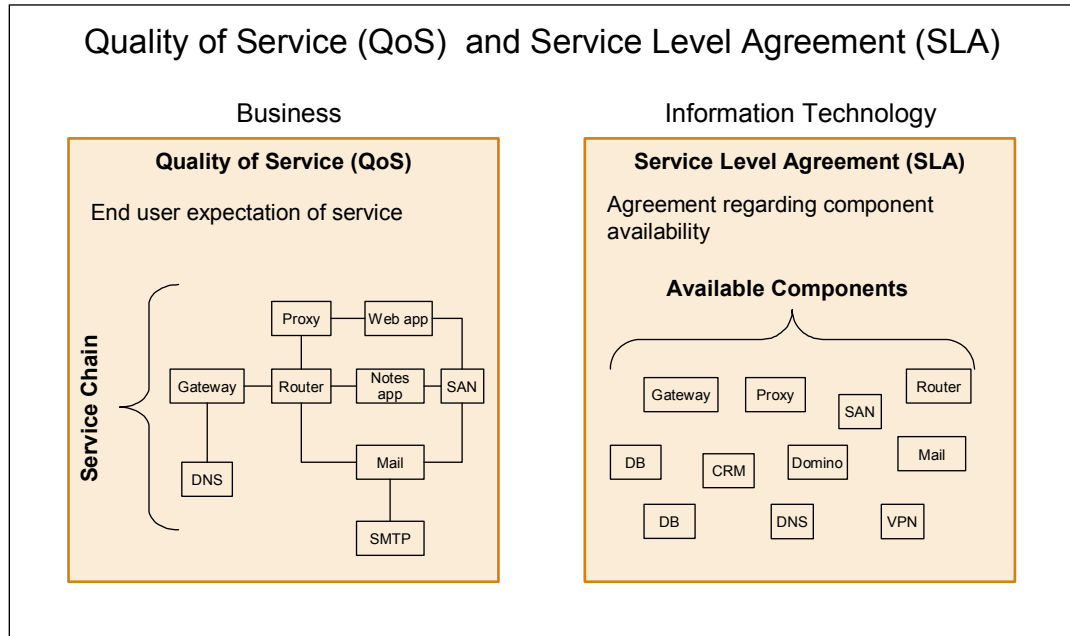


Figure 2-4 Comparison of QoS and SLA

2.4.3 Bridging business and IT metrics

Often there is a significant disconnect between the metrics used by the business and IT to measure costs and services. In order to resolve these issues, each group needs to make efforts to bridge the gap by defining common measurement baselines that map to both the business metrics (ROI and QoS) and IT metrics (TCO and SLA).

Business managers should look at the following:

- ▶ Identify business requirements with and map to the service chain.
- ▶ Define baseline QoS measurements.
- ▶ Set and measure project IT ROI.

IT organizations should look at the following:

- ▶ Connect component SLAs to meet/exceed service chain QoS baselines.
- ▶ Identify and implement cost effective solutions to meet user service requirements.

Figure 2-5 shows the bridging between business and IT metrics.

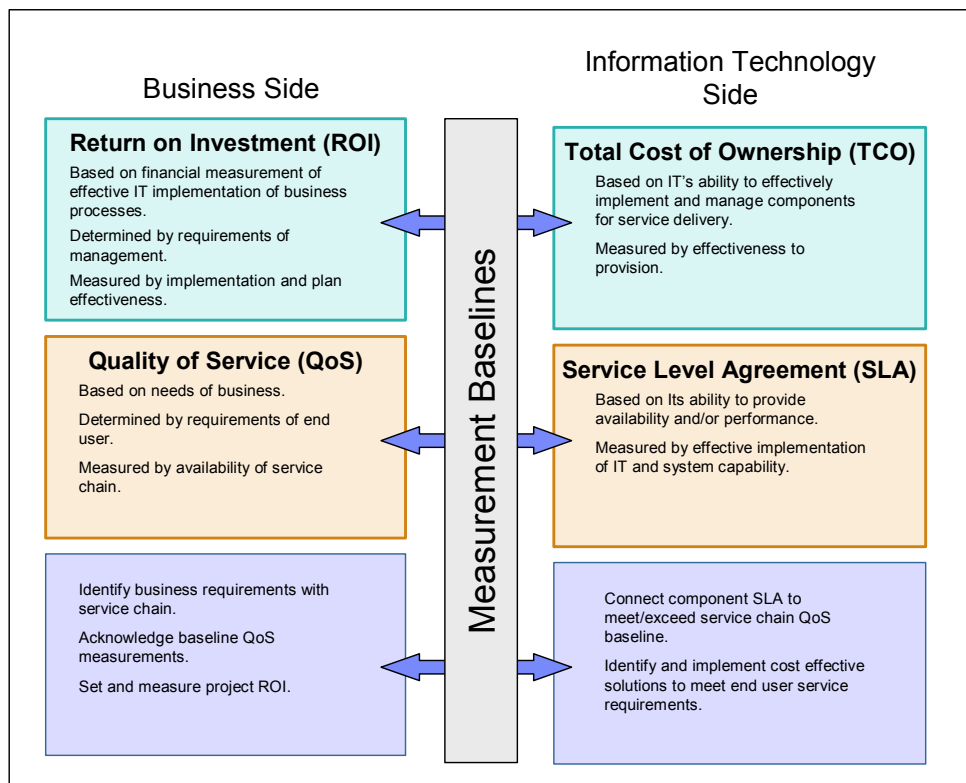


Figure 2-5 Bridging business and IT metrics

2.4.4 Taking advantage of cost benefits

Here we discuss the advantages of cost benefits.

Lowering administrative overhead

Centralization and domain consolidation can yield tangible administrative cost reductions. With centralization, cost savings are realized by reducing the number of resources needed to monitor and maintain a large number physical servers. This can include reducing the number

of remote administrators needed to support the system, or reducing the licensing costs associated with system administration software installed on distributed servers.

With domain consolidation, cost savings are realized by reducing the amount of time spent by administrators managing the complexities of multiple logical systems. Simplifying administrative tasks, such as system monitoring, user registration and recertification, and server task management, can allow a business to reduce the number of administrators needed to support the overall enterprise.

Note: Most administrative staff reductions with consolidation activities are realized by eliminating the need for part-time administrators or software at remote sites, or in eliminating redundant activities and functions performed by dedicated domain administrators.

Lowering asset maintenance and operational costs

By reducing the number of servers needed to support Domino, businesses can reduce the overall costs related to hardware and software maintenance, and can also reduce costs associated with running those servers, including:

- ▶ Hardware upgrades
- ▶ Hardware vendor maintenance agreements
- ▶ Licensing and renewals of operating system, Domino, and support software
- ▶ Electrical power conditioning, floorspace lease, and cooling systems at multiple locations

Note: Centralization can lead to an increase in the costs associated with network utilization as more users access Domino services across a business' WAN instead of accessing them locally. It is important to balance these costs increases against cost savings in other areas.

Lowering troubleshooting costs

Consolidation can provide the opportunity for businesses to implement and enforce standards related to hardware platforms, server operating system, and Domino versions. This can help the business lower costs by reducing the:

- ▶ Training costs for administrators to maintain skills across multiple platforms
- ▶ Productivity costs associated with assembling a large team to work on problems in large businesses with distributed support organizations, such as separate Windows and UNIX® support teams

2.5 Serviceability benefits

Consolidation can provide certain many serviceability benefits. While these have cost savings associated with them related to improvements in efficiencies, they are most directly seen as tangible benefits to users and IT staff.

- ▶ Reducing complexity
- ▶ Enforcing standardization
- ▶ Simplifying administration
- ▶ Improving performance
- ▶ Simplifying systems management

2.5.1 Reducing complexity

Architectural complexity can have a significant impact on an IT organization's ability to identify and respond to problems. As the number of components, remote site, interconnected nodes and applications that make up a system increases, it becomes significantly more difficult to manage the environment and ensure SLA targets are met. Problems caused by excessive complexity include:

- ▶ Inability to meet service chain (QoS) targets
- ▶ Difficulty identifying root causes of problems
- ▶ Extended lead times to resolve issues
- ▶ Administration and support failures due to missing, overlapping, or conflicting areas of responsibility
- ▶ Difficulty applying system updates due to subsystem interdependencies
- ▶ Difficulty identifying the potential impact of proposed architectural changes

Figure 2-6 shows an extreme example of architectural complexity.

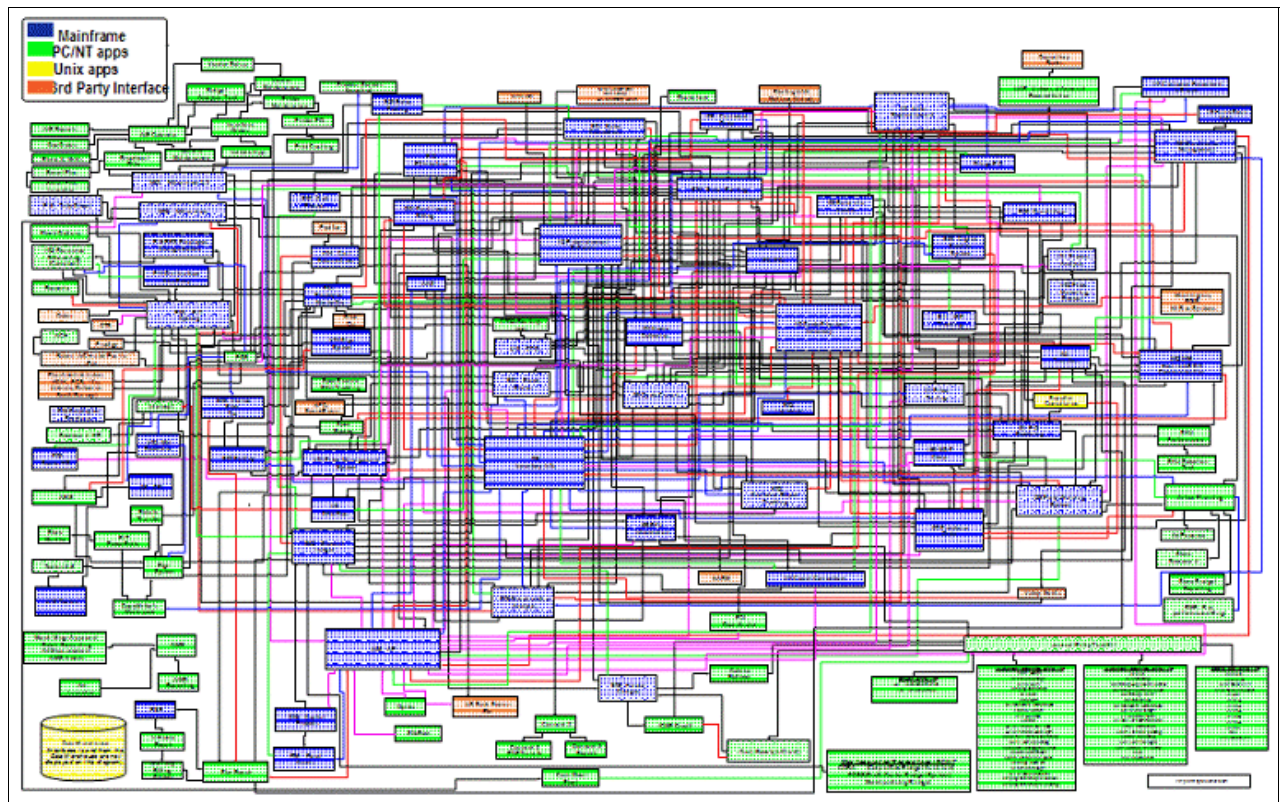


Figure 2-6 An extreme example of architectural complexity

One of the key goals of consolidation should be to simplify a system's implementation model. In a Domino environment, considerations should include consolidation of:

- ▶ Physical servers and partitions
- ▶ Domino domains
- ▶ Organizational certificate hierarchies
- ▶ Common data sources used by Notes/Domino applications

Note: Care should be taken to ensure that consolidation of these resources does not lead to such issues as reduced service levels caused by single points of failure.

2.5.2 Enforce standardization

Standardization of environments can become a serious issue as a business' Domino environment grows over time. This is especially true with highly distributed organizations, or those that have grown through acquisition and have integrated what were once external data centers. Key problems related to a lack of standardization can include:

- ▶ Need to support multivendor hardware
- ▶ Administrator skills needed in multiple operating systems
- ▶ Issues related to third-party product compatibility with different Domino versions

By standardizing on a common platform during the consolidation effort, IT can improve the overall serviceability of the environment:

- ▶ Infrastructure standards simplify later upgrades to hardware, operating systems, and Domino.
- ▶ Consistent systems simplify problem determination and resolution processes.
- ▶ Analysis of performance data across platforms become more consistent, allowing for comparative analysis of workload across Domino systems.

2.5.3 Simplifying administration

Organizations with multiple domains and different certificate structures are unable to fully leverage the administrative benefits of Domino across their enterprise for the following reasons:

- ▶ Since different Domino domains require separate Public Address Books, which become the focal point for administration, multiple domains increase the number of touch points for administrators to manage users, server, connections, security, and so on.
- ▶ Domino's policy based administration is easiest to manage if based on the organizational components of a user or server ID.

Consolidating Domino domains and recertifying users and servers to use a common organizational root can greatly reduce the administrator's workload.

2.5.4 Improving performance

Organizations with a large number of smaller servers, and those with widely distributed systems, can have difficulty providing a consistent level of server to users. Also, the greater the number and diversity of server platforms in use becomes, the more difficulty administrators have determining the root cause of performance problems.

While consolidation by itself does not necessarily provide performance improvements, a properly consolidated system can allow for:

- ▶ More effective workload balancing
- ▶ Simplified system-wide bottleneck analysis and tuning
- ▶ Better fault tolerance, reducing mean time between failures

- ▶ On demand redistribution of infrastructure resources (such as processor and memory) on enterprise servers

2.5.5 Simplifying system management

Managing a large, diverse, or distributed infrastructure that supports a business' Domino environment can be an extremely daunting task. System administrators in such environments have difficulty:

- ▶ Ensuring the integrity of backups on a system-wide basis
- ▶ Managing the distribution and application of hardware and software updates
- ▶ Managing system availability in remote sites with shared, part-time on-site administrators
- ▶ Ensuring all central and remote administration resources share the same base Domino administration skill set

Physical consolidation can help simplify management of a business' Domino environment by:

- ▶ Centralizing backup and recovery operations
- ▶ Reducing the time and effort associated with implementing system updates
- ▶ Reducing the logistical planning and effort required to train remote administrators

2.6 Measuring success

Finally, while we have thoroughly reasoned out the potential benefits for consolidation, the issue still remains about how to measure success in a server consolidation effort. Success will be defined differently for each organization, but it is essential to first establish a proper baseline, prior to implementing changes associated with the server consolidation. Keep in mind, you will be measuring against baselines in the following areas:

- ▶ 2.4.1, "Return on Investment and Total Cost of Ownership" on page 18
- ▶ 2.4.2, "Quality of Service and Service Level Agreement" on page 19
- ▶ 2.5.1, "Reducing complexity" on page 23
- ▶ 2.5.2, "Enforce standardization" on page 24
- ▶ 2.5.3, "Simplifying administration" on page 24
- ▶ 2.5.4, "Improving performance" on page 24
- ▶ 2.5.5, "Simplifying system management" on page 25

2.6.1 Define pre-consolidation baselines

In order to understand the impact of change, and to measure its impact toward a more efficient, easily managed infrastructure, we must work from an established baseline of data and statistics.

The importance of historical data

Domino administrators understand the value of gathering statistics regularly to monitor their systems' activity and platform usage. The analysis of server logs and events can be particularly useful for identifying and resolving issues that might occur on a daily basis. However, in the long run, it is the collection, retention, and analysis of Domino historical statistics gathered by the Statistics Collector task that gives Domino administrators the ability to identify trends in the behavior and usage of servers in their domain.

While statistical data is necessary for daily troubleshooting and bottleneck analysis, maintaining a collection of long-term statistical data is also critical to validating decisions related to performance management, system-wide load balancing, and capacity planning.

Maintaining a collection of historical data can help administrators directly address comparative analysis questions, such as:

- ▶ What are the performance characteristics of our system under user normals load as opposed to heavy load days?
- ▶ How have the operational characteristics of our system changed over time?
- ▶ What has been the impact of user and application growth on our Domino environment?
- ▶ What is the potential impact of adding additional users or applications, assuming a similar usage profile?
- ▶ Do we have the excess capacity on any given servers to better balance mail users or collaborative applications?
- ▶ How fast are my servers consuming system resources, such as memory or disk storage, and when might we need to consider upgrades?
- ▶ What impact have we seen as the result of recent system tuning or upgrades?

By effectively leveraging historical statistical data, administrators can better project when and where performance problems might occur, and provide quantitative justification for the execution of proactive plans to address potential issues before they become problems visible to users and management.

Limits of historical data

Capturing and analyzing long-term statistics can be very beneficial when performing performance analysis, capacity planning, and system re-architecture. However, there are limits to the viability of historical data.

It is important to remember that any given set of statistics have to be taken within the context of the specific system load and configuration that existed at the time that those statistics were gathered. Thus, it is critical to maintain a separate, detailed chronology of major system changes to be used by the Domino administrator as a part of their overall analysis of the statistics.

Important: Avoid making assumptions when analyzing historical statistics. Make sure you know what system changes occurred, and when they occurred, so you can *properly* interpret the statistic.

Creating baselines for infrastructure analysis and performance tuning

From the point of view of infrastructure analysis and performance analysis, historical statistics are valuable as baseline information, both for making tuning decisions, and for analyzing the results of changes in the infrastructure or tuning events. Having a set of baseline historical data provides a Domino administrator with:

- ▶ A complete view of the infrastructure's performance
- ▶ The means to compare the benefits of potential tuning with its implementation costs
- ▶ A set of quantitative data points against which the results of the tuning event can be measured
- ▶ A sampling that can be used as the basis for long term trend analysis

Baselines performance data is not a simple snapshot of a system before a tuning event takes place. It should:

- ▶ Be representative of normal system loads
- ▶ Be a sampling for a set period of time (at least one week, preferably more)
- ▶ Not include data from periods with unusual events (system failures, high usage volumes, and so on)
- ▶ Include descriptions of what components or services were running on individual servers

Baseline data is a specific subset of the full collection of historical statistical data, and should be saved separately from the full collection. This baseline data can be saved as:

- ▶ An archived subset of data in Notes database
- ▶ A spreadsheet export from a period of the historical data

A new set of baseline statistics should be saved after the infrastructure has stabilized upon the completion of every major tuning change or system upgrade.

Note: For additional information about establishing baselines and managing historical data, please refer to the Redpaper *Domino 7 Performance Tuning*, REDP-4182 at:
<http://www.redbooks.ibm.com/redpieces/abstracts/redp4182.html>

2.6.2 Map service targets against actuals

Given that one of the key goals of server consolidation is to improve service targets, it is critical to have agreements in place that identify the current Service Level Agreements (SLAs), as well as the targeted SLAs going forward. The SLA defines an agreement between the administrators of a system and the consumers of that system's services. Please refer to 2.4.2, "Quality of Service and Service Level Agreement" on page 19 to review what is covered in an SLA and Quality of Service Agreement.

As the server consolidation is implemented, review actual statistics and metrics regularly to monitor any changes and to track progress toward the against improved targets.

2.6.3 Perform user satisfaction surveys

Finally, solicit user feedback with structured user satisfaction surveys to monitor user perception and, if necessary, address any unexpected side effects of the server consolidation effort.



Approaches to consolidation

This chapter focuses on finding the right approach for Domino infrastructure consolidation as well as covering important dependencies to consider when starting consolidation planning.

Within the following pages, we begin by describing a generic Lotus Domino architecture topology, concentrating on both the fundamental infrastructural building blocks, as well as non-technical factors influencing this infrastructure.

Based on this model, we will cover four different approaches and techniques for consolidation and outline technical and organizational issues and impacts to consider. By transforming the most applicable techniques and models to *your* current Lotus Domino infrastructure, this will help you define the right focus and scope for your individual consolidation purposes, knowing the most important things to consider.

This chapter covers the following topics, all aimed at helping you identify the most applicable consolidation approach to your organization's specific needs:

- ▶ We begin by presenting a generic Lotus Domino architecture topology to use as a basis to step into different consolidation techniques.
- ▶ Building upon a generic foundation, we highlight different approaches for Domino server consolidation.
- ▶ Finally, we provide specific tips and techniques for Domino domain consolidation.

Ultimately, the goal is to enable you to tailor each consolidation approach to best meet your organizations' needs, without losing focus on business and delivery related influences and dependencies.

3.1 Domino architecture topologies

As already mentioned in the introduction of this Redpaper, your current Lotus Domino infrastructure most likely performs vital business functionality, both in terms of hosting technical implementations, as well as providing services based upon your business requirements. It also most likely represents a topology that has grown and expanded over time, and through various new business demands.

Figure 3-1 shows a basic framework of such an infrastructure. We will use this framework to step into different consolidation approaches.

Important: This diagram (Figure 3-1) is fundamental to the discussion in this chapter. Specific consolidation approaches relate back to this, so it is worth understanding it. Throughout the chapter, we refer to specific blocks contained in this diagram as “building blocks”.

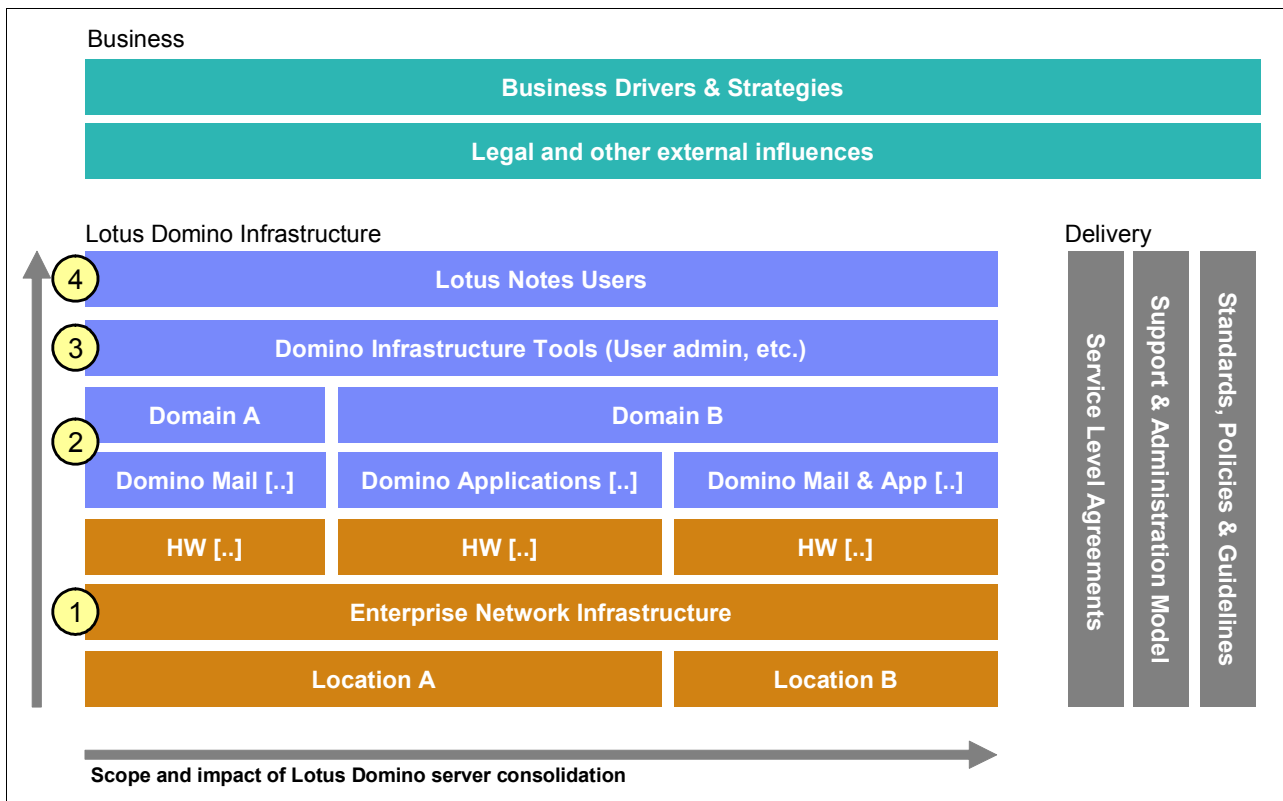


Figure 3-1 Generic Lotus Domino architecture and component model as framework for consolidation approaches

- ▶ First (reading from bottom to top), it shows your infrastructure based upon a foundation of one or more locations (data centers) having an enterprise data network and hosting a number of servers with various operating systems (represented by Marker # 1).
- ▶ Your Domino infrastructure rests on this foundation providing e-mail, workflow, or other Domino related services on the application level, some as dedicated servers for e-mail or applications, some as mixed ones. These Domino servers are interacting within one or more Domino Domains, partly overlapping different sites, organizational units, or even across countries (represented by Marker # 2).

- ▶ There are different tools required to manage this environment, for example, user administration, backup and recovery, or virus scanning (represented by Marker # 3).
- ▶ Finally, the top layer of the Domino Infrastructure represents users accessing this infrastructure via Lotus Notes client or an Internet browser (represented by Marker # 4).

The technical Lotus Domino Infrastructure is also influenced by non-technical items divided into business related drivers and influencing factors (see Figure 3-2). These include:

- ▶ Company’s business drivers and strategies, as well as special requirements to the messaging and collaboration infrastructure, like performance and availability
- ▶ Legal aspects or other external influences

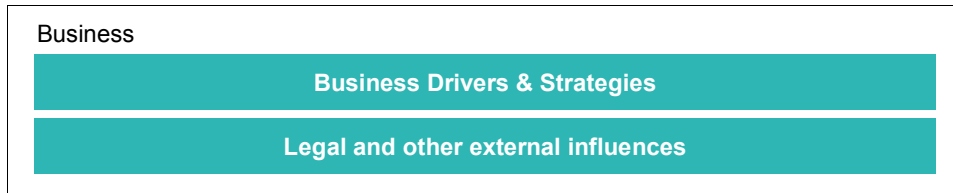


Figure 3-2 Business related building blocks

Finally, delivery related areas also having an influence (see Figure 3-3) include:

- ▶ Enterprise or department specific standards, policies, and guidelines, such as security, compliance and *Business Contingency Planning (BCP)*
- ▶ Support and administration models
- ▶ *Service level agreements (SLA)* to be fulfilled

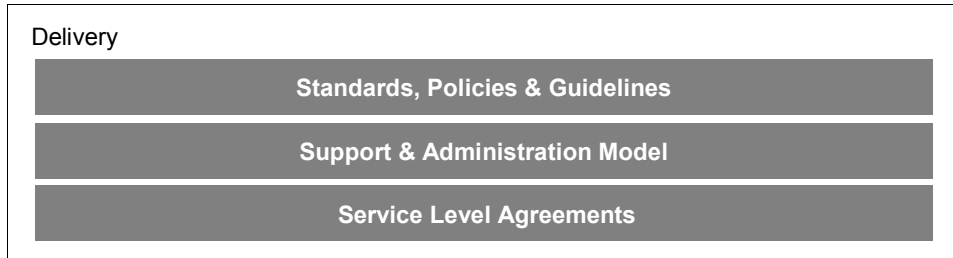


Figure 3-3 Delivery related building blocks

Important: When speaking of consolidation, these non-technical items must be considered in your planning, design, and project execution phases. They will have a direct impact in the feasibility and success of any consolidation activity.

All those building blocks, technical and non-technical, may be in or out of scope of your consolidation project. But even if they are out of scope, they may have an impact on your consolidation project.

While your current infrastructure may look more or less complex, we can use this conceptual illustration (Figure 3-1 on page 30) particularly the building blocks shown in the diagram - to focus on different types and techniques of server and domain consolidation.

In the next sections, we will outline different approaches, things to cover, and limitations to incorporate in your planning. As stated at the beginning of this Redpaper, server and domain consolidation does not only mean to put more users on one machine to reduce redundancies. It is also an overall process to centralize services across locations, geographic borders, or

domains. Regardless of the scope, all consolidation approaches will have an impact on your Lotus Domino architecture.

Key point: Server and domain consolidation means more than simply putting more users on one machine to reduce redundancies. Server and Domain consolidation is also an overall process to centralize services across locations, geographic borders, or domains.

3.1.1 Consolidation models presented in this chapter

Building from the basic conceptual Domino infrastructure highlighted in Figure 3-1 on page 30, this chapter describes both Server Consolidation approaches and Domain Consolidation approaches. The approach is not to cover each permutation exhaustively, but to outline four basic approaches and bring out the key issues. From this, readers and administrators can map these approaches to their infrastructure and extrapolate the proper approach.

Server Consolidation approaches include:

- ▶ “Approach 1 - Consolidating servers within one location” on page 32
- ▶ “Approach 2 - Consolidating servers across two or more locations” on page 39

Domain Consolidation approaches include:

- ▶ “Approach 3 - Domain consolidation by consolidating servers across domains” on page 44
- ▶ “Approach 4 - Consolidating Domino domains by moving whole servers” on page 49

3.2 Server consolidation models and techniques

By using the following models, we will make examples of the different server consolidation techniques. For those building blocks that are relevant in these models, we will outline important steps to perform or issues to consider.

The approaches to consolidation are divided into two key approaches:

- ▶ Consolidating servers within one location
- ▶ Consolidating servers across two or more locations

Consolidation approaches having an impact on more than one domain are covered in 3.3, “Domino domain consolidation models and techniques” on page 43.

Depending on your consolidation targets, you may merge the different approaches and techniques according to your requirements.

3.2.1 Approach 1 - Consolidating servers within one location

Based on the background covered in Chapter 2, “Reasons for consolidation” on page 7, you may have identified several potential opportunities to consolidate your Lotus Domino servers within one Domino domain and locate these servers in the same location.

Attention: The definition for consolidating servers within one location is as follows:

Reducing the number of server instances that exist within a single Domino Domain, assuming all servers are already within a single location (site).

This particular technique touches only a couple of our building blocks (see 3.1, “Domino architecture topologies” on page 30). Nevertheless, there are a side effects to consider.

We will outline these with the help of the architectural model shown in Figure 3-4.

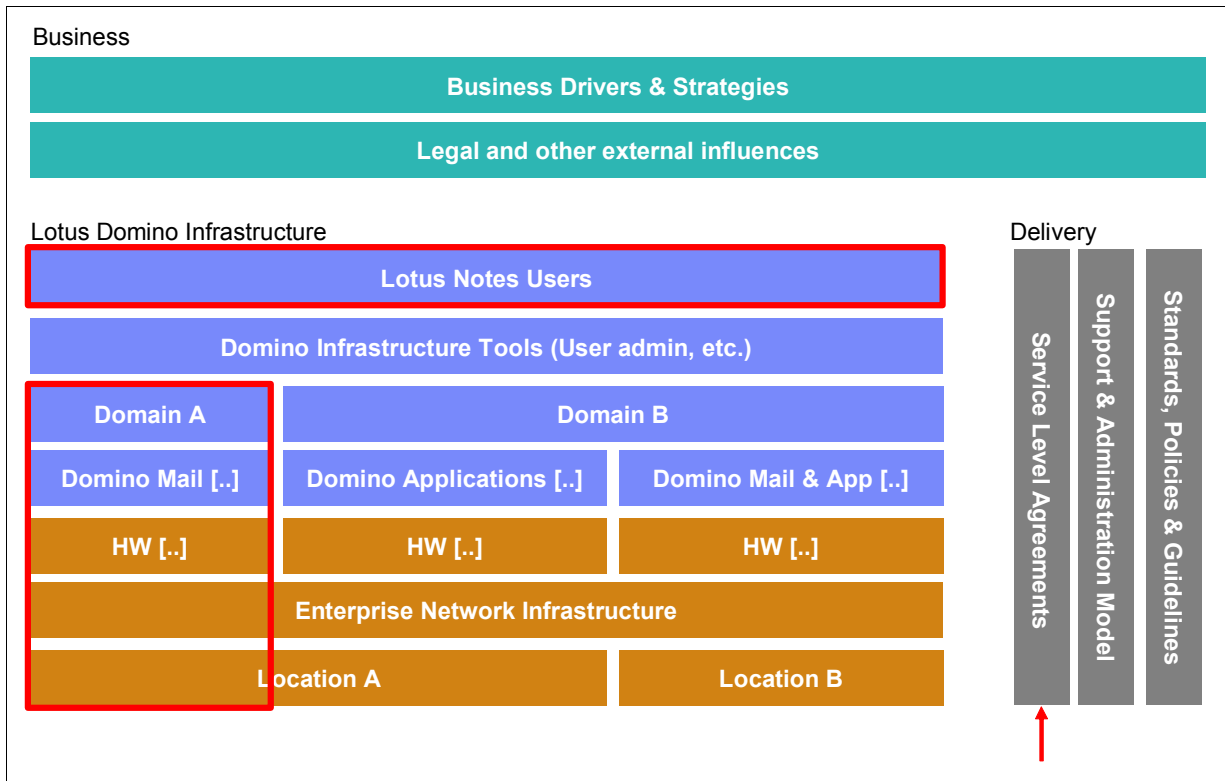


Figure 3-4 Scope of server consolidation within one location and one Lotus Domino domain

Impacts on hosting site and asset management

Based on the fact that we focus on machines hosted in the same location, there are only minor impacts on your site related to asset management when consolidating several servers on new hardware. Required footprints, network, and other resources have to be available during consolidation phases. Once the original machines are decommissioned, there might be more resources available.

Impacts on enterprise network infrastructure

Your server consolidation may require changes in special network segments when concentrating the network load on fewer machines.

You can find recommendations to tune your Lotus Domino network performance in the IBM Redpaper *Domino 7 Performance Tuning - Best Practices*, REDP-4182.

Impacts on system hardware and Lotus Domino servers

In general, there are two appropriate ways to consolidate Domino Servers, regardless if they are clustered or not:

1. Lotus Domino Server consolidation by moving data (user mail files and application databases) from multiple machines to other existing machines because of released system resources, for example, after upgrading to Lotus Domino R7 (see Figure 3-5).

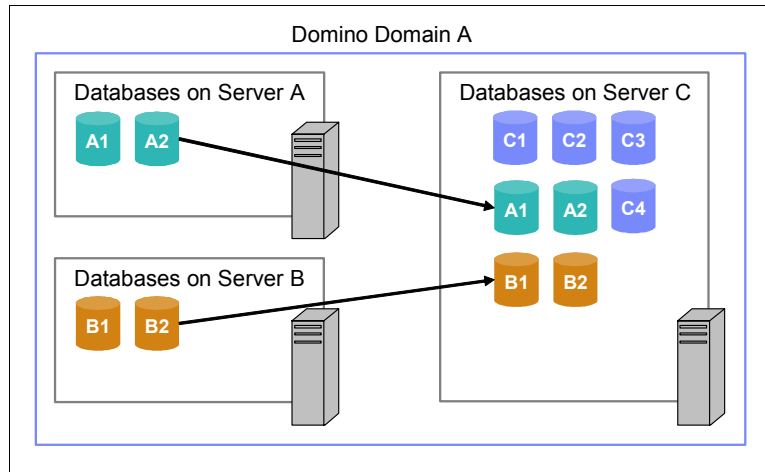


Figure 3-5 Consolidating servers to one existing machine

2. Lotus Domino Server consolidation by moving data from multiple machines to one, newly built, big sized machine (see Figure 3-6).

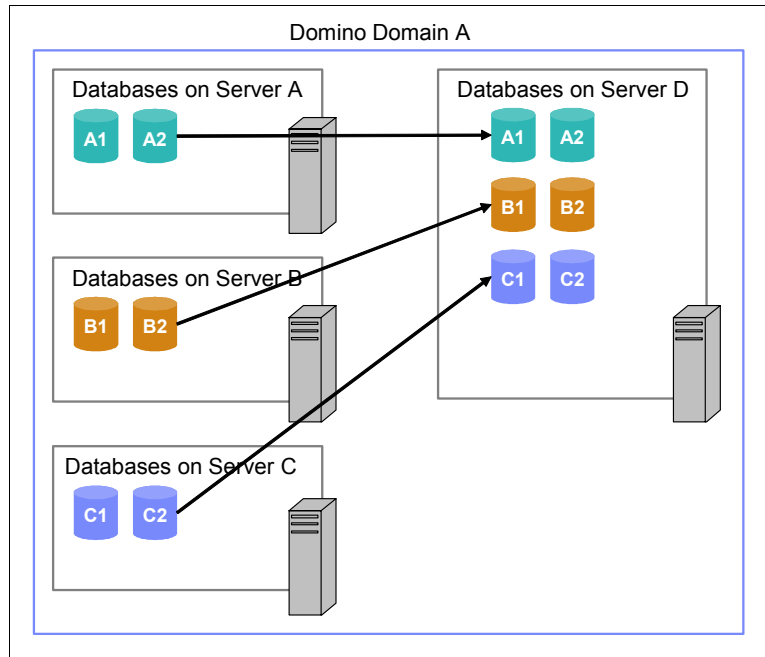


Figure 3-6 Consolidating servers to one new machine

Each consolidation technique has its pros and cons and depends on your explicit requirements, preconditions, and best-suited environment. We will outline advantages and limitations to take into account for each technique.

Server consolidation by moving data to already existing machines

When moving Domino applications or user mail files from one or several machines to one already existing machine within your domain, you have to note the following considerations:

- ▶ Is the target machine able to cover the additional load and already has the appropriate sizing in the areas of:
 - Network traffic
 - CPU and Memory load
 - Storage
 - Backup facilities
- ▶ Are the machine's maintenance time slots long enough to perform all the required tasks, such as backup, compact, or fixup, even after putting additional load on them?
- ▶ If a huge amount of data is being moved onto existing machines, verify that the Domino backup solution will still cope with the load.
- ▶ The Domino transaction logging solution and the effects of additional server load on the logging and the backups of the logs.
- ▶ If you perform cross operating system platform migration of Domino data, are there any application specific requirements to take into account, for example:
 - Operating system related program libraries
 - Hardcoded server names, links, directory paths, and so on
- ▶ How to include the target machine into a special monitoring during migration to react quickly on sizing or other issues.

The consolidation of servers to already available machines suggests a couple of advantages:

- ▶ No additional cost for new machines, even not during the consolidation phase.
- ▶ Consolidation activities take place on already running machines; therefore, there is no additional hardware to build, configure, and operate during the migration phase.
- ▶ No additional Domino server installation, configuration, and maintenance is required.

Server consolidation by moving data to a newly built machine

Consolidating your servers to one newly built machine adds a lot of flexibility to your consolidation approach. But there are also a lot of things to cover when choosing this approach:

- ▶ Do you have enough resources to cover this additional machine, for example:
 - Data center footprint (physical space requirements/accommodations)
 - Administration staff
 - Network, storage (for example, SAN, if applied), and backup availability
- ▶ Include shipping and installation lead time for new hardware in your schedule
- ▶ Sizing your new system according to your requirements
- ▶ Choosing the right operating system platform for the new machine by considering:
 - Available skills for administration and maintenance
 - Lotus Domino R7 operating system requirements
 - Domino applications and system tools platform requirements

Advantages when migrating to a new machine:

- ▶ More flexibility on system and platform scaling
- ▶ More consolidation capacity due to scaling flexibility
- ▶ Better performance improvements due to new hardware with newer technology
- ▶ Less dependencies on other productive systems during the project's lifetime

You may find the Lotus Domino hardware requirements specifications in the Domino 7 release notes at:

[http://www.lotus.com/1dd/doc/uafiles.nsf/docs/relnote70/\\$File/readme.pdf](http://www.lotus.com/1dd/doc/uafiles.nsf/docs/relnote70/$File/readme.pdf)

and information about Lotus Domino 7 performance on different platforms in this developerWorks® article:

<http://www.ibm.com/developerworks/lotus/library/domino7-enterprise-performance>

User impact during server consolidation

Moving user mail files, applications, or other databases between servers will certainly impact your Lotus Notes users. To keep this impact to a minimum, you should consider the following aspects:

- ▶ For user mail-file database moves

There is an available administration process called *Move mail file* for moving mail files between servers within one Domino domain. Details of this process can be found in your Lotus Domino Administrator 7 Help.

You may find also instructions about moving mail file archives, mail files for roaming users, or for shared mail installations in your Lotus Domino Administrator 7 Help.

If you prefer to move mail files manually, please consider the following:

- Unless recommended otherwise, encrypted mail files (server replicas) need to be unencrypted. As an administrator, by default you cannot compare the document count between the source and target server and you also cannot change the ACL (unless you can do this via Full Administration rights, but even then, this is dependant on the level of encryption on the mail file).
- Validate the connection documents and ACL adjustments (access for new server, change of administration server, and so on) when creating replicas on the target server.
- Verify that the mail files do not have replication disabled.
- Check the selective replication settings on the source mail files as there are:
 - Partial document replication (change to full documents).
 - *Deletions* replication should be enabled to assure a match between source and target mail files.
- Check if quotas are enabled on the mail file and its status. Being over quota may badly affect successful replication in clustered (target) environments and can also affect standard one to one replication. *Disable* quotas during migration and re-enable them after a successful migration.
- Verify if mail files have mail forwarding enabled. It may be that certain mail files do not need to be migrated. If mail forwarding is required, it may affect the sequence of migrations. You will not impact the same user more than once if the migration of the forwarding mail file and the mail file forwarded to will be migrated at the same time.
- Ensure that scheduled replication is working between the source and target servers.

- Change the user's personal record in Server Names & Address Book to point to the new mail server to enable mail routing via the target machine.
 - Change the user's Lotus Notes client location settings to new mail server and ensure that user has access to the new server. Remember that there may be more than one location document pointing to the original server.
 - Change the user replication settings to replicate local replicas with the target server (if you are using a local replica).
 - Remove the source server icon on the user's workspace (if you are not using a local replica).
 - Add a target server icon on the user's workspace (if you are not using a local replica).
 - If the user has an Out of Office agent, or other agents running, check whether you should keep the original replica until the user is back or resign the agent with a generic ID on the target server.
 - Create any cluster replicas on cluster servers (and enable them in the clusync.nsf database).
 - Set Quotas on the target server to match the source server (after migration is complete).
 - Exchange Unread Marks so that the source and target servers are identical.
- For Domino applications and other databases

There are also instructions included in your Lotus Domino Administrator 7 Help that support moves of application databases. You may find different approaches using the administration process or by using the description of manual steps under the keyword *Moving Databases*.

If you prefer to move databases manually, please consider the following:

- Check whether the number of replicas can be reduced during consolidation.
- Ensure connection documents and ACL adjustments (access for new server, change of administration server, and so on) when creating replicas on the target server. Check whether replicas of databases already exist.
- Check the agents that are required to run within each application and validate their signatures and settings, for example:
 - To reassign agents on the target server with the appropriate ID
 - For applications originally deployed in previous versions of Domino, the default agent settings would have been different.
 - Agents may have been assigned to run on a specific server instead of any server or agents may have been set to run on a specific server to prevent it from running on multiple servers and therefore creating replication/save conflicts.
- Disable replication and replace the source replica with a database (using the same path and file name) linked to the target server replica, including a script to update the user's bookmarks.
- If an application uses Readers/Authors fields and users have local replicas, the migration process will not match documents between the source and target servers (until all users have replicated with the target server). This means that you will have to communicate with the users on how to do this task.
- Due to Readers fields, it may be that the target server cannot see all the documents.
- Update any mail-in documents to point to target server.

- Create any cluster replicas on cluster servers (and enable them in the clusync.nsf database).
- Check that the ACL groups are available in the target domain (if the move is cross-domain, see 3.3.1, “Approach 3 - Domain consolidation by consolidating servers across domains” on page 44).
- Change the user replication settings to replicate local replicas with the target server.
- Check for any profile documents or lookup documents in the database to be updated after migration.
- Check whether any third-party software changes need to be implemented at same time as migration, for example, LEI, DB2®, ConnectDirect, and so on.
- Verify if the database developers need any migration agents run at migration time
- Exchange Unread Marks to verify that source and target servers are identical.
- Assess any Full Text Indexes on the source server to create them on the target server after migration.
- Set Quotas on the target server to match the source server.
- Ensure that workspace/bookmarks are updated correctly to point to the target server to prevent users losing access to databases.
- Consider updating catalog.nsf after the migrations to automatically point users to the new database location without needing to use workspace/bookmark updates.
- Ensure that your Change Management system includes making your Help Desk aware of the source and target locations of all databases and when they are migrated.
- Investigate whether applications can be migrated during the day / evening / weekend. Centralizing into a few sites may mean you are also centralizing across time zones.
- Update the Rooms and Resource databases, if appropriate.

More details for consolidating applications are available in Chapter 5, “Project planning overview for performing server consolidation” on page 101.

Impacts on delivery building blocks

The act of consolidating your servers means that you will need to *perform changes in your production environment*. Accordingly, any unforeseen event or problem may directly impact your ability to conduct business. To mitigate any business impacts, proper change management is mandatory.

Change management activities include:

- ▶ Change scheduling aligned to business hours and availability needs
- ▶ Risk management and risk mitigation
- ▶ Approval processes
- ▶ Documentation of changes
- ▶ Change review and verification

Important: Minimizing your number of servers by consolidation and increasing the number of users or applications hosted on one machine automatically increases the business impact during any downtime of this machine during future operations.

Therefore, it is important to include the following activities in your consolidation project schedule to prepare any infrastructure and processes around these topics:

- ▶ Business Contingency Planning (BCP)
- ▶ Service Level Agreements (SLA) considerations
- ▶ Backup and Recovery planning
- ▶ Domino clustering

We will cover these aspects in Chapter 5, “Project planning overview for performing server consolidation” on page 101.

3.2.2 Approach 2 - Consolidating servers across two or more locations

In addition to any geographically centralization of machines by only moving hardware between data centers without impacting the Domino infrastructure, there are techniques to consolidate Lotus Domino servers across locations.

Attention: The definition for consolidating servers across two or more location is as follows:

Reducing the number of physical servers or server instances that exist within a single Domino Domain, which are placed across multiple locations.

Note: This section covers items to take into consideration for cross location server consolidation. The items discussed in 3.2.1, “Approach 1 - Consolidating servers within one location” on page 32 must also be observed.

Figure 3-7 shows the scope of server consolidation across two or more locations.

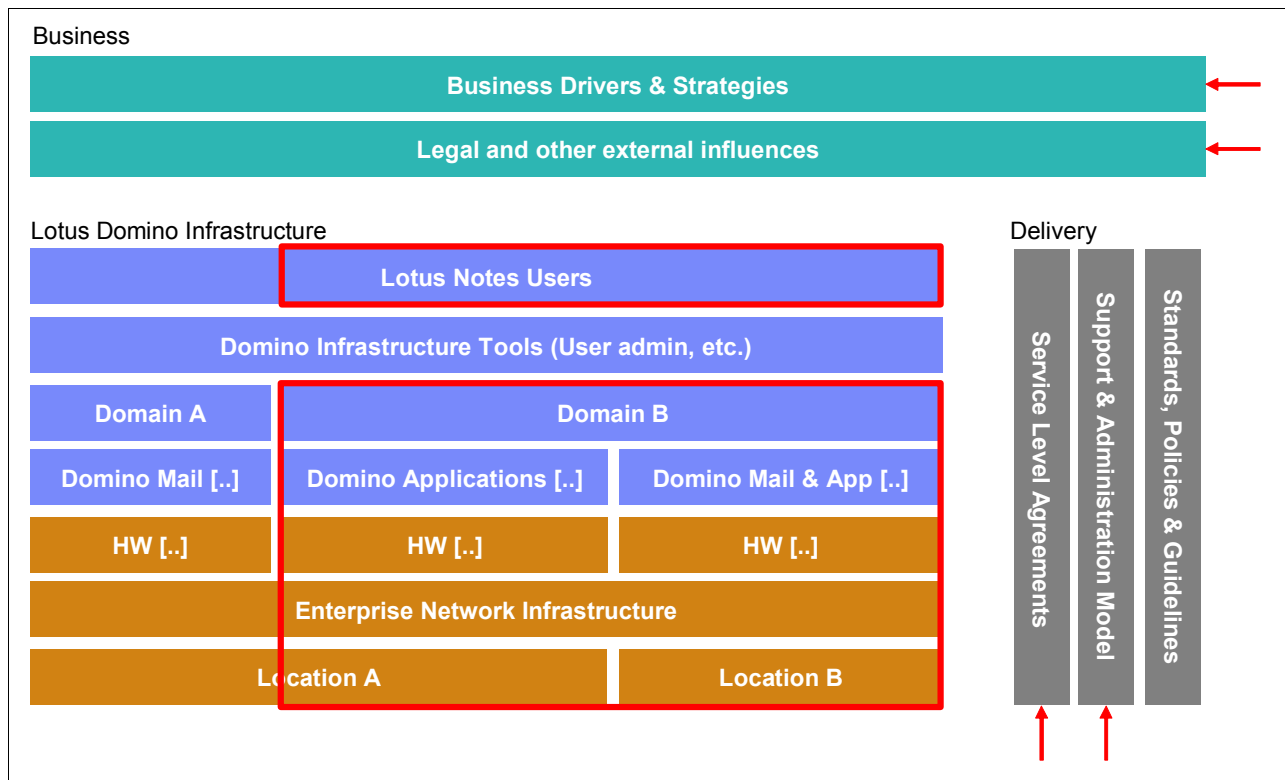


Figure 3-7 Scope of server consolidation across two or more locations

Impacts on hosting site and asset management

Consolidating Lotus Domino servers across locations impacts, of course, the hosting sites affected by this approach. If the consolidation is aligned with adding additional resources at the target site, the required footprints and data center related resources have to be available.

The factors for this approach include not only the reduction of Domino instances (easier administration) and standardization of your infrastructure, but also the desire to minimize your TCO on the following items:

- ▶ Real estate operations
- ▶ *Full-time-equivalent (FTE)* costs
 - Facility management
 - Security personnel
 - Data center maintenance
 - Server operating
 - Domino operating
- ▶ IT Infrastructure costs
 - Network infrastructure and back end
 - Backup and storage systems
 - *Uninterruptable power supply (UPS)* facilities
 - Cooling systems

Note: In the case of following larger site consolidation approaches, these activities should be tracked in a separate project.

Impacts on enterprise network infrastructure

Any Lotus Domino server consolidation is heavily dependent on your enterprise network's capacities. By moving Domino databases like mail files or applications away from the user, your *Wide Area Network (WAN)* must handle this additional load as well as your network architecture to provide the required availability and stability.

By using Domino related functionalities and strategies, you may support your network infrastructure to handle these consolidation impacts. Possible options are:

- ▶ Domino network compression.

Valuable if no other network compression is in place, for example, on Microsoft's Remote Access Service (RAS) on WANs, which includes built-in compression. If point to point communications in the WAN is Domino to Domino traffic only (NRPC), then Domino compression should be used, as it is more effective than standard network compression.

Information how to enable Lotus Domino Network compression can be found in the Lotus Domino Administrator 7 Help.

- ▶ Enforcing users to work in replication mode, using local mail files on their client machines.

By providing local replicas of mail files and selective applications on users' client machines, this helps to significantly reduce bandwidth load instead of working directly on the server.

- ▶ Consider the usage of a hub or hubs to handle the mail routing and replication between sites.

To limit the impact on the network, in a multi site setup, the usage of a hub to handle the mail routing and replication between sites is recommended. In this way, you can control how much load you are adding to the network (as opposed to a mesh topology, where every server can add load to the network when routing mail or replicating).

However, today's global network capacities and availability of broadband services offers new opportunities for server consolidation, which are mostly less expensive than operating multiple delivery sites.

Impacts on system hardware and domino servers

From a server perspective, there are mostly the same aspects to consider as in 3.2.1, "Approach 1 - Consolidating servers within one location" on page 32 regarding impacts on system hardware and Domino servers.

Again, you may consolidate by moving databases to an already existing machine in your target location or consolidating on a newly built server (see Figure 3-8).

When consolidating your mail files, application databases, and so on, you must ensure that users are still able to access them after migration, especially when the target servers are in a new location.

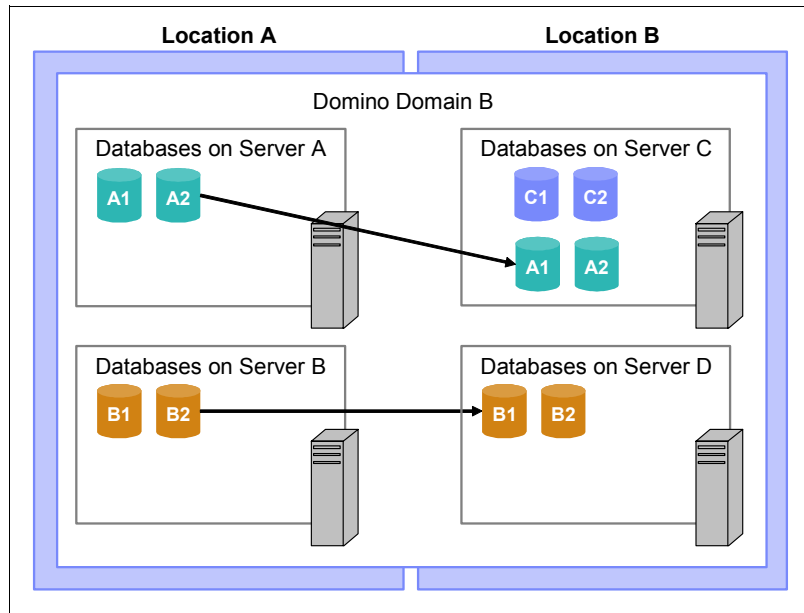


Figure 3-8 Server consolidation methods across two or more locations

User impact during server consolidation

In addition to the recommendations regarding user impact in 3.2.1, “Approach 1 - Consolidating servers within one location” on page 32, your users may have some concerns about performance losses and connectivity issues after a location change.

Depending on your network infrastructure, running connectivity tests with the users may help determine whether additional network routes, Lotus Notes connection documents, or similar items are required.

Impacts on delivery building blocks

Because there are impacts to your delivery site when consolidating servers across two or more locations, there is a potential impact to your delivery organization regarding support and the administration model, as well as the service levels you are required to meet.

If you are centralizing your support and administration, you also need to consider the effect of time zones on the SLA and core support hours. If you are supporting servers and users across multiple time zones, the SLA may force the centralized support teams to work different hours than what they were normally do.

By having several Domino administration teams throughout the locations, the server consolidation will create redundancies that have to be managed. On the other hand, your target location administration staff may have additional workload come out of the consolidation.

The effects on your administration model are covered in Chapter 4, “Administration models” on page 53.

Your service level agreements must be adapted and revised due to new prerequisites and higher dependencies on fewer machines.

Impacts on business related entities

Before consolidating a server across locations, some business related issues must be covered.

- ▶ Are there any business drivers and strategies that require local availability of Domino servers because of:
 - Special availability requirements that may be affected
 - Business critical information that require dedicated hosting
 - Needs of local support and administration (see Chapter 4, “Administration models” on page 53)
- ▶ Are there any legal guidelines or licensing requirements and orders that force local hosting or administration of data and services, such as:
 - Particular export regulations (for example, in US export regulations)
 - Particular financial laws (for example, in Japan, Switzerland, or Luxembourg)
 - Specific security regulations (like the Italian data security act that forces all people that have access to Italian data, wherever it is stored, to change their passwords every 90 days)

3.3 Domino domain consolidation models and techniques

Domino domain consolidation not only offers you TCO reduction by minimizing the number of servers to operate, it also minimizes the administration effort that is required to maintain a complete Domino domain.

There are two key approaches to consolidate Domino domains:

- ▶ Domain consolidation by consolidating servers across domains
- ▶ Consolidating Domino domains by moving whole servers

Depending on your consolidation targets, you may again merge the different approaches and techniques according to your requirements.

Consolidating Lotus Domino domains requires a detailed planning and design phase. These methods seem to be the most complex, but give the most consolidation and technical benefits.

If we take a look at our architecture and component model (Figure 3-9), we will recognize that all building blocks are affected by these consolidation approaches. By consolidating Domino domains, your complete e-mail and collaboration infrastructure and delivery will be affected. The next sections will figure out what kind of effect this may be.

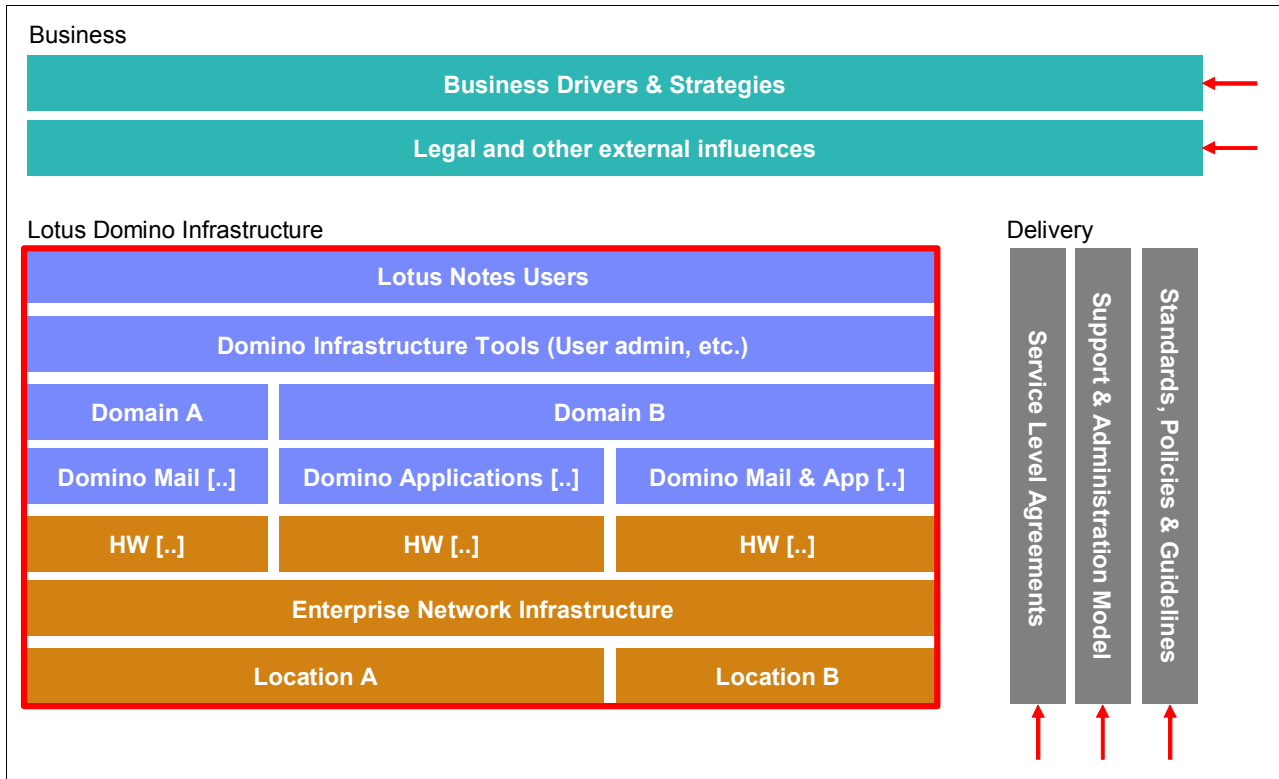


Figure 3-9 Consolidating servers across two or more Domino domains

3.3.1 Approach 3 - Domain consolidation by consolidating servers across domains

Attention: The definition for consolidating Domino domains by consolidating servers across domains is as follows:

Reducing the number of physical servers or server instances that exist in multiple Domino domains by reducing the number of Domino domains at the same time.

As in 3.2.1, “Approach 1 - Consolidating servers within one location” on page 32, there are two ways to consolidate servers and domains at the same time.

1. You can do Lotus Domino server and domain consolidation by moving data (users, mail files, and application databases) from multiple machines to other existing machines located in other, already existing Domino domains (see Figure 3-10 on page 45).
2. You can do Lotus Domino server and domain consolidation by moving data from multiple machines to fewer, newly installed machines within a newly created consolidation domain (see Figure 3-11 on page 45).

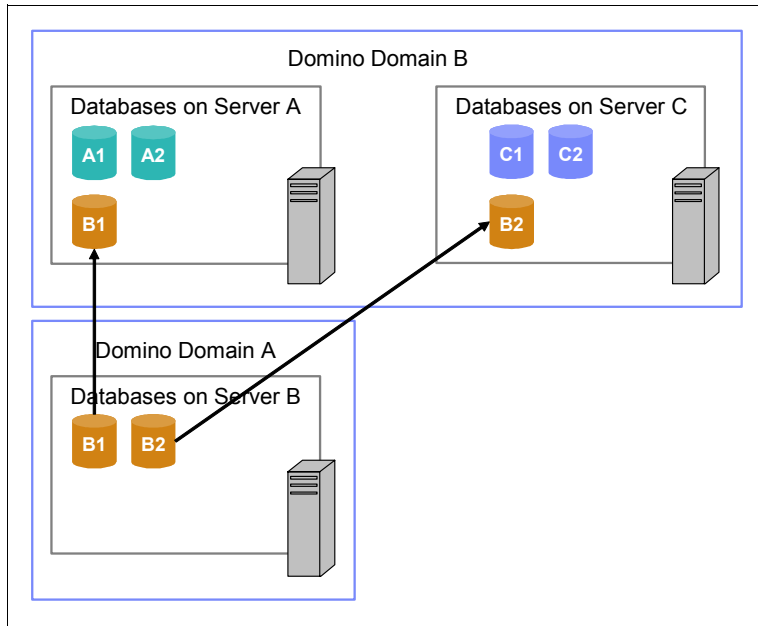


Figure 3-10 Server and domain consolidation by moving data to existing domains and servers

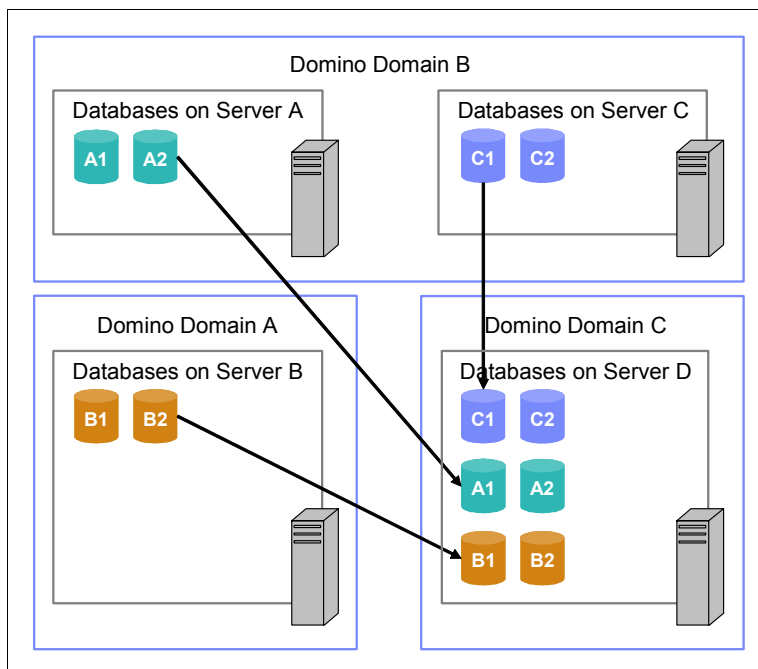


Figure 3-11 Server and domain consolidation by moving data into a new domain with new servers

Impacts on hosting site, asset management, and enterprise network infrastructure

The impacts on hosting sites, asset management, and network infrastructure caused by consolidating servers across domains depends mostly on if you consolidate across locations. In the case where you are building a new domain with new servers, you have to add additional resources into your delivery site.

See 3.2, “Server consolidation models and techniques” on page 32 for more information.

Impacts on system hardware and Domino servers

Beside checking available resources on your target machines when moving data to already existing machines across domains or sizing new hardware to be built in a new domain, there are a couple of things to consider.

Due to a cross domain move of your mail users, applications, and other databases, you must ensure that any accessibility, serviceability, and manageability is still possible. For example:

- ▶ Domino directory related
 - Server access due to different certification hierarchies in target domain
 - Tighter security restrictions, like public key checking or other policies
 - Missing cross-certifications and certifier documents
 - Mail routing issues due to changing domain names
 - Access and mail groups requirements for mail, administration, and application access
 - Required connection documents and replication schedule
 - Domain documents
 - Directory assistance and external address books
 - Cluster settings
 - Client related additional fields in Domino directory
- ▶ Domino directory synchronization

Extended directory catalogs and directory catalogs can be negatively affected during migration and transformation activities. This in turn may have a performance impact on the production services, as re-indexing of large directories is very CPU intensive. Careful planning is required to avoid duplication during transition activities.
- ▶ User administration
 - Creation, change, and deletion processes of person records and ID files
 - Processes and tools for user mail file and application database handling
- ▶ User mail service requirements
 - Emergency/user help desk access control
 - Template handling
 - Signing policies
 - Quota standards
 - Out of Office continuation
 - Web mail, DWA, and so on
 - Mobile devices access and replication
 - Delegation access during and after migration into a new domain
 - Rooms and resources migration
 - Server to server access during a migration period to ensure cross-domain free time lookup
- ▶ Application requirements
 - Backup
 - Agent runtimes
 - Web access and DNA aliases

- Load balancing
- Hardcoded values, server and domain names, and specific platform requirements

Impacts on Domino domain model

When starting domain consolidation projects, you should be aware of your currently maintained domains as well as be aware of each domain's role within your enterprise infrastructure.

Domain consolidation by moving data to existing domains and servers

Consolidating Domino domains by migrating users and application into already existing domains has an impact on your replication, mail routing, and connectivity topology, as shown in “Impacts on system hardware and Domino servers” on page 46.

Be aware of other domains connecting to your domain, which is a focus of decommission, such as pass-through domains, SMTP routing related domains, or dedicated replication domains to mitigate risks.

Domain consolidation by moving data into a new domain with new servers

In an infrastructure with multiple domains, grown in the past due to business expansion or based on former user restrictions within Domino, there may be a big value in consolidating your domains in one new domain built from scratch.

Consolidating servers on new machines with the latest technology and joining them to an untouched domain will probably result in the most benefits of consolidation. Lotus Domino 7 and former releases have a couple of new features that are simple to implement when starting from the beginning than including them into existing infrastructures. You may migrate your users and applications bit by bit into this infrastructure.

Benefits of this approach:

- ▶ Taking advantage of a enterprise wide, transparent Lotus Domino policy and *Execution Control List (ECL)* implementation to improve serviceability, standardization, and security
- ▶ Replacing obsolete certification hierarchies by calculating new organizational certifiers based on the latest technology, for example, 128-bit keys or using *Certificate Authority (CA)* processes
- ▶ Replace former design customizations that are outdated to minimize development costs
- ▶ Redesign complex architectures and topologies
- ▶ Replace or improve inefficient processes impacting your enterprise's infrastructure maintenance

Impacts on Domino infrastructure tools

Each Domino domain within your infrastructure may have several maintenance or security related tools running. These may be, for example:

- ▶ Tools for user administration
- ▶ Tools for database administration
- ▶ Monitoring tools
- ▶ Reporting collectors
- ▶ Virus scanning tools
- ▶ Mail retention solutions
- ▶ Disclaimer functionalities

- ▶ Application or business specific tools

You must assess which tools are required in the target domain or how these services are covered in the future. Additionally, you should assess which costs may occur when migrating or adapting dedicated tools into the target environment to strike the right path.

User impact during server consolidation

Moving a user's mail files or applications between domains must happen in co-operation with your users. Changing mail routes and moving person records between domains impacts Internet e-mail availability during the migration. To update local Lotus Notes client settings like location information, mail server and domain settings, bookmarks, and so on, user interaction cannot be avoided. It is important to inform your users about the upcoming change in advance, during, and after the change to have their full attention and acceptance.

If applicable, you can minimize the impact on the daily business by migrating users based on a random selection and not per department or organizational unit. Keep your Help Desk up to date so that they can expect additional calls.

For moves into domains with different certification hierarchies or tighter security restrictions like public key checking, you have to ensure that required cross-certifications and certificate documents are available, as well as making sure the public key in the user's ID file matches the one stored in the directory.

In addition, ECL updates to users workstations may be needed if the IDs are different between domains. The migration also needs to update the personal documents (Notes domain field) in the user's local names.nsf that points to users in domains that are migrated to a new domain.

Impacts on delivery building blocks

The consolidation of Domino domains, often combined with site and administration unit consolidations, mostly requires a reorganization of your delivery units and a rebuild of your administration model (see Chapter 4, "Administration models" on page 53).

Also, your support structures may be affected due to consolidation or shared responsibilities like local on-site support and centralized back office support structures.

It is important to include your delivery organization in your project planning. Ensure that all kinds of services will constantly remain during your project phases.

Impacts on business related entities

Business related interests and strategies must be in line with any consolidation approach, especially when it comes to domain consolidation followed by changing the administration model or when rebuilding the complete infrastructure. Additionally, reducing TCO for your e-mail and collaboration infrastructure is, in most cases, a driver of business as well.

For some infrastructure components, there will be a need to host them in a separate domain, whether business related due to outsourcing intentions or based on legal restrictions or security needs.

However, do not undervalue the impact on the company structure. Multiple domains may exist within companies because of decentralized company models or because of mergers. When merging domains, it also means the company structure is changing (from an IT perspective). The user population must be kept informed during such activities to manage user expectations and to avoid negative feelings about the new solution. User perception during domain consolidation can be critical to the success of the changing company/support

structure and morale. Negative feelings can quickly turn into negative perceptions of a new solution.

3.3.2 Approach 4 - Consolidating Domino domains by moving whole servers

If we focus on consolidating Domino domains without reducing the amount of servers (for example, because of required regional availability), there is the possibility to move complete servers from one domain to another.

Attention: The definition for consolidating Domino domains by moving whole servers is as follows:

Reducing the number of Domino domains by moving Domino servers from one domain to another without reducing the number of servers or server instances.

The business driver for this approach is to reduce the administrative cost spent in maintaining multiple domains.

Figure 3-12 shows the transfer of a complete Domino server from domain A to domain B. This means that we do not move on a per database level, but logically switch the Domino server's identity into the other domain.

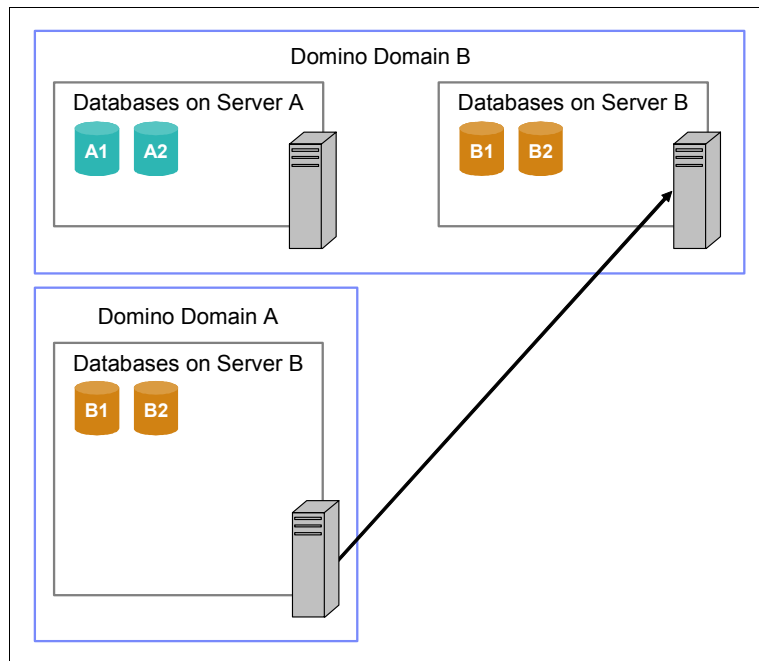


Figure 3-12 Domain consolidation by switching the server's identity into another domain

Impacts on hosting site, asset management, and network infrastructure

Since this approach covers only logical, Lotus Domino internal changes, there are no impacts on your hosting site, asset management, or enterprise network.

Impacts on system hardware and domino servers

Moving a complete Domino server instance from one domain into another requires a couple of changes on your system as well as the preparations listed in "Impacts on system hardware and Domino servers" on page 46.

Additionally, when moving, you should:

- ▶ Copy server documents and program documents into the target domain and update the server document's domain field
- ▶ Copy configuration documents, cross-certifications, and certifier documents
- ▶ Add required domains
- ▶ Copy person documents (the domain change will be carried out on the cut-over date)
- ▶ Verify that mail and access groups are unique and then copy them into the new domain
- ▶ Add required resources into the target domain
- ▶ Analyze the agents required and ensure the security settings are according to the agent signature in the target domain
- ▶ Update any third-party connections, for example, LEI, DB2, and ConnectDirect

In the case of renaming your servers during the domain move, you should:

- ▶ Create new server IDs
- ▶ Extend cluster documents in both domains by adding new server names to existing clusters of source servers
- ▶ Update mail file, application, and system ACLs (not replicated within domain) by adding new server names
- ▶ Add a DNS alias for a new Domino server name, if applicable

On the cutover date, the following steps must be covered:

- ▶ Shutdown of server
- ▶ Replacement of system databases, server names, and address book
- ▶ Deployment of domain specific templates
- ▶ Adaptation of server's notes.ini by changing respective values, such as:
 - ServerKeyFilename= (If the server is being renamed.)
 - ServerName= (If the server is being renamed.)
 - ServerNameNative= (If the server is being renamed.)
 - ServerTasks= (If the changes are mandatory within the new domain.)
 - Domain= (TargetDomain)
 - Names= (File name of target Server Names and Address Book)
- ▶ Change of Domain name in person records, mail-in databases, and resources to switch mail routing
- ▶ Sent mail to users to enforce an update of location documents, local replication settings, and bookmark update
- ▶ Reassign enabled out-of-office and other agents

In the case of renaming your servers during the domain move, you should:

- ▶ Deploy new server IDs
- ▶ Change administration server name in ACLs

Impacts on Domino domain model and infrastructure tools

For all domain consolidation approaches, it is important to review all possible dependencies and interfaces affected by decommissioning a domain.

Based on the fact, that you are going to move complete servers between domains, your replication and mail routing topology will become smarter. Therefore, some replication documents and Domino Named Network (DNN) settings may be obsolete.

User impact during server consolidation

Note that moving large groups of users and applications grouped by complete servers has a bigger impact on your users than if you move users in smaller, discreet groups. But if you only want to consolidate domains, this will be an applicable approach. As part of your project planning, acceptable downtimes and move schedules must be agreed upon in advance. You have to be aware of different user access restrictions between the source and target domain to ensure that users may access their mail files and application after the move. If you have Domino policies in place, their impact due to the domain change must be assessed.

Impacts on delivery building blocks and business related entities

Delivery and business related items covered in “Impacts on delivery building blocks” on page 48 and “Impacts on business related entities” on page 48 will also apply here.



Administration models

This chapter focuses on the administration model for the Domino environment and discusses the *relationship between Server Consolidation activities and the implications for the Administration Model*. Whether you are consolidating across domains, or consolidating to reduce the number of physical servers, the administration model used within your Domino environment is of great importance. As soon as you have more than a few administrators or locations in your company, you should ask the question whether the model under which you manage your Domino infrastructure best fits the needs of the company.

In this chapter, we address the following:

- ▶ We present the key concepts for either a centralized administration model or a distributed administration model.
- ▶ We describe five of the most typical administration models, presenting the pros and cons for each, and explain the key issues that make each model successful.
- ▶ We describe the key supporting administrative processes required when undergoing a server consolidation. This reinforces the linkage between server consolidation and understanding/selecting the most appropriate administration model.
- ▶ We discuss the factors to ultimately help you select the best administration model for your organization's needs.
- ▶ Finally, we have an in-depth discussion of the extended ACL (xACL) in which we explain how to use this feature to take more effective, granular control of the Domino directory.

4.1 Importance of the administration model

Many companies have a distributed administration model where the administrators are physically placed in different locations. The locations might even be spread across borders or continents. In those situations, the use of different administrative teams is often a necessity, thereby presenting the challenge of different administrative rights and responsibilities.

With multiple administrators, you might not want to have them to all operate the directory with the same level of access rights. You might want to restrict the administrator to a certain geographical region or a structure within the hierarchical naming scheme of Domino.

Why limit the access to certain parts of the Domino directory? That often occurs when new administrators are introduced or you have administrators only responsible for certain parts of the directory. In those cases, you want to make sure that they are not deleting or altering documents outside of their responsibilities.

Having administrators in different locations or geographies often results in different methods of administration and procedures within the same company. There is also the aspect of trust between administrators in different locations/regions where regions or locations are run independently as possible. Neither scenario is acceptable from the perspective of a company. A standardized administration model is required and it must fit the company's needs.

Undertaking the steps of consolidation calls for the *right model* of administration to match your organization and your consolidation goals. It is important to understand that there is no single, simple formula that determines the *right model* and that it is up to your company to evaluate what is appropriate. We will outline the different administrative models and highlight the pros and cons of each.

4.2 Linking the importance of administration model to server consolidation

Before discussing details of an administration model, we want to establish a clear foundation explaining the relationship between the administration model and consolidation goals.

Why is the administration model important and why is this worth re-examining within the context of a consolidation effort?

- ▶ A consolidation effort will ultimately represent a change in the Domino infrastructure. Given the close relationship between the infrastructure and the administration requirements to support it, a consolidation effort presents a logical time to re-examine the overall administration model.
- ▶ The goal of a consolidation is to arrive at a more efficient/optimized Domino infrastructure. Simultaneously, changes to the administration model can also help create more efficient management.
- ▶ Finally, 4.5, "Supporting processes" on page 64 discusses the processes involved with a consolidation effort. Prior to beginning a consolidation effort, it is very important to examine the current administration model in your organization and make sure that it is most effective for carrying out these supporting processes.

4.3 Defining administration models

The Domino infrastructure can be seen as a service layer within your company, transparent to the organizational chart. Accordingly, there is no need to have administrators and servers in the same physical locations. The servers can be placed in data centers and only need the attention of a technician if maintenance is required.

The same applies when discussing the administration model. With this more transparent approach, the design of the consolidated Domino infrastructure can be de-coupled from the typical setup of having administrators physically located on site, next to the servers.

There are two primary administration models that will be discussed in further detail:

- ▶ Distributed administration model
- ▶ Centralized administration model

Both models can then be sub-grouped into different variants, with the intention that each different variant highlights strengths and weaknesses of the approach, and ultimately provides key points for considering your best solution.

4.3.1 Distributed administration model defined

The distributed administration model is based on more than one location for your servers in your Domino infrastructure, and having multiple administrators working within the various locations. This model calls for distributed administration and responsibilities, which in some cases does not mean optimal administration. A distributed model can range from merely two distinct locations, to having administrators residing in different countries.

A distributed administration model calls for well-defined responsibilities between the locations, as well as very clear guidelines and processes.

As an example, the handling of Domino certifiers always become an issue when having a distributed model and questions, such as though the local administrators are:

- ▶ Allowed to only create users
- ▶ Allowed to also delete users/documents in the Directory
- ▶ Given general access to Directory and parts that are out of their location

Attention: A distributed administration model calls for well defined responsibilities between the locations, as well as very clear guidelines, processes, and clear channels of communication.

4.3.2 Centralized administration model defined

The centralized administration model is based on having the administrators working out of one location. The benefits of having an administrative team working closely together in one location can be realized through greater efficiency and greater adherence to corporate standards and the ability to address technical issues.

Note that within an centralized administrative model, the administrators do not need to be in the same physical location as the servers. The benefit is derived through placing the team together and leveraging a greater comprehensive knowledge of the system. This is a big advantage realized both in terms of efficient administration, as well as reducing the TCO of the overall infrastructure.

4.4 Examples of typical administration models

Below you will find different administration models. To accommodate the transparency and responsibilities within these models, two layers are presented. Specifically, we are differentiating between:

- ▶ Domino Administrator responsibilities
- ▶ Data Center responsibilities

The idea is to show that when we are talking about Domino administrators, we are not necessarily talking about the same people who are also responsible for the physical servers. This responsibility can obviously belong to two different organizations within your company. This approach/mindset to clearly define and differentiate between responsibilities is also what you have seen in Chapter 3, “Approaches to consolidation” on page 29.

It is very important to distinguish between responsibilities in these models. The Domino administrator primarily addresses the Domino administration, and the people dealing with the data center administration have another focus.

- ▶ Domino administrator responsibilities:
 - Domino server configurations
 - User handling
 - Architectural thinking
- ▶ Data center responsibilities:
 - HW maintenance
 - Operating system maintenance
 - Backup recovery
 - System management

Dividing the responsibilities, as above, gives clear lines within the IT organization. Furthermore, this gives you the flexibility to work with just the right administration model that suits your organization.

The number of Domino Domains you are administering is not as important a factor when determining the most appropriate administration model. The reason for this is based upon the transparency between the physical server locations and the actual locations where administrators are located. Accordingly, you must distinguish between:

1. The locations from where the servers are physically placed
2. The locations where the administration team is situated

Domino Domains must be treated as transparent to the physical locations.

The administration models presented in the upcoming section are the ones that we consider to be representative of the main stream. From those presented, you can extrapolate variants that best suit your organizations’ specific needs.

4.4.1 Model - one location with one or multiple administrator(s)

The one location model has the administrators in one place and then deals with all servers within that single location. This represents the most simple and straightforward model of the ones presented.

Figure 4-1 shows the one location with one or multiple administrators model.

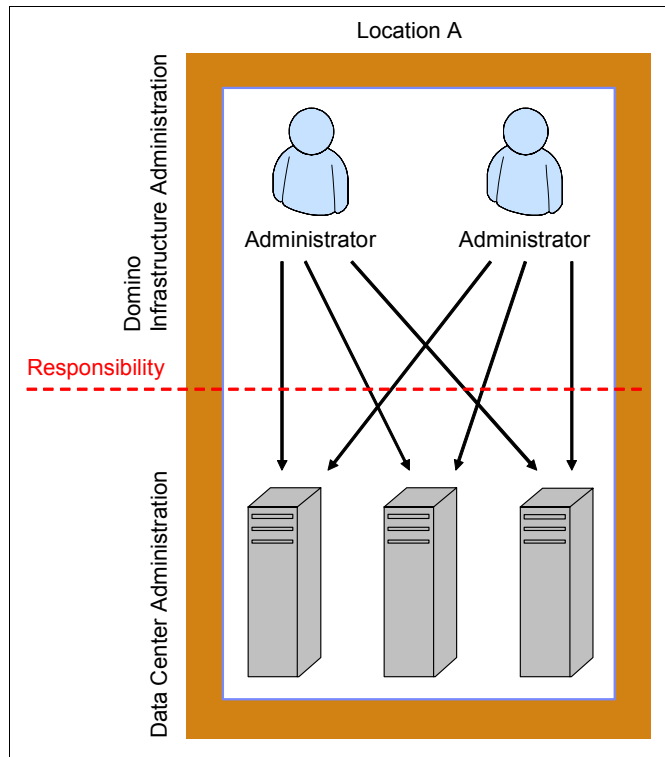


Figure 4-1 One Location, one or multiple administrator(s)

4.4.2 Model - one location with one or multiple administrator(s) with different responsibilities

This model represents one location, and is very similar to the first one presented, but the administrators now have different responsibilities. Implementing this model successfully calls for different approaches for handling the administration strategy for an administrator (or several administrators) who individually have fewer rights.

Figure 4-2 shows the one location with one or multiple administrator(s) with different responsibilities model.

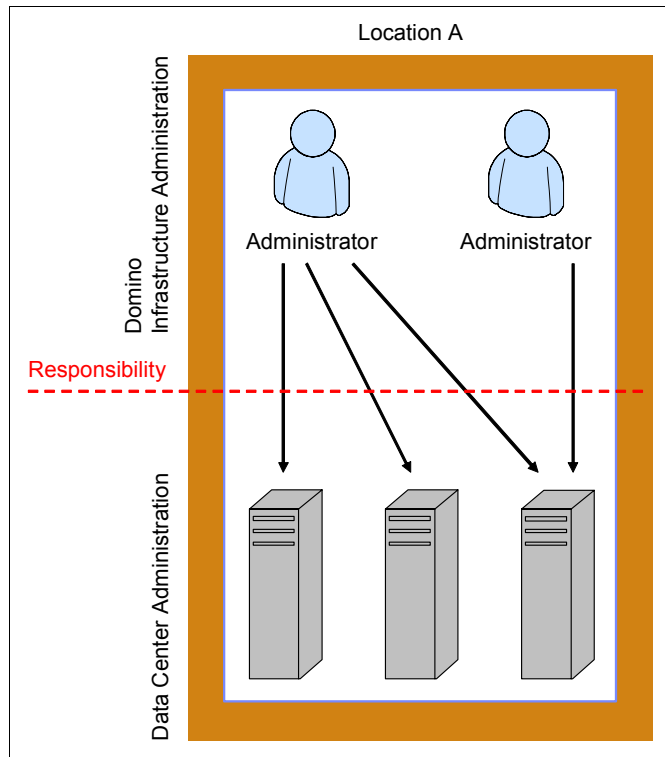


Figure 4-2 One location with one or multiple administrator(s) with different responsibilities

Defining the responsibility

There are three key approaches to consider within this scenario, which can help define specific responsibilities.

Mutual trust

The administrator has exactly the same rights in the Domino Directory as other administrators, but there exists an agreement that he is only administering a certain part of the hierarchical naming schema.

Advantages

The absolute advantage within a mutual trust scenario is the minimal administration effort with this setup. There are not extra settings that need to be implemented in the directory.

Disadvantages

There are three obvious disadvantages with this model:

- ▶ The first is that you will almost always find administrators who will not respect this agreement and still implement users/groups or server based settings on their own.
- ▶ The other issue, for example, is that an administrator with limited access could mistakenly delete many of the users in the directory due to a procedural error or simply as the result of less knowledge about proper Domino administration. This presents a severe risk and vulnerability.
- ▶ Limited access through group hierarchy.

Through a granularly defined group and document level access hierarchy, the administrator has only access to those documents that are within the defined hierarchical naming schema.

Advantages

The advantage of this model is that you have efficiently controlled the administrator's access and you can trust that he will only be able to modify the documents he is supposed to.

Disadvantages

The disadvantage is the effort to create the model and implement it as well as maintaining it for future changes within your Domino directory.

Implementing Extended Access Control List (xACL)

Finally, the third option for successfully implementing this scenario involves implementing the extended ACL (xACL), which enables you to easily control administrators and *is the recommended method over the above described group hierarchy* approach. As mentioned above, the limited group hierarchy approach requires more maintenance than an approach based on xACL. For further xACL details, please refer to 4.7, "Implementing extended ACL" on page 66.

4.4.3 Model - two locations with multiple administrators and isolated administration tasks

With this model, we now introduce the decentralized model where the Domino Domain is spread across two locations, while also having administrators in both locations to administer the system. Note that in this model all administrators have the *same rights* for administering the directory.

Important: In this scenario, we emphasize that the administrators must have clear guidelines of operating the environment. If a mistake occurs in one location, there is a very high chance that this change will be replicated to the other locations and vice versa.

Figure 4-3 illustrates a conceptual model of this approach to administration. While this model is quite typical due to the multiple locations of Domino servers within a single domain and the decision to have administrators on site in the same location as these servers, *this Administration Model contains inherent risks and requires clear communication and guidelines.*

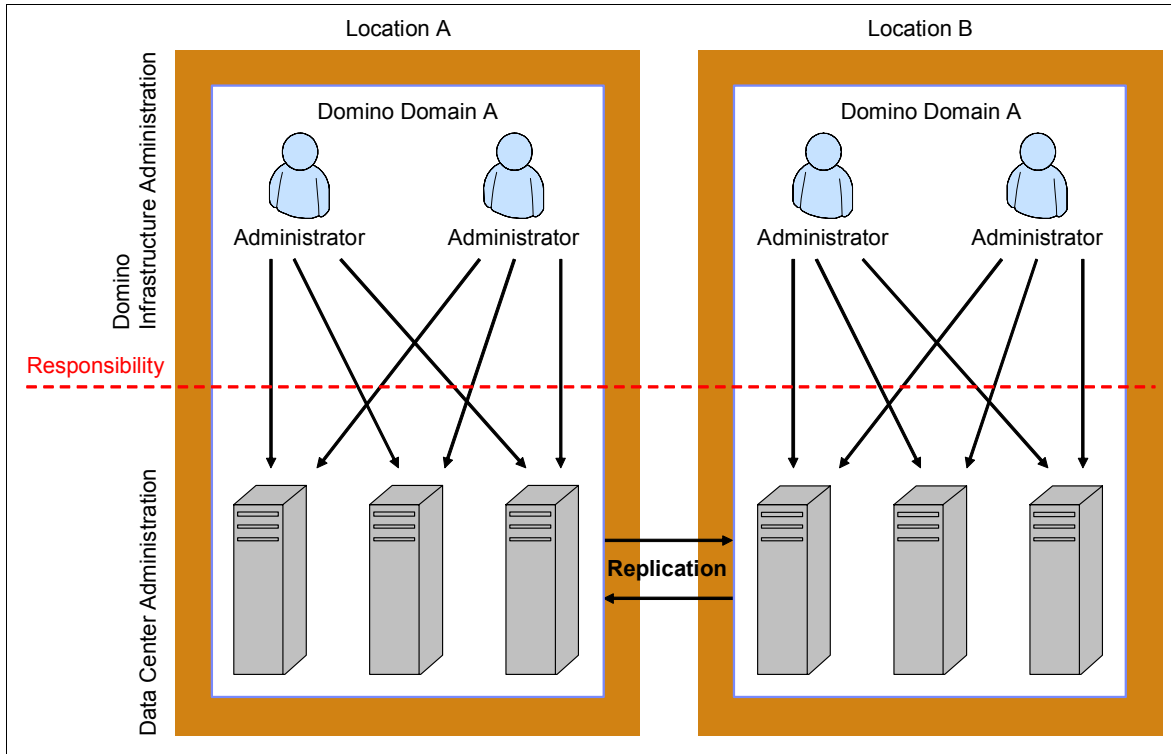


Figure 4-3 Two locations with multiple administrators and isolated administration tasks

As seen in many organizations, this approach to administration often leads to a belief over time that administrators are now working well together and accordingly, they eventually see each location as their own. While this may seem to represent an efficient mode of operation, this is not necessarily an advantage to the overall infrastructure. The primary risk lies in communication; local dependencies and conditions are not always communicated to the other side.

Attention: A distributed administration model calls for well-defined responsibilities between the locations, as well as very clear guidelines, processes, and clear channels of communication.

Compared to a centralized administrative model, the administrative effort in this decentralized model usually has additional overhead. Furthermore, the synergy and potential communication between the two locations probably could be better if the administrators were brought together.

Again, this presents a case where effective use of the Extended ACL feature (xACL) provides more granular control in the Domino directory. As for the methods to control the access of the administrators, refer to 4.7, "Implementing extended ACL" on page 66.

4.4.4 Model - two locations with multiple administrators and cross administration tasks

This decentralized model is based upon multiple administrators within two locations, each with cross referencing administration tasks and responsibilities. The conceptual illustration of this model is shown in Figure 4-4.

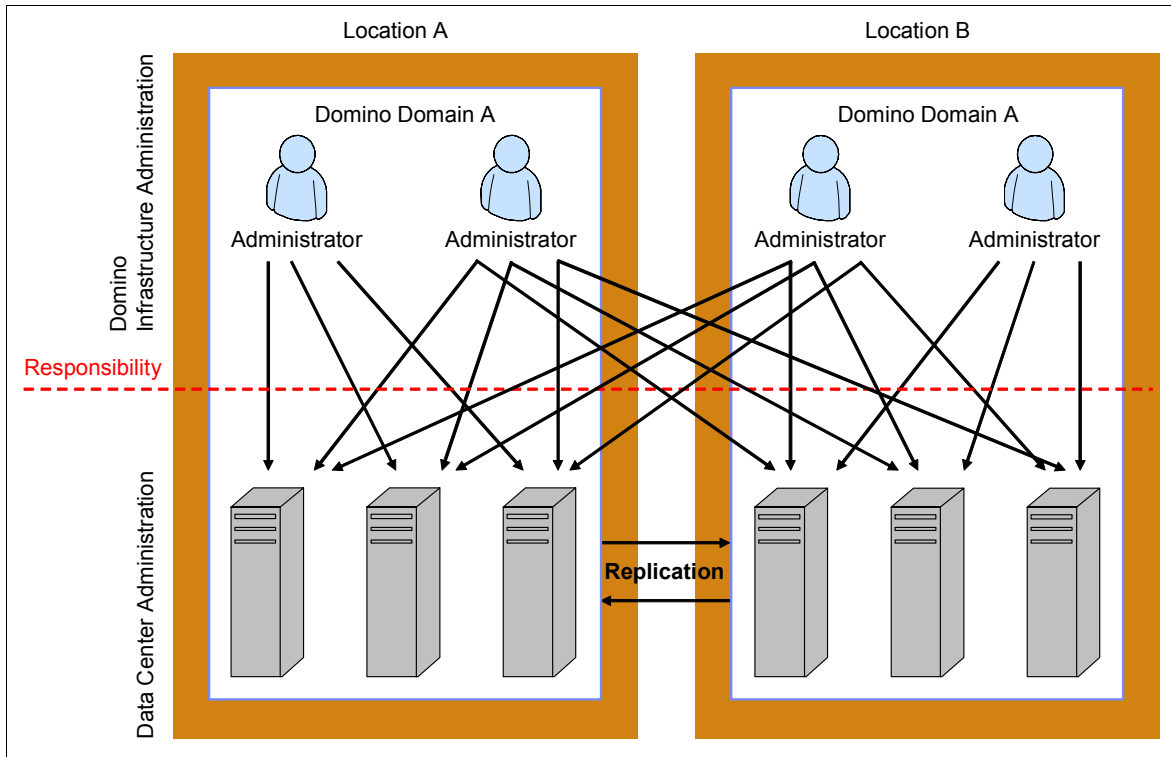


Figure 4-4 Two locations with multiple administrators and cross administration tasks

The administrative structure is again only to control specific rights and access for a decentralized structure, as described in 4.3.1, “Distributed administration model defined” on page 55. In terms of overall TCO, this approach presents a less attractive solution.

The foundation (namely the clearly defined roles, responsibilities, and channels of communication) from which the administrators are administering the Domino directory is crucial to the success of managing the overall infrastructure. When studying Figure 4-4, the risks become apparent when you consider how each individual administrator is involved with many servers. Many shortcuts can be made here, so there is less transparency for other administrators.

Attention: A distributed administration model calls for well-defined responsibilities between the locations, as well as very clear guidelines, processes, and clear channels of communication.

As for the methods to control the access of the administrators, please refer to 4.7, “Implementing extended ACL” on page 66.

Finally, Figure 4-5 illustrates a slight variant to the one shown in Figure 4-4 on page 61; however, the key issues at stake do not really change. In this case, we just have a local administrator handling his specific site while the overall administration task resides in the other location.

In terms of access to the infrastructure, the method is not different from the one mentioned above. The considerations of how to set up the access rights and define which segments of the hierarchical naming schema to administer are the same. Defining and setting up the hierarchical naming schema is the real challenge if one does want to limit access for some administrators.

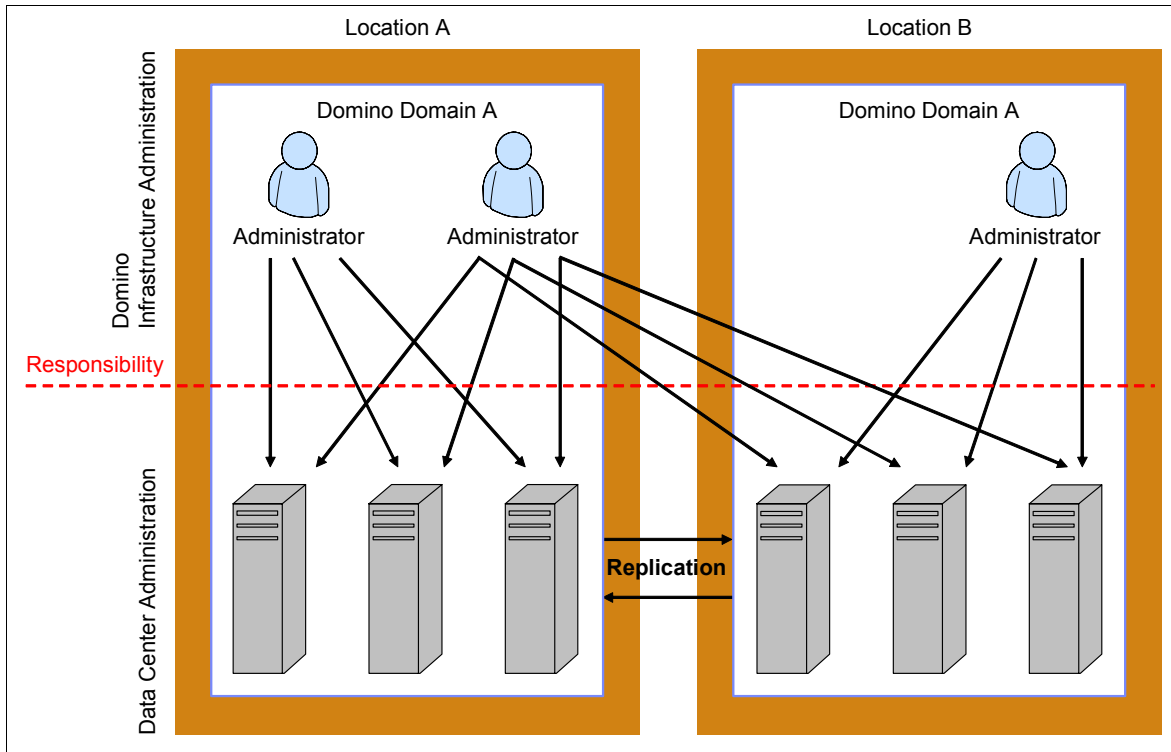


Figure 4-5 Two locations with multiple administrators and cross administration tasks

4.4.5 Model - two locations with multiple administrators and centralized administration tasks

The final administration model presented in Figure 4-6 on page 63 is the fully centralized model where the administration is done from within one location. All administrators are placed within this location and they will have the synergy of working together as well as clear lines of communication.

Again, the granularity of administrator access must be considered, and can be effectively implemented using xACL, but at least you will not have the risk of administrators creating solutions for their location without proper communication.

Concentrating the administrators in one place calls for an appropriate support model and becomes especially important when considering a scenario of multiple time zones covered by the centralized administration team. Help desk functionality as well as requests for new users must be handled and the supporting processes set up to support this model.

In terms of TCO, and effectively managing an infrastructure based on clear communication, guidelines, and roles/responsibility, this is the most optimal model. Keep in mind, however,

that the supporting processes must support this model in order to take advantage of the benefits.

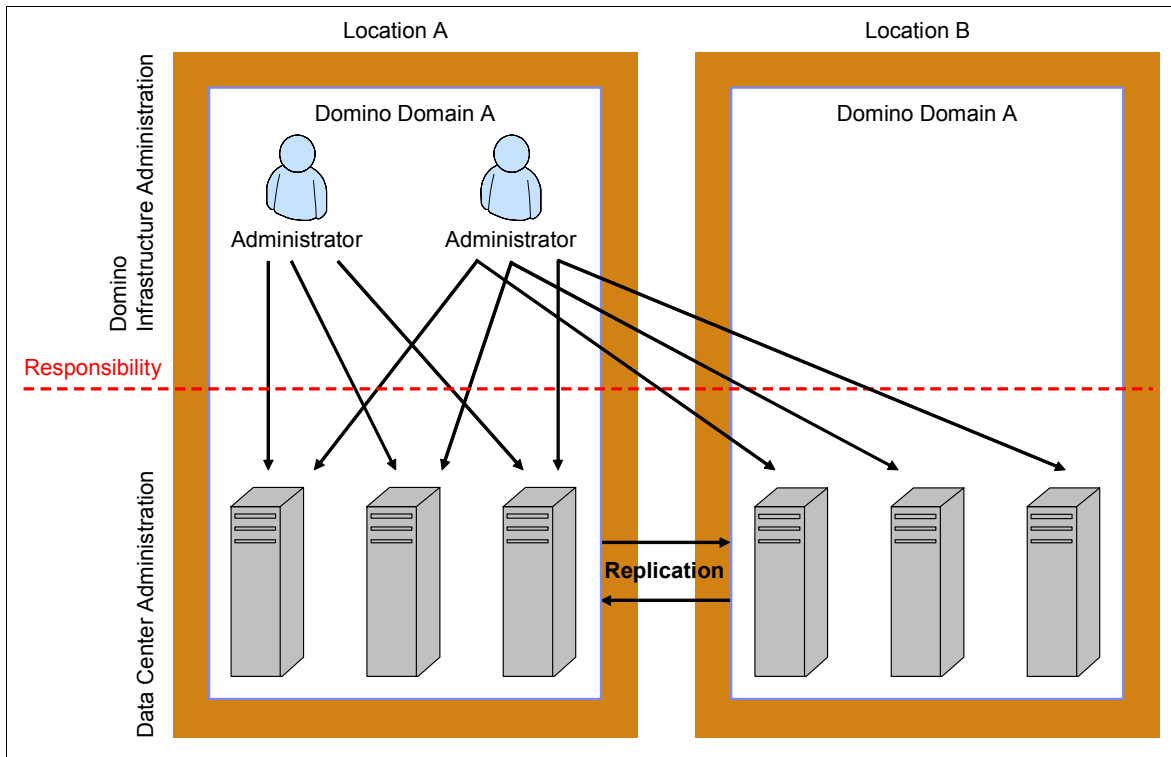


Figure 4-6 Two locations with multiple administrators and centralized administration tasks

Considerations for multiple time zones, geographical issues, and dependencies

Implementing an administration model across multiple time zones obviously calls for supporting processes. It may not be realistic to have a centralized European based administrator team without also being able to support users in Asia during their office hours, which differ from Europe.

Using the model described in 4.4.5, “Model - two locations with multiple administrators and centralized administration tasks” on page 62, we provide some alternate approaches to consider:

- ▶ Switch the centralized administrative team to an Asia based team, and later on back to the European based administrators when administrating after office hours.
 - During the administrative transition from one team to the other, clear and consistent communication about the current issues is absolutely crucial for success.
 - The Local Help Desk in Asia would initially take user calls and pass those on to the European based administrators that they cannot solve themselves.
 - This transition could make the response time longer for the users. Is this an acceptable solution in terms of user satisfaction, and are any SLAs in place?
 - Additionally, an important component to discuss is whether the Help Desk function is capable of actually handling these calls or if they are always passing on the tickets to the other administrative team?

- ▶ Alternatively, your company may be very well served with one centralized administrative model, based on the European business hours. The company is willing to accept the risk, or does not see a problem with having no administrative support for other region's office hours outside of the centralized European business hours.

4.5 Supporting processes

There is a whole suite of processes that need to be considered and in place when undergoing a server consolidation. You must consider the future surrounding environment that supports the Domino infrastructure.

Domino engineering

- ▶ Domino server support.
- ▶ Maintain and update Domino server and add on products.
- ▶ Install and test Domino server and new software releases.
- ▶ Determination of thresholds (Domino related).

General Domino / Notes administration

- ▶ Domino server support.
- ▶ Maintain and update Domino server and add on products.
- ▶ Install and test Domino server and new software releases.
- ▶ Monitor Domino mail routing.
- ▶ Check the Domino server log (log.nsf), statistic databases, and replication.
- ▶ Install, run, and monitor Domino mail virus protection.
- ▶ Run and monitor SMTP and Fax gateway services.
- ▶ Capacity management of Domino data partition.
- ▶ Perform Domino application disaster recovery tests.
- ▶ Adjustment of Domino directory and configurations.
- ▶ Notes system database administration.
- ▶ Determination of thresholds (Domino related).
- ▶ Qualify and solve problems or assign tickets.
- ▶ Provide on-call duty.

Help desk

- ▶ Lotus Notes user support.
- ▶ User management.
- ▶ Qualify and solve problems or assign tickets.
- ▶ Creating statistics on reported user errors.

Operations

- ▶ 24 x 7 monitoring of Domino applications.
- ▶ Operating and error handling of Domino server.
- ▶ Monitor capacity of Domino partitions on SAN.
- ▶ Platform Domino service restart.

- ▶ Perform system dump in case of Domino application error.
- ▶ Perform Domino application disaster recovery tests.
- ▶ Determination of thresholds (Server related).
- ▶ Operate backup.

Tip: Is your company spread over a wide geographic base? If so, a centralized administration needs processes to handle the above issues, preferably through a centralized database. Due to different time zones, a centralized database for handling these requests is a good way to manage and track requests, as well as making them in advance.

The supporting processes and their underlying importance are magnified when having all administrators in one location compared with multiple locations. In the distributed model, the users tend to contact the local administrator and get the problem fixed locally. In the case that the 'local administrator' is part of a centralized team, the user needs a method of contacting the administration team.

4.6 How to select an administration model

Although we have presented several examples of typical administration models, there is unfortunately not an easy decision support matrix that supports you in the selection of a model that suits your needs. There are multiple factors that influence the selection of the administration model.

Many companies have, at the outset of their investment in Domino, implemented a model of administration and have not really worked with the concept of a model and trying to identify the strength and weaknesses of their current model. It has simply just grown along with the infrastructure and in some cases become very hard to handle and administer.

When undergoing a server consolidation, it is important to also review the model of administration to see whether it will fit the consolidated infrastructure or needs a rework.

Also, try to identify whether your current model is actually optimal for the current environment and evaluate the impact a consolidation will have.

4.6.1 Factors influencing choice of appropriate Administration Model

Factors influencing the selection are:

- ▶ Support organization to handle user requests.
- ▶ Are you covering more than one time zone?
 - Is it necessary to have administrators on duty for multiple time zones?
 - Is it enough that the help desk handles support calls?
- ▶ Do your administrators have to handle support calls?
 - Is this feasible or is it better to have an dedicated help desk?
- ▶ Do you have clear responsibilities?
 - Domino administrators handle the Domino infrastructure.
 - Data center administrators handles the physical hardware.

- ▶ Are the surrounding processes in place?
 - How do you register users?
 - Third-party tool with connection to HR system.
 - Manually by done by Domino administrators, and the user is informed through e-mail or database or other means of communication.
- ▶ Do you want to reduce the overall TCO?
 - Reducing servers.
 - Reducing administrators.
 - Reducing / optimizing number of databases.
 - Remove redundancy and databases not in use anymore
- ▶ Does the size of the company have an influence?

This is actually a very interesting question to consider. Many companies will have the view that a large global organization requires a decentralized model, with administrators in each continent, closer to the users and geographically based groups of users.

The final factor concerns bandwidth and your Wide Area Network:

To what extent does the Wide Area Network support the user population accessing centrally managed servers out of one location? This is a pure bandwidth and latency issue but many companies with these issues are working in replication mode and do not work directly on the servers. Choosing the option of having servers in all continents does not mean that you need administrators at the same location. They can still be centralized out of one location as long as the supporting processes are in place.

Therefore, the model of administration and also the degree to which you want to consolidate your environment is made up of many factors that need to be addressed by you internally and then optionally confirmed through proof of concepts to ensure that you are on the right track.

The different server consolidation approaches presented in the previous section, together with the underlying support processes, will influence you administration model. Therefore, having selected the consolidation approach that fits your company, it is time to choose the right administration model to be able to continue the consolidation work and actually execute the project. With these two elements decided, you can begin to plan the concrete steps for a consolidation project.

For more information about the steps for planning and managing the phases of the consolidation project, please refer to Chapter 5, “Project planning overview for performing server consolidation” on page 101.

4.7 Implementing extended ACL

With the Domino feature extended ACL (xACL), you can build a granular administration model that delegates the proper responsibilities through delegation of Person (and Group) Document management based upon a specific hierarchy.

4.7.1 Overview of extended ACL

The extended ACL controls give enterprises the ability to delegate administration to regional administrators without giving them manager access. You can configure these regional administrators to allow them to administer only directory objects within their own organizational units.

An extended access control list is an optional directory access-control feature available for a directory created from the PUBNAMES.NTF template, namely either a:

- ▶ Domino Directory
- ▶ Extended Directory Catalog

Functionality of extended ACL

An extended ACL is tied to the database ACL, and you can access it through the Access Control List dialog box using a Notes 7 or Domino Administrator 7 client. You use an extended ACL to apply restrictions to the overall access to the database ACL. You cannot use it to increase the access the database ACL allows.

Important: Extended ACL is used to apply *restrictions* to the overall access of the database ACL. You cannot use it to *increase* the access the database ACL allows.

Use an extended ACL to set access to:

- ▶ All documents with hierarchical names at a particular location in the directory name hierarchy. For example, all documents whose names end in OU=AM/O=ITSO_Org1.
- ▶ All documents of a specific type. For example, all personal documents.
- ▶ A specific field within a specific type of document.
- ▶ A specific document.

An extended ACL allows you to:

- ▶ Delegate your Domino administration, for example, allow a group of administrators to manage only documents named under a particular organizational unit.
- ▶ Set access to precise portions of the directory contents.
- ▶ Set access to documents and fields easily and globally at one source, rather than requiring you to control access through features such as multiple Readers and Authors fields.
- ▶ Control the access of users who access the directory through any supported protocol: Notes (NRPC), Web (HTTP), LDAP, POP3, and IMAP.

4.7.2 Understanding the elements of an extended ACL

To set up an extended ACL, use the "Extended Access at target" dialog box, which you open from the database Access Control List dialog box. The elements of an extended ACL are:

- ▶ Access settings: The allowed access
- ▶ Subjects: The users and groups whose access you control
- ▶ Targets: Categories of documents or specific documents to which access settings apply

4.7.3 Understanding the levels of access - using Administer access

This section will help you understand who is affected by restrictions within an extended ACL, or for the sake of administering access, who can grant access or modify access settings at an extended ACL target.

- ▶ An extended ACL cannot restrict the access of a user with Manager database access or an administrator with "Full Access administrators" access to a server. (This is controlled through the Server document in the Domino Directory.)
- ▶ An extended ACL also cannot prevent a user with Designer or Manager database access from modifying the directory design.

To allow someone with Designer or Editor access in the database ACL to modify access settings at an extended ACL target, grant Administer access.

Someone with Manager access in the database ACL can modify an extended ACL without having Administer access.

Grant Administer access to allow someone to manage access to documents under a target category without granting the person Manager access in the database ACL.

A user with Editor or Designer access in the database ACL does not have the Administer access by default; you must grant the user that access explicitly. You grant someone Administer access to a target category and not to a specific document.

Note: You can give a Domino 7 server Administer access to a selected target category. This access enables the server to be an extended administration server whose Administration Process manages documents below the selected target category. Please see 4.8, "Using an extended administration server" on page 95 for more information.

4.7.4 Plan the extended ACL

We *strongly* recommend that prior to implementing a change in the working environment, you *thoroughly* plan an extended ACL on paper before you implement it.

After you have planned the extended ACL on paper, test it in a non-production environment before deploying it. When planning an extended ACL, use a sparse access control model that minimizes the number of extended ACL subjects you specify:

- ▶ Use categories as targets, / (root) or subcategories below / (root), rather than individual documents. To subcategorize documents below / (root), you may have to give some documents, for example, Group documents, hierarchical names manually.
- ▶ As a general rule, use the default target scope "This container and all descendants" as the target scope to extend subjects' access to target subcategories.
- ▶ Use names that represent groups of users (Self, groups, wildcard subjects, -Default-) as subjects rather than the names of individuals.

When you use a sparse access control model, Domino can check extended ACL access settings quickly and you can manage extended ACL access settings easily.

Extended ACL at the Organizational level

To ease the understanding of xACL, Figure 4-7 on page 69 explains the level set at the Organizational level within the directory hierarchy.

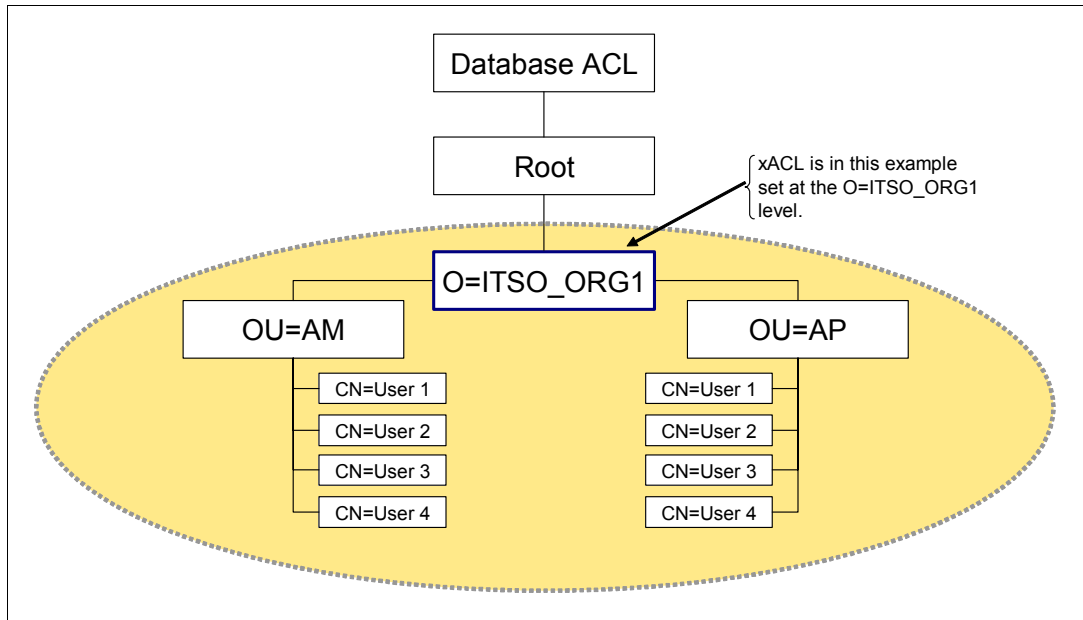


Figure 4-7 xACL set at the Organizational level

Extended ACL at the Organizational Unit level

To ease the understanding of xACL, Figure 4-8 explains the level set at the Organizational Unit level within the directory hierarchy.

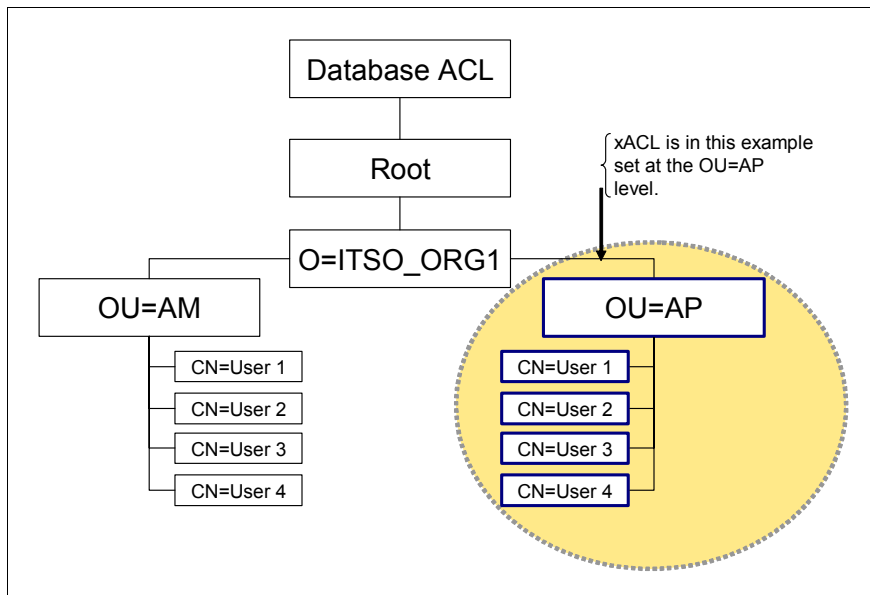


Figure 4-8 xACL set at the Organizational Unit level

Extended ACL at the Organizational Unit Container level

To ease the understanding of xACL, Figure 4-9 explains the level set at the Organizational Unit Container level within the directory hierarchy.

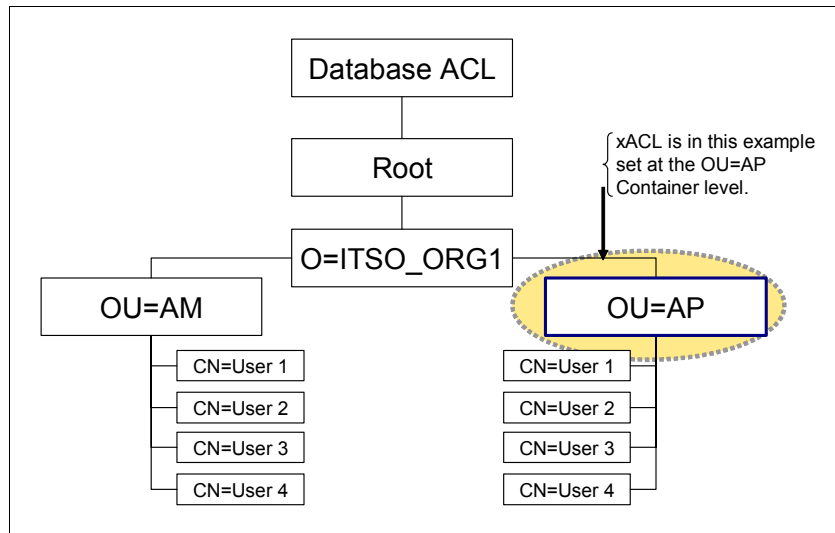


Figure 4-9 xACL set at the Organizational Unit Container level.

4.7.5 Extended ACL access settings

There are several access settings you can use to control a subject's access to an extended ACL target. For each access setting, you choose Allow or Deny. You can leave an access setting unchecked, but if you do, other subjects in the extended ACL or database ACL determine whether the subject is allowed or denied the access. It is better to select Allow or Deny to help ensure you get the access control results you expect.

Access settings apply to existing documents at a selected target. If the selected target is a category of documents, access settings also apply to documents added to the category in the future.

An extended ACL cannot restrict the access of a user with Manager database access or an administrator with "Full Access administrators" access to a server (controlled through the Server document in the Domino Directory.) An extended ACL also cannot prevent a user with Designer or Manager database access from modifying the directory design.

Note: For ease of reading, this topic uses the terms document, field, and form. If an extended ACL will control LDAP access, apply the LDAP equivalent terms instead: entry, attribute, and object class.

The access settings shown in Table 4-1 control access to a *document* as a whole.

Table 4-1 Document access settings

Access setting	Tasks allowed
Browse	Allows a user to access a document.
Create	Allows a user to create a document.
Delete	Allows a user to delete a document.

The access settings shown in Table 4-2 control access to a field within a document.

Table 4-2 Field access settings

Access setting	Tasks allowed
Read	Allows a user to read a field. The user must also have Browse access to the document.
Write	Allows a user to modify a field.

When more than one type of document uses a particular field, you control access to the field separately for each type of document.

Example 1: Deny users the ability to view all documents in the directory

Figure 4-10 shows the scenario where you, the administrator, through the use of xACL, have denied the users in the ITSO_ORG1 Organization Unit “AM” the ability to see the documents in the other “AP” Organizational Unit within the same Domino directory.

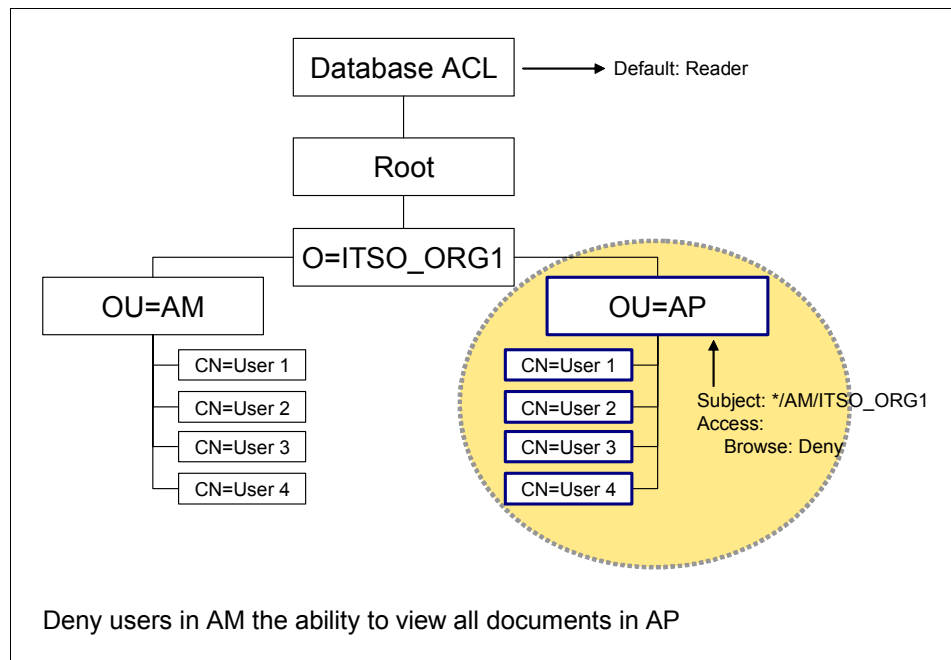


Figure 4-10 Deny users in AM the ability to view all documents in AP

Example 2: Enable administrator to operate within an OU

Figure 4-11 shows the scenario where you, through xACL, have enabled the administrators in the ITSO_ORG1 Organization Unit “AP” to also administer documents within that OU.

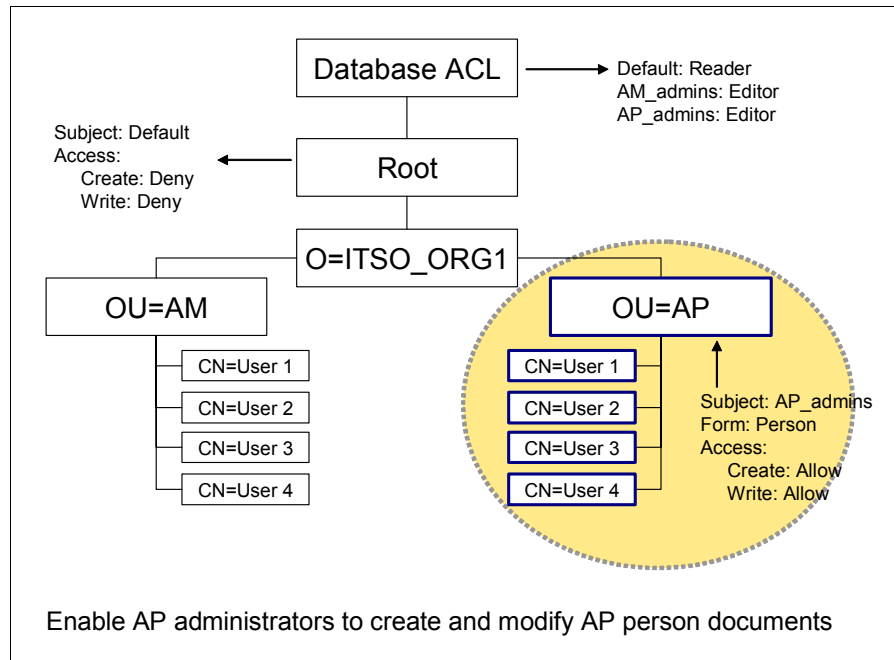


Figure 4-11 Enable AP administrators to create and modify AP person documents

This can be used in geographical dispersed organizations who need local or regional administration and a certain set of control so that the administrators are not altering documents out of their OU level.

If you are controlling the access of Notes and Web users, be aware of the following issues:

- ▶ If you deny a Notes or Web user access to a field in a document, when the user opens the document, the document does not show the field and the text (TRUNCATED) shows in the tab of the document. In addition, the user is unable to edit the document, even if the user has write access to the fields in it.
- ▶ If you deny a Notes or Web user access to a field in a document that a view uses to sort the document, the name of the document is blank in the view. The user can still select the document to open it.
- ▶ To delete a document, a Notes or Web user must be able to see the document in a view. To see a document requires Browse access to the document.
- ▶ To create a document, a Notes or Web user or a Notes application must have Create access to the document as well as Write access to the fields to which the user/application will add values.

Note: These issues do not apply to access through other means, such as LDAP access or Notes application access, except where indicated.

4.7.6 Database security features and extended ACL

The access set for a user in an extended ACL can never exceed the access that the database ACL, including the database ACL privileges and roles, allows the user.

For example, if the database ACL allows a user only Reader access, you cannot use the extended ACL to allow Write access. Or if a user is omitted from the database ACL User Creator role, you cannot use the extended ACL to allow the user Create access to Person documents.

Access set through a security feature in the database design also restricts the access you can specify in an extended ACL. For example, if a Readers field on a particular form prevents a user from reading fields in documents created with that form, giving a user Browse access to the form in the extended ACL does not override the access specified in the Readers field.

4.7.7 Group naming scheme and extended ACL

When working with extended ACL you must follow the following simple naming rules to make it work properly.

You can use any of these characters for the group name:

1. Letters A through Z
2. Numbers 0 through 9
3. Ampersand (&)
4. Dash (-)
5. Period (.) (*please see comment / notes below*)
6. Underscore (_)
7. Apostrophe (')

Please note that:

1. You must not use a backslash (\) or any other characters not included in the list above, because they can cause unexpected results.
2. A Group name can be a maximum of 64 characters in length.
3. For easier administration, use a name without spaces. Do not use a name that is in use as the name of an organizational unit in the hierarchical name scheme.
4. While the use of the period (.) is not prevented, it may be advisable to avoid its use, in consideration of possible future conflicts with Internet addressing. At this time, though, there are no known issues relative to using the period in Group names.
5. Use of the "#" (pound sign / hash) character in Group names is not recommended by IBM. A client may not have a problem in Domino, but issues could emerge as the client implements other collaborations.
6. With the introduction of Notes Domino 6, the forward slash (/) is not only acceptable, but is necessary for some xACL functionality.

4.7.8 Implementing an extended ACL for a Domino Directory

To set up an extended ACL for a Domino Directory or Extended Directory Catalog, you must enable extended access for the database.

Important: Before you enable extended access to the Domino Directory, make sure you understand the implications of doing so:

- ▶ Enabling extended access may take a few minutes on a very large directory database. The Notes or Domino Administrator client is unavailable for other purposes during this process.
- ▶ To ensure that the database replicates properly, extended access requires use of the advanced database ACL option "Enforce a consistent Access Control List across all replicas."
- ▶ After you enable extended access, you cannot make changes to the database on a server running an earlier release because the changes cannot replicate to a Domino 6 or later server. If you enable extended access, you must make directory changes only to a replica on a Domino 6 or later server.
- ▶ Enabling extended access enforces the database ACL, extended ACL, and Readers and Authors fields for Notes clients looking up names in the directory. For example, if you enable extended access, then Notes users who are addressing mail must have at least Reader access in the database ACL to use type-ahead addressing or F9 address resolution against the directory, or a Notes application that calls NAMELookup functions to search the directory must have the necessary database access to carry out the operation.
- ▶ Enabling extended access enforces the database ACL and extended ACL for anonymous LDAP searches of the directory. Enabling extended access removes the anonymous LDAP access settings from the domain Configuration Settings document, and they remain removed unless you disable extended access at a later point. By default, the directory database ACL gives Anonymous users No Access, so if you want LDAP users to search the directory anonymously, you must change the access for the Anonymous entry if you enable extended access.

Important: Do not enable extended access if you have any uncertainty about doing so.

Steps for enabling extended access for Domino Directory or Extended Directory Catalog

To enable extended access for a Domino Directory or Extended Directory Catalog:

1. Select the database, right-click it, and select **Database** → **Access Control**, as shown in Figure 4-12.

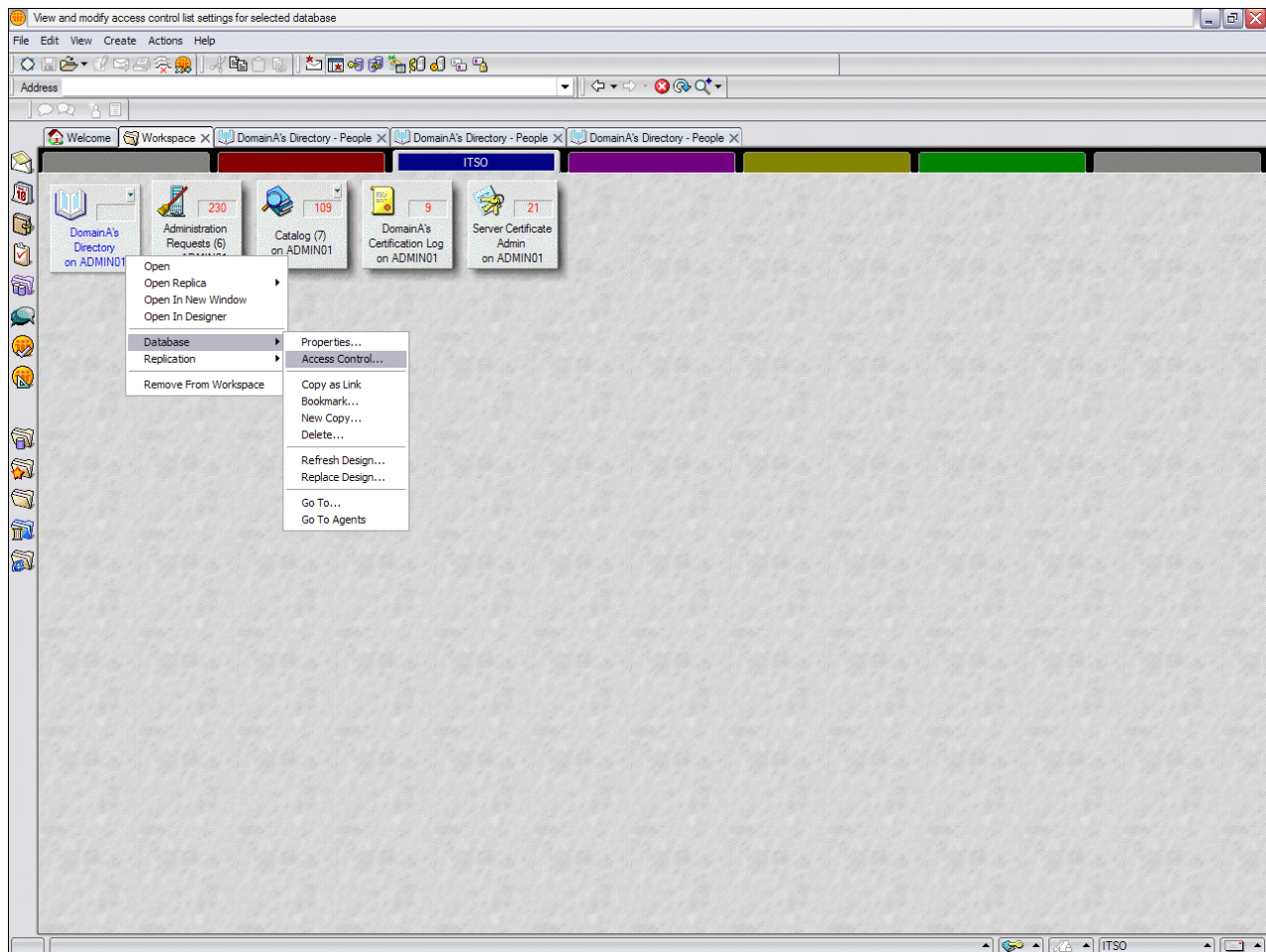


Figure 4-12 Choose Database - Access Control

2. Ensure that the administrative users have Manager access in the Domino directory's ACL, as shown in Figure 4-13.

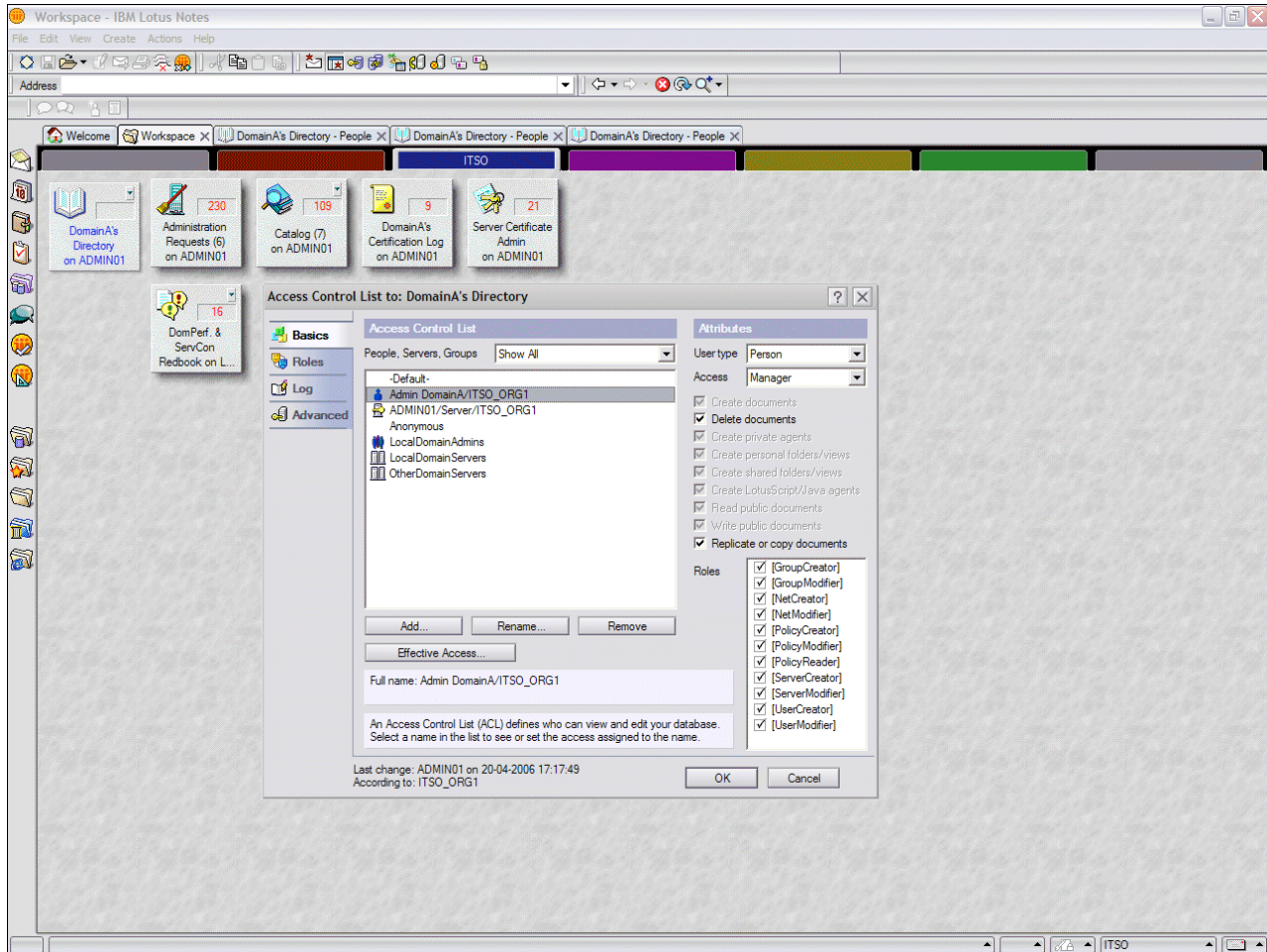


Figure 4-13 Ensuring administrative users Manager rights on Directory

3. Click the **Advanced** button, and then select **Enable Extended Access**, as shown in Figure 4-14.

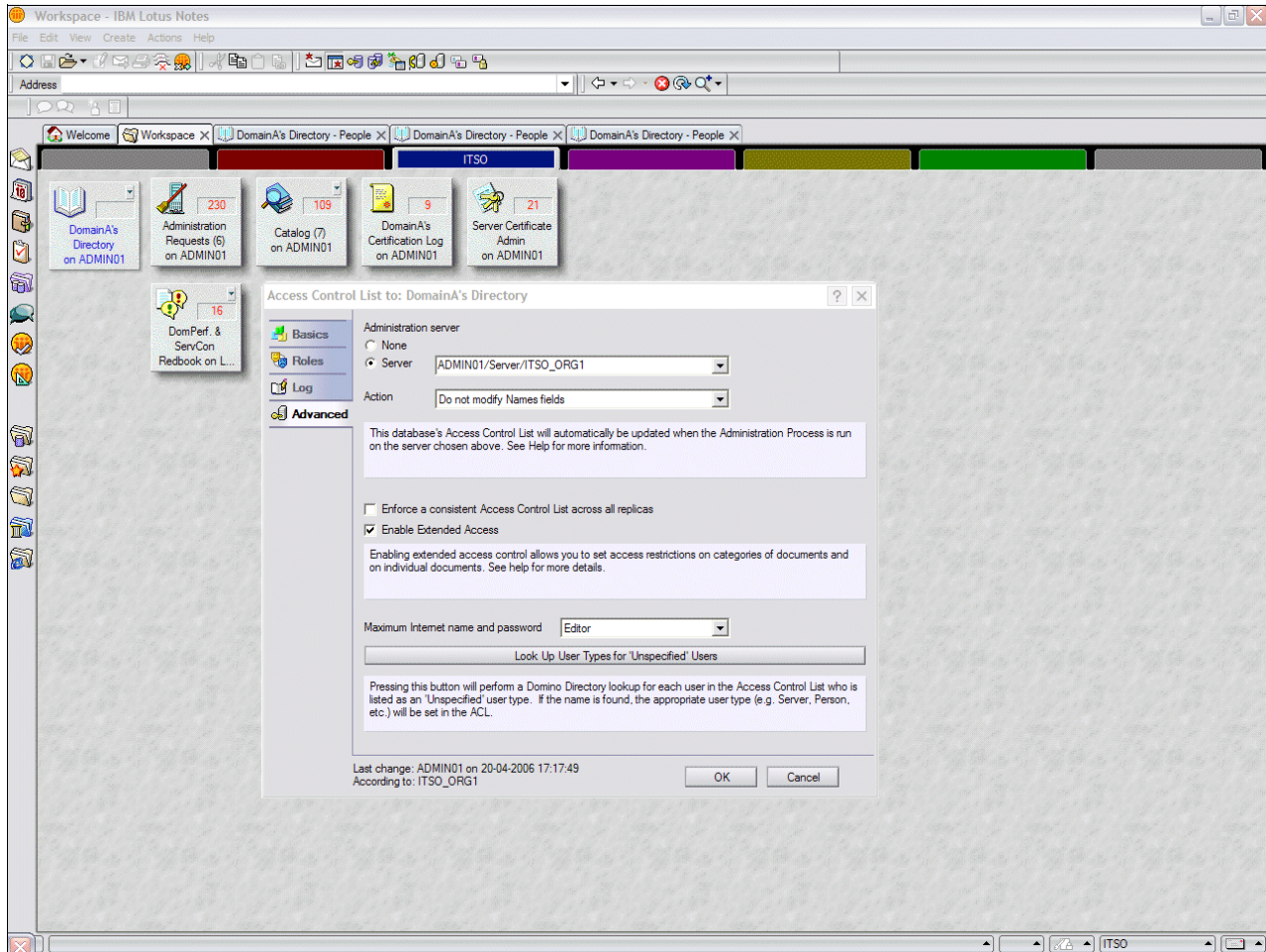


Figure 4-14 Enabling extended access

4. Click **Yes** to continue, as shown in Figure 4-15.

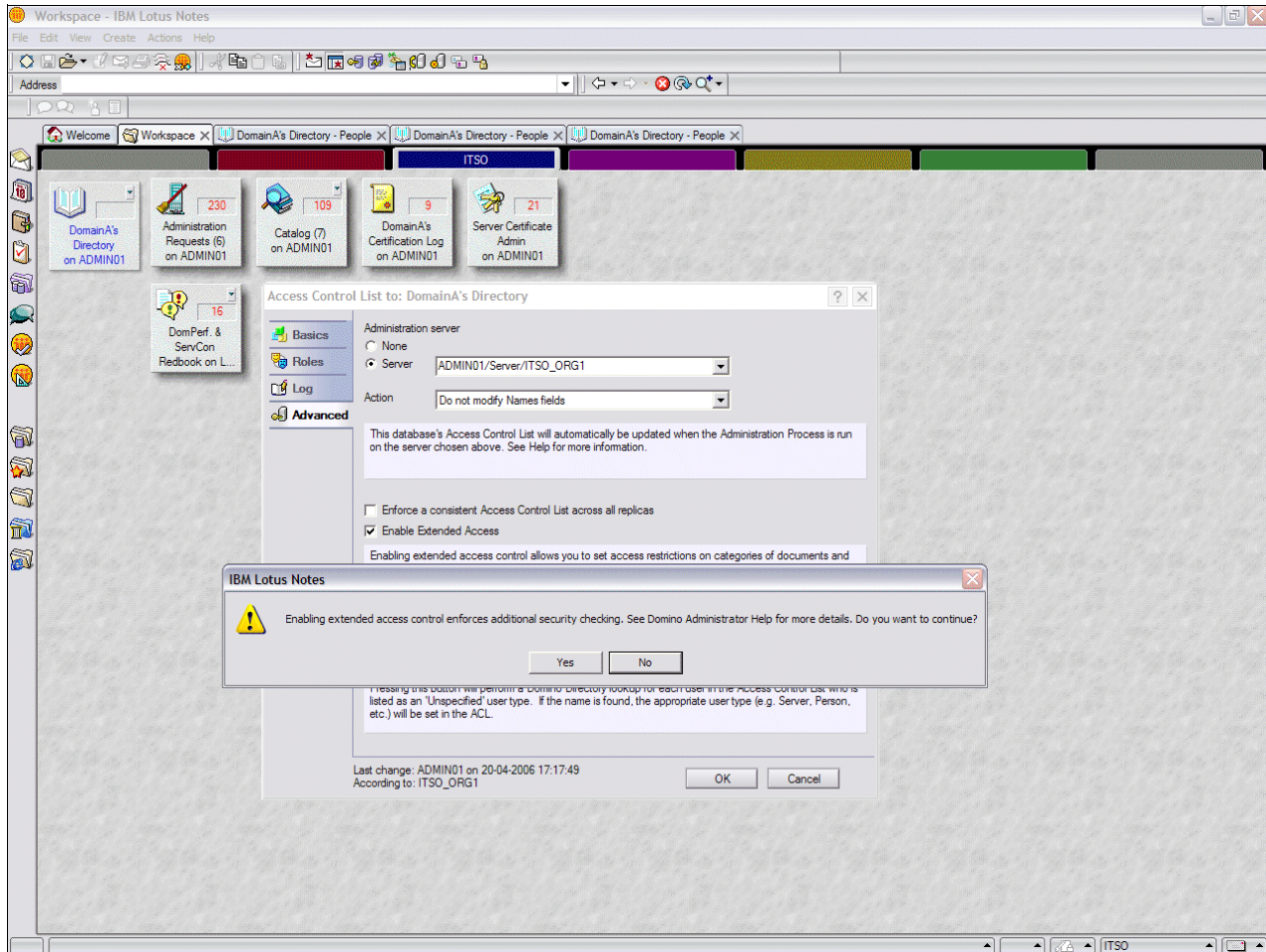


Figure 4-15 Enabling extended access prompt to accept

5. If your Domino directory does not have the "Enforce a consistent Access Control List across all replicas" enabled, you will be prompted, as shown in Figure 4-16 on page 79, to enable this feature. Click **Yes** to enable it.

Important: Consistent access control must be enabled to use xACL.

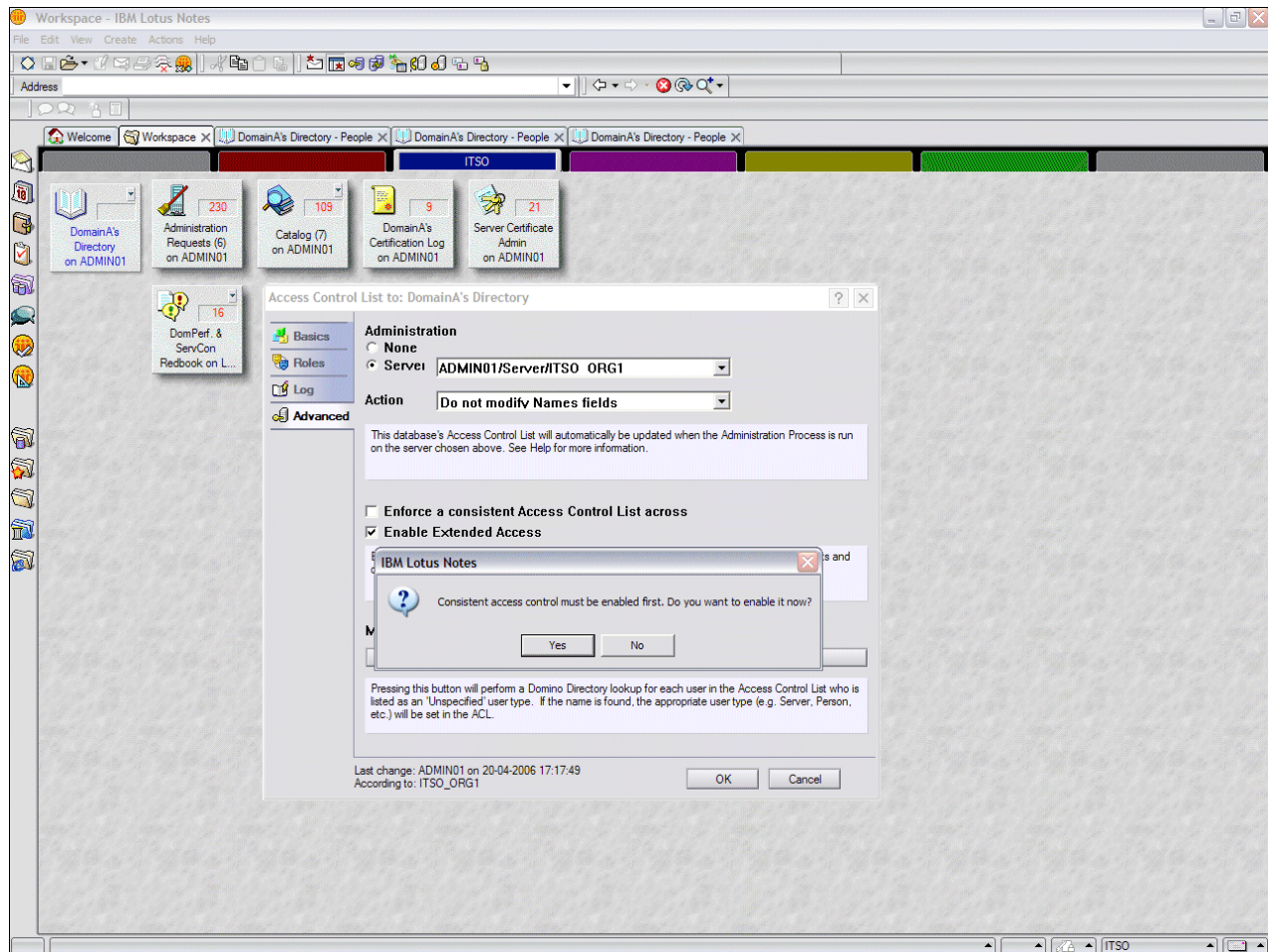


Figure 4-16 Enabling Consistent Access Control

Tip: If Consistent Access Control is already enabled, you will not see the prompt in Figure 4-14 when enabling extended access control on the directory.

6. If your organization has more than one administrator managing the extended access control for the directory, you should enable document locking on the directory to avoid document conflicts. The prompt displayed after accepting Consistent Access Control (Figure 4-17) urges you to not forget this feature when you have multiple administrators.

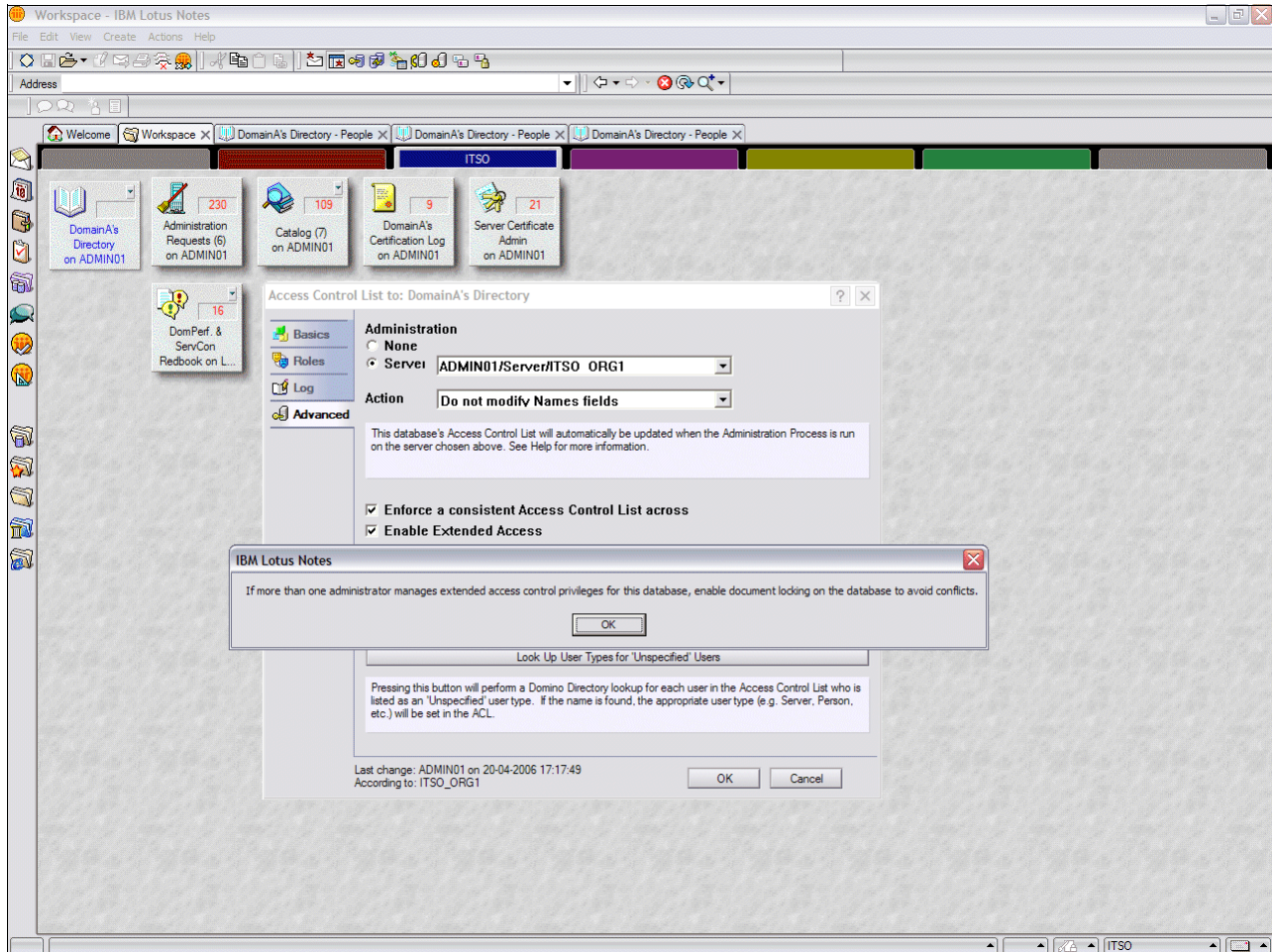


Figure 4-17 Document locking notification prompt

7. Click **OK** in the Access Control List dialog box (Figure 4-18) to accept the changes made.

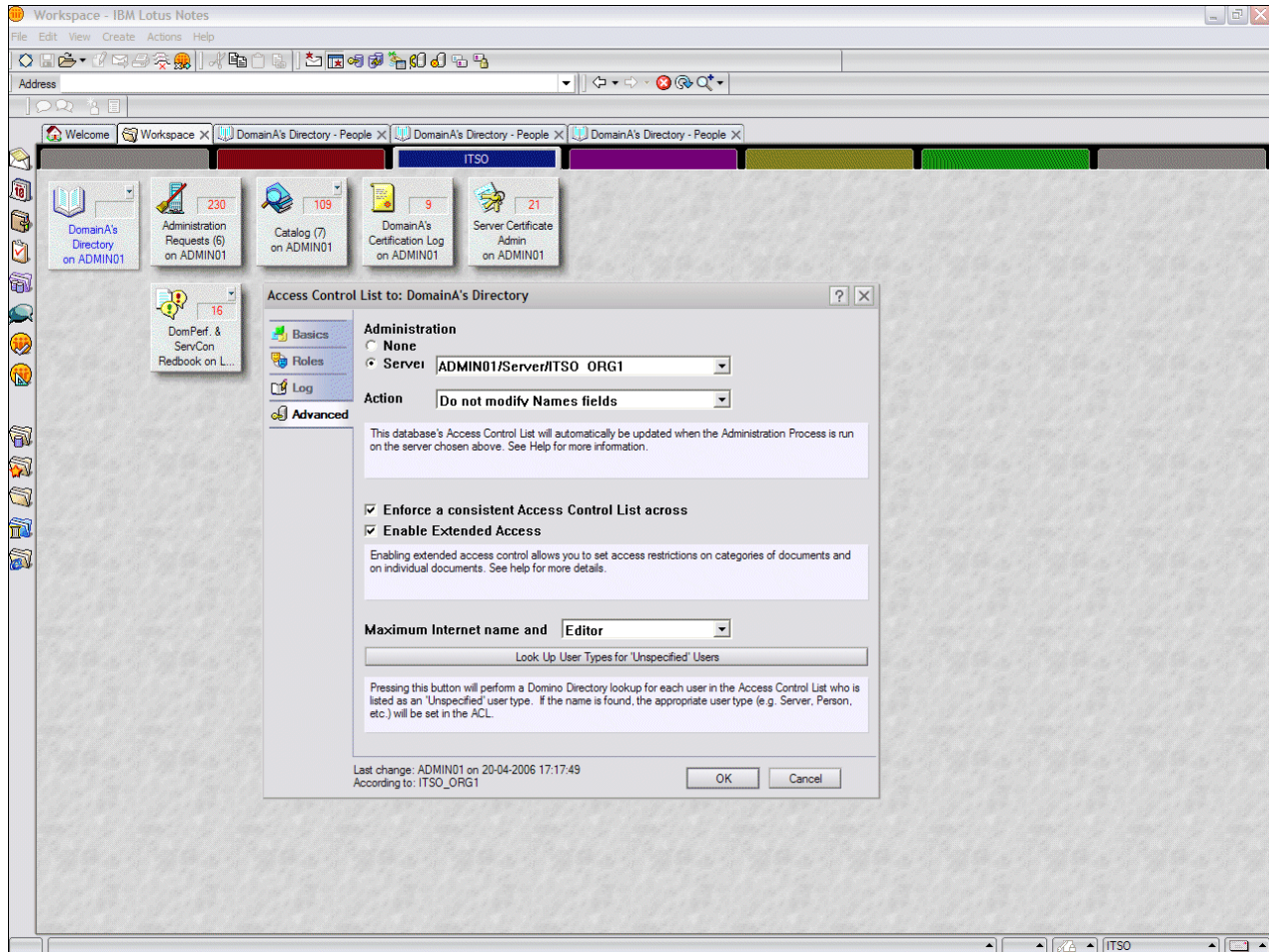


Figure 4-18 Accepting the changes made in the ACL dialog box

8. At the "Enabling extended access control restrictions. This may take a while." prompt, click **OK**, as shown in Figure 4-19.

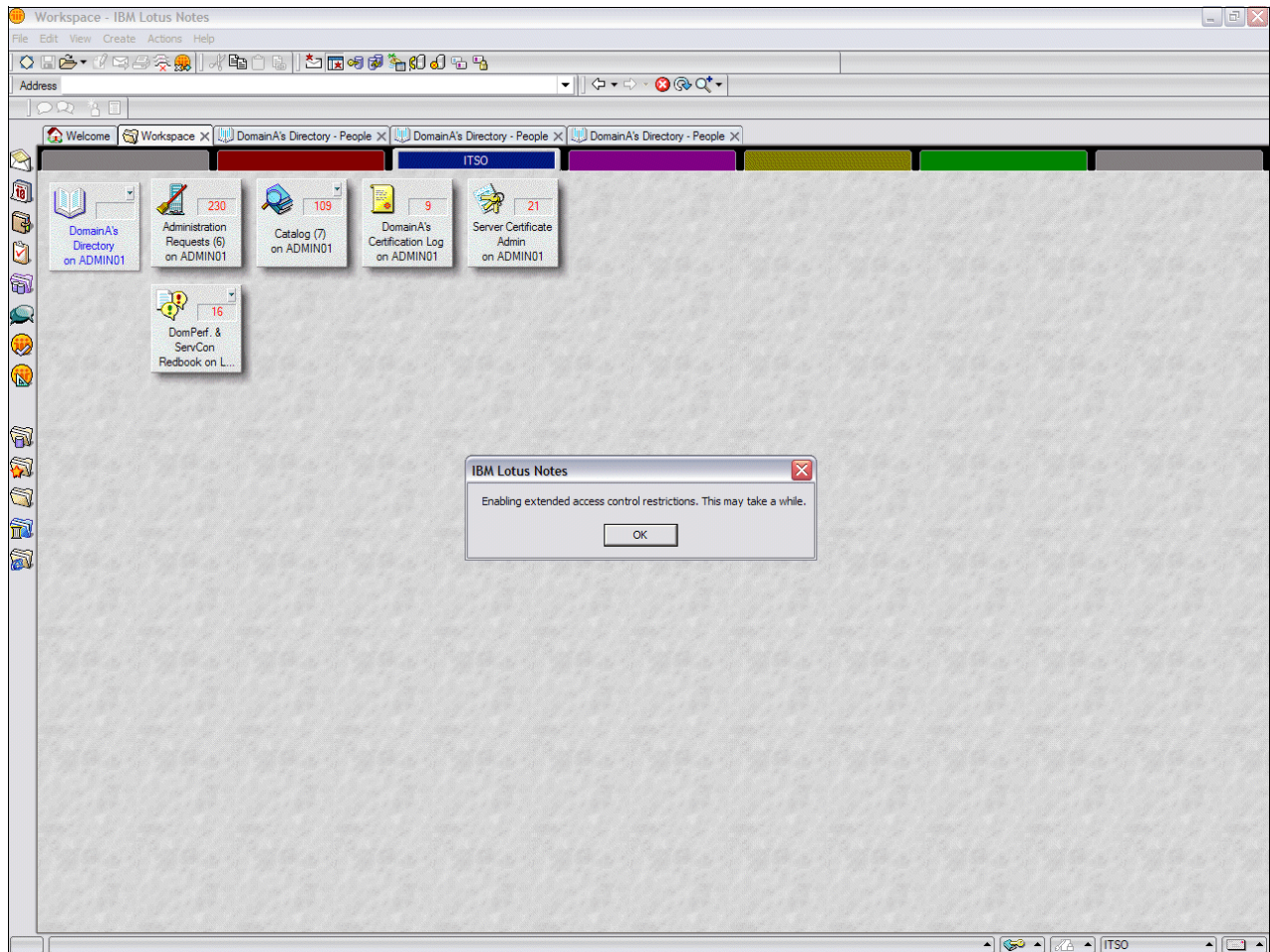


Figure 4-19 Prompt "Enabling extended access control restrictions. This may take a while."

9. To validate the process, you should take a look at the status bar of your client (see Figure 4-20).

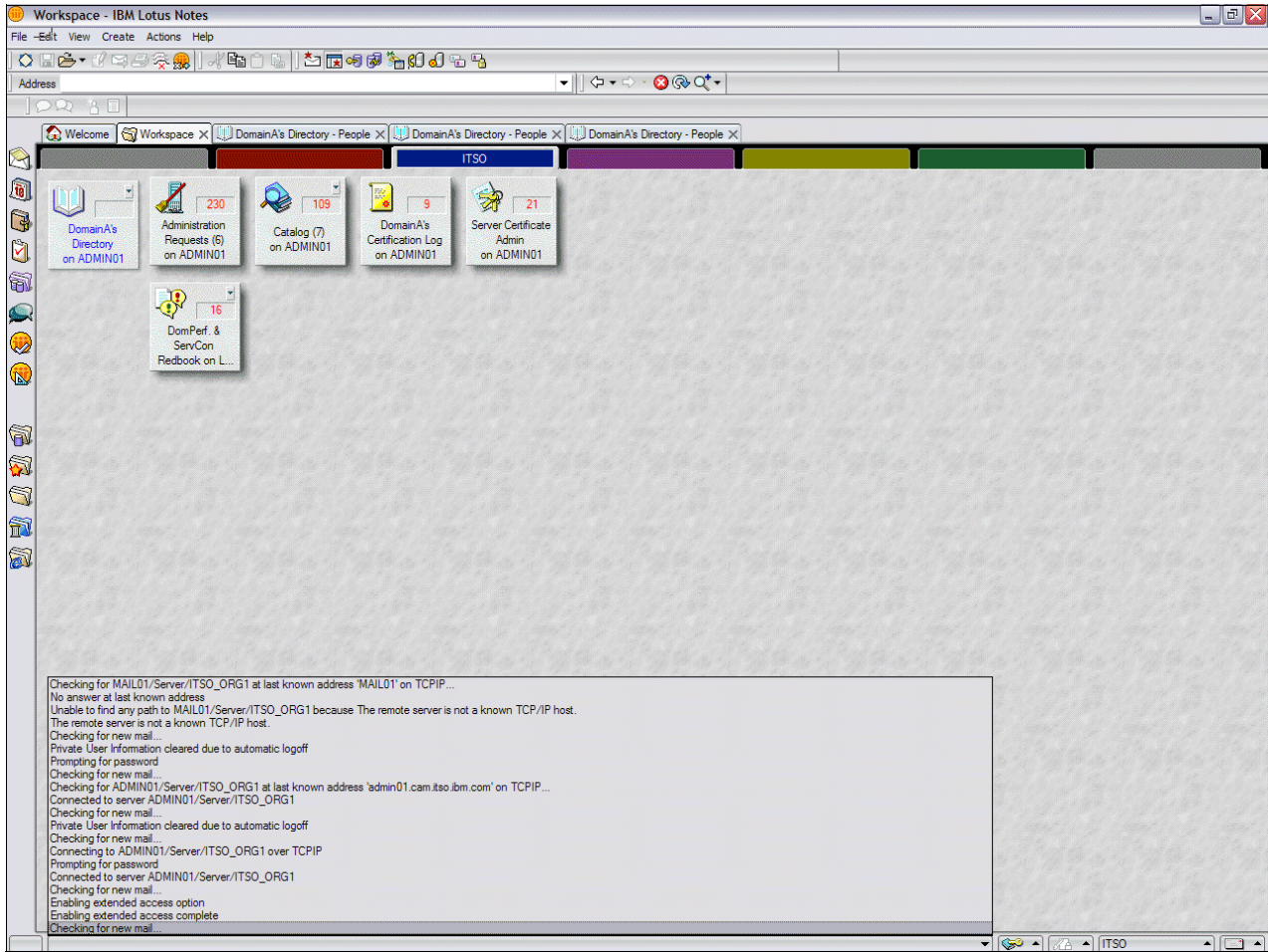


Figure 4-20 Client status bar

10. To validate whether document locking is enabled or not, right-click the directory and select **Database** → **Access Control**, as shown in Figure 4-21.

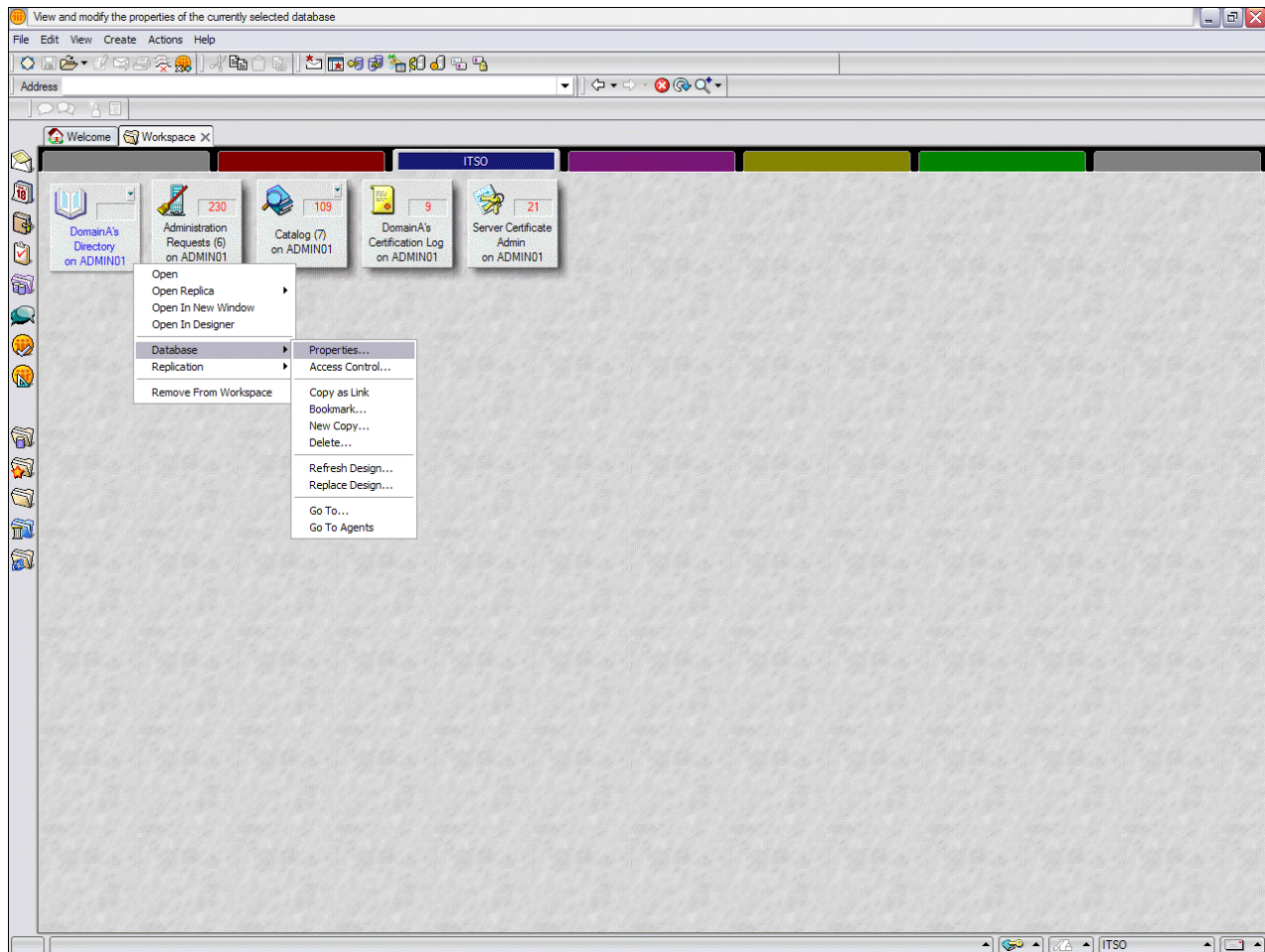


Figure 4-21 Selecting directory database properties

11. The database properties dialog box is displayed and the box "Allow document locking" must be enabled, since we have multiple administrators in the organization. Enable document locking by selecting the check mark box, as shown in Figure 4-22 on page 85.

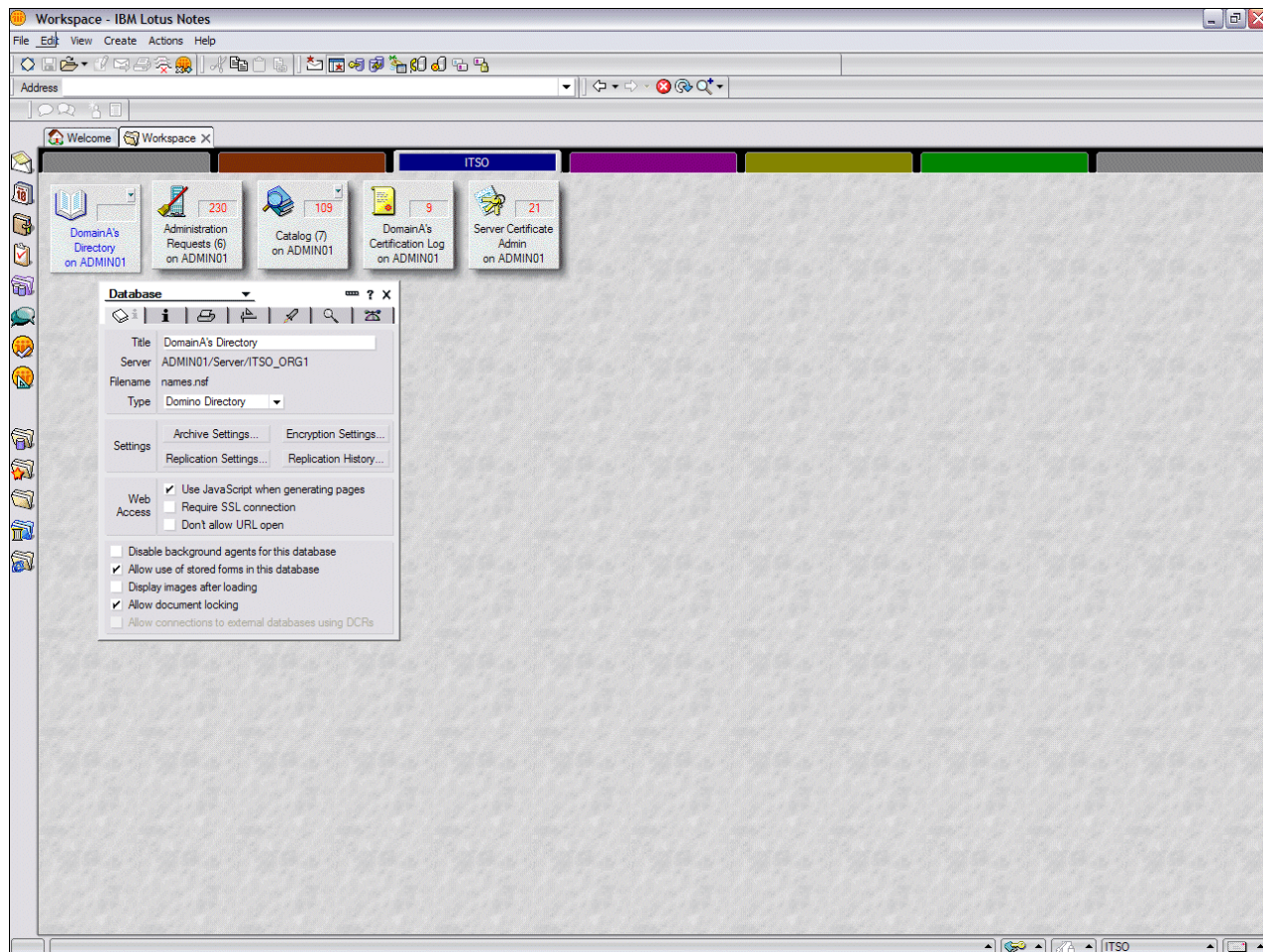


Figure 4-22 Enabling document locking

Important: Document locking ensures that only one administrator can modify the extended ACL at a time.

4.7.9 Validate (Log) changes made to the extended ACL

For verification/validation of any changes made, you can display a log of all changes made to an extended ACL and to the database ACL. Each entry in the list shows:

- ▶ When the change occurred
- ▶ Who made the change
- ▶ What element was changed

To perform this validation through the log files, perform the following steps:

1. Open the database that uses the extended ACL, and select **File** → **Database** → **Access Control**.
 - Do one of the following:
 - Click **Log** from the Access Control List dialog box.
 - Click **Extended Access** and then click **Log** from the "Extended Access at target" box.

2. Select a line of log history. To see the complete text of the log history, look in the field at the bottom of the dialog box, as shown in Figure 4-23.

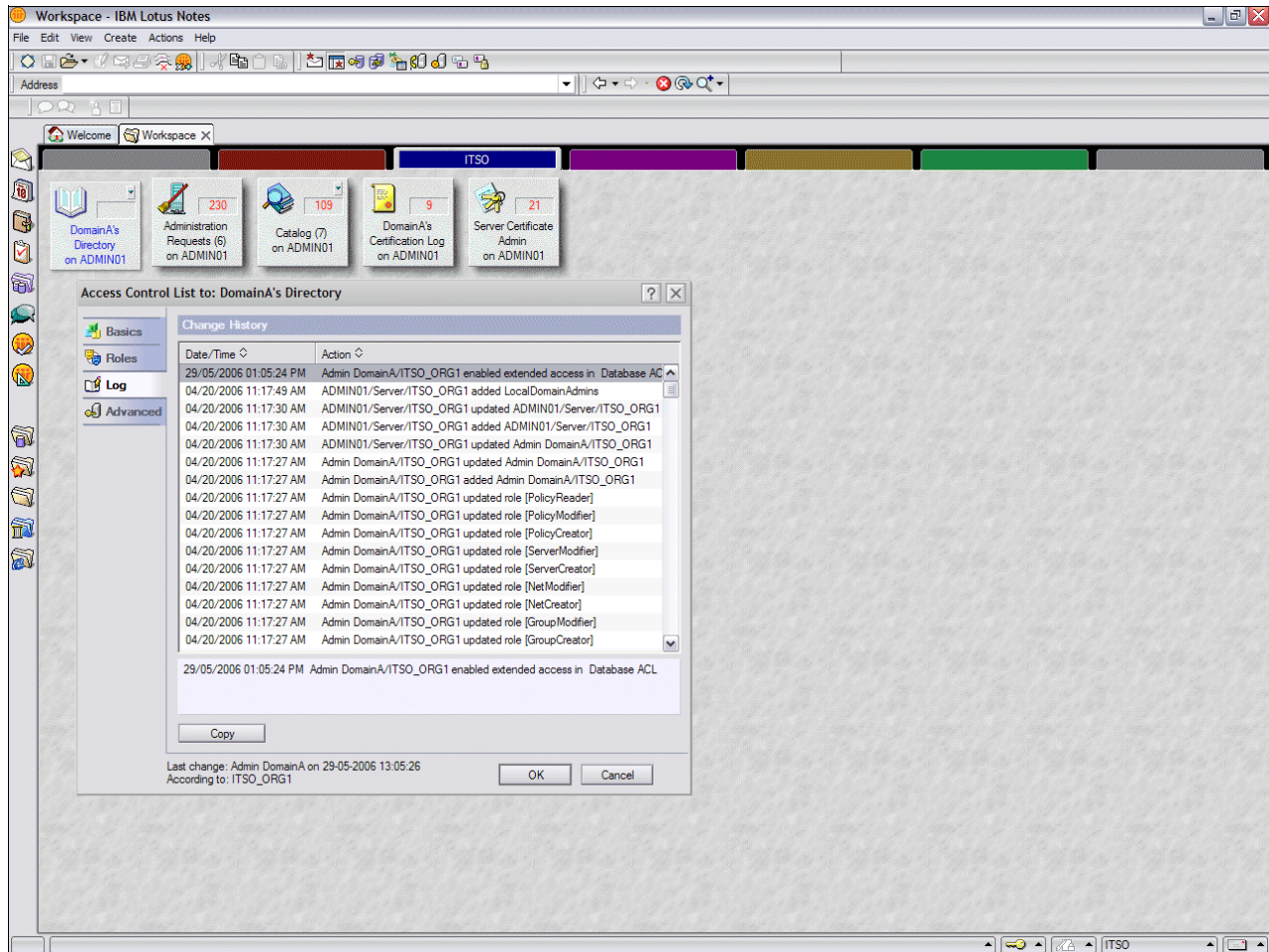


Figure 4-23 Capturing of Log changes

Note: If you use a Macintosh client, you cannot copy the content from the log into Notepad, which is an option in Figure 4-23 by using the **Copy** button.

4.7.10 Setting a subject's access to an extended ACL target

An extended ACL subject is a name for which you are setting access to a selected extended ACL target like a specific OU within your directory.

To set a subject's access to an extended ACL target in a Domino Directory or an Extended Directory Catalog, follow these steps:

1. Make sure you have enabled extended access for the directory.
2. Select **File** → **Database** → **Access Control** to open the Access Control List dialog box. Make sure you have one of the following:
 - a. Manager access.
 - b. Editor or Designer access and the Administer extended ACL access to the target for which you are setting the subject's access.

- i. Either a database manager or someone with Administer access to the target must give you this access, as shown in Figure 4-24.

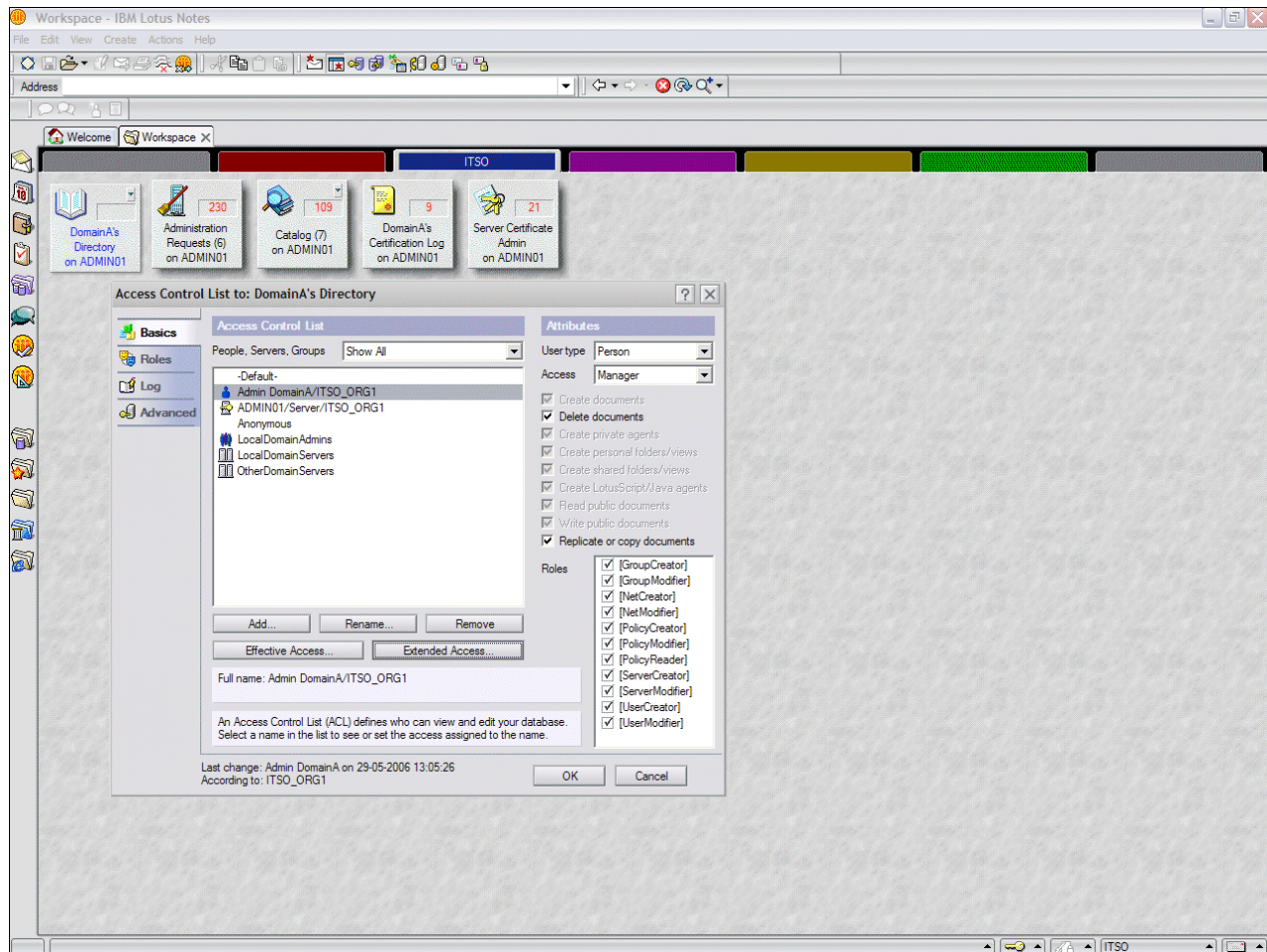


Figure 4-24 Ensuring Manager access to directory

3. With Basics selected, click the **Extended Access** button, as shown in Figure 4-25.

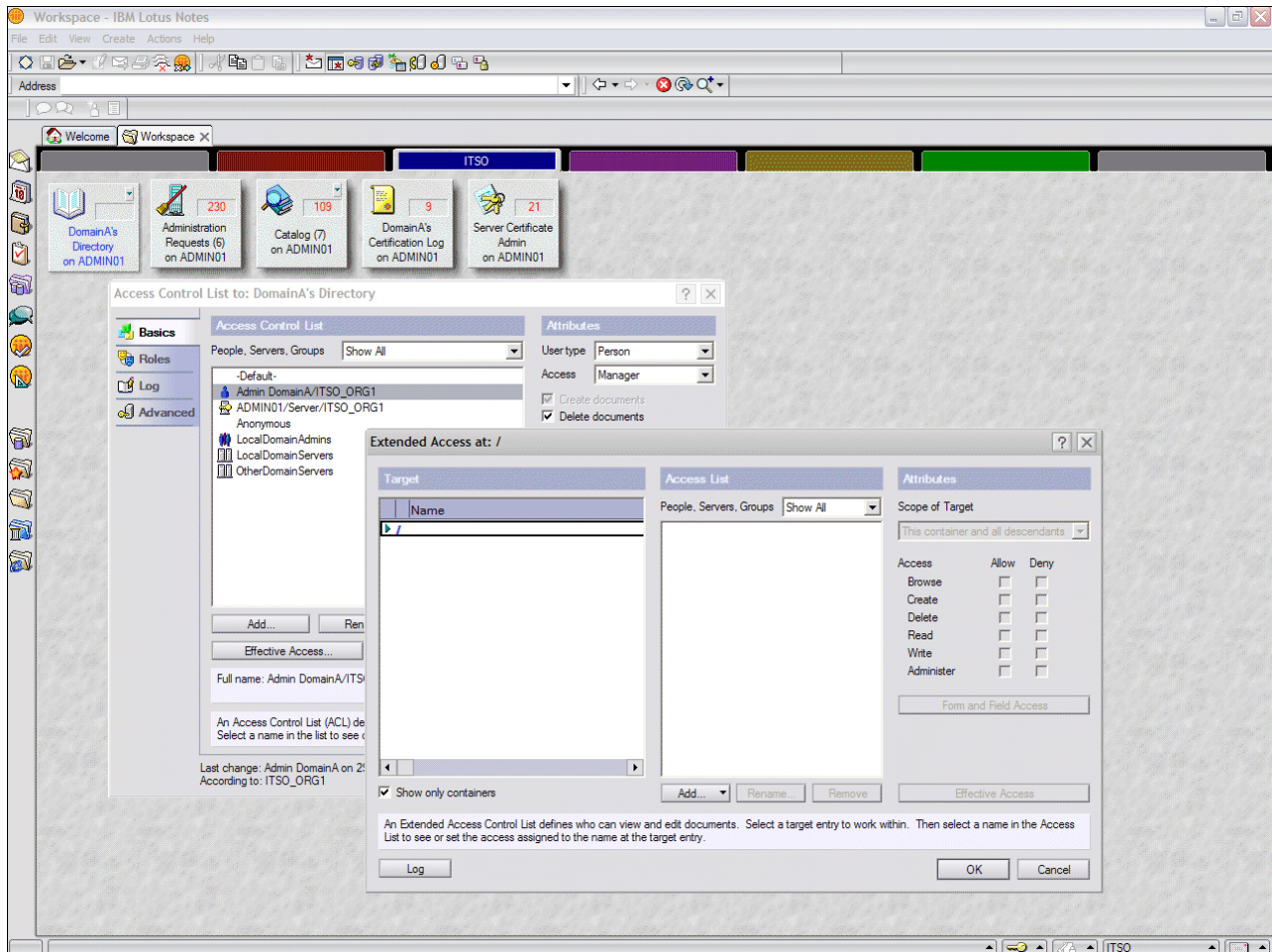


Figure 4-25 Extended Access at: / dialog box

- In the Target box at the left of the "Extended Access at target" dialog box, expand the target categories as necessary and select the target, as shown in Figure 4-26.

Tip: Below the Target box, deselect **Show only containers** to show the documents under each target category. Select the option to show only the target categories. You can choose a single document as a target, but doing so is discouraged.

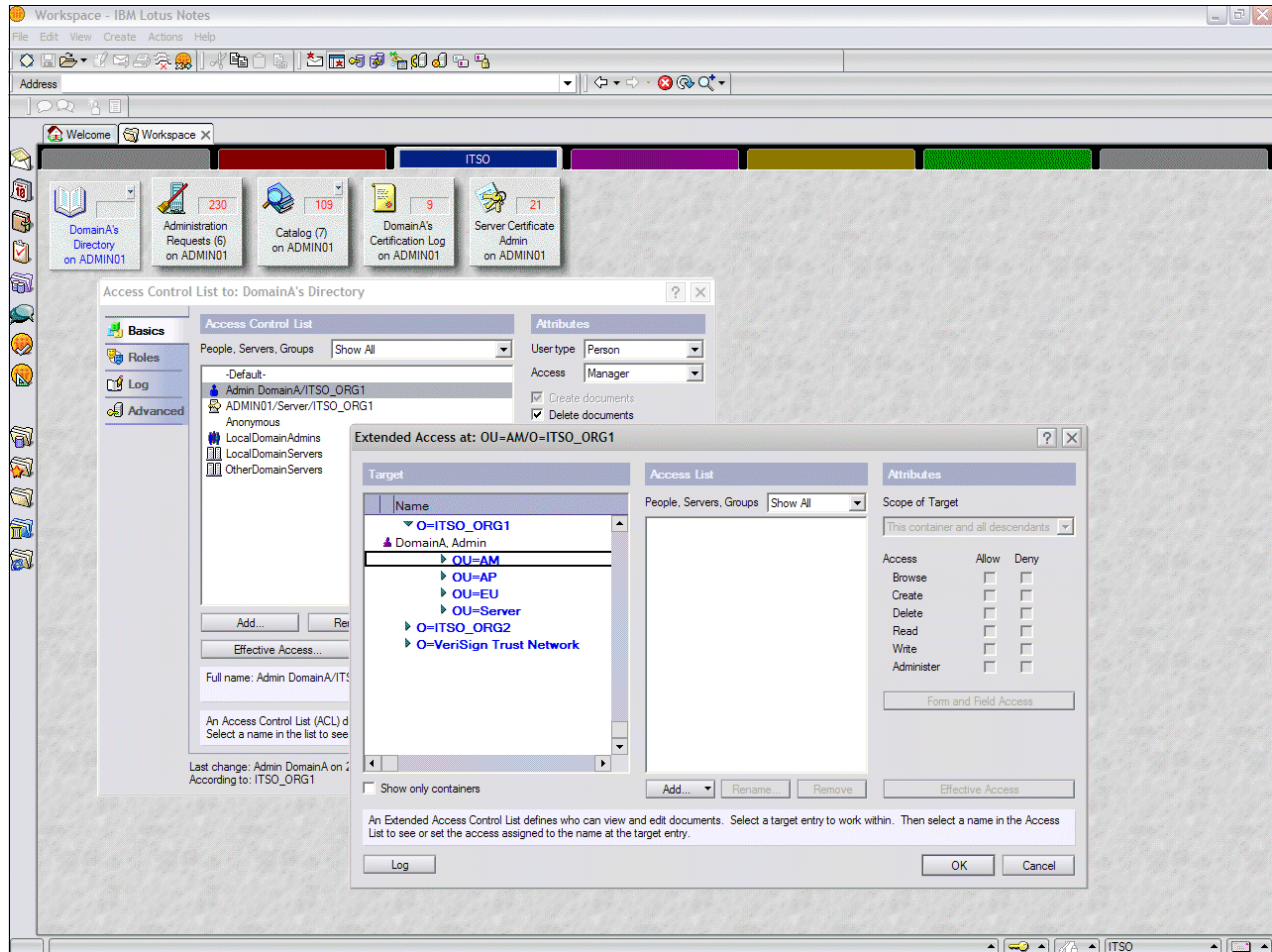


Figure 4-26 Expansion of directory tree

Further expansion of the directory tree is necessary to see the next level, as shown in Figure 4-27.

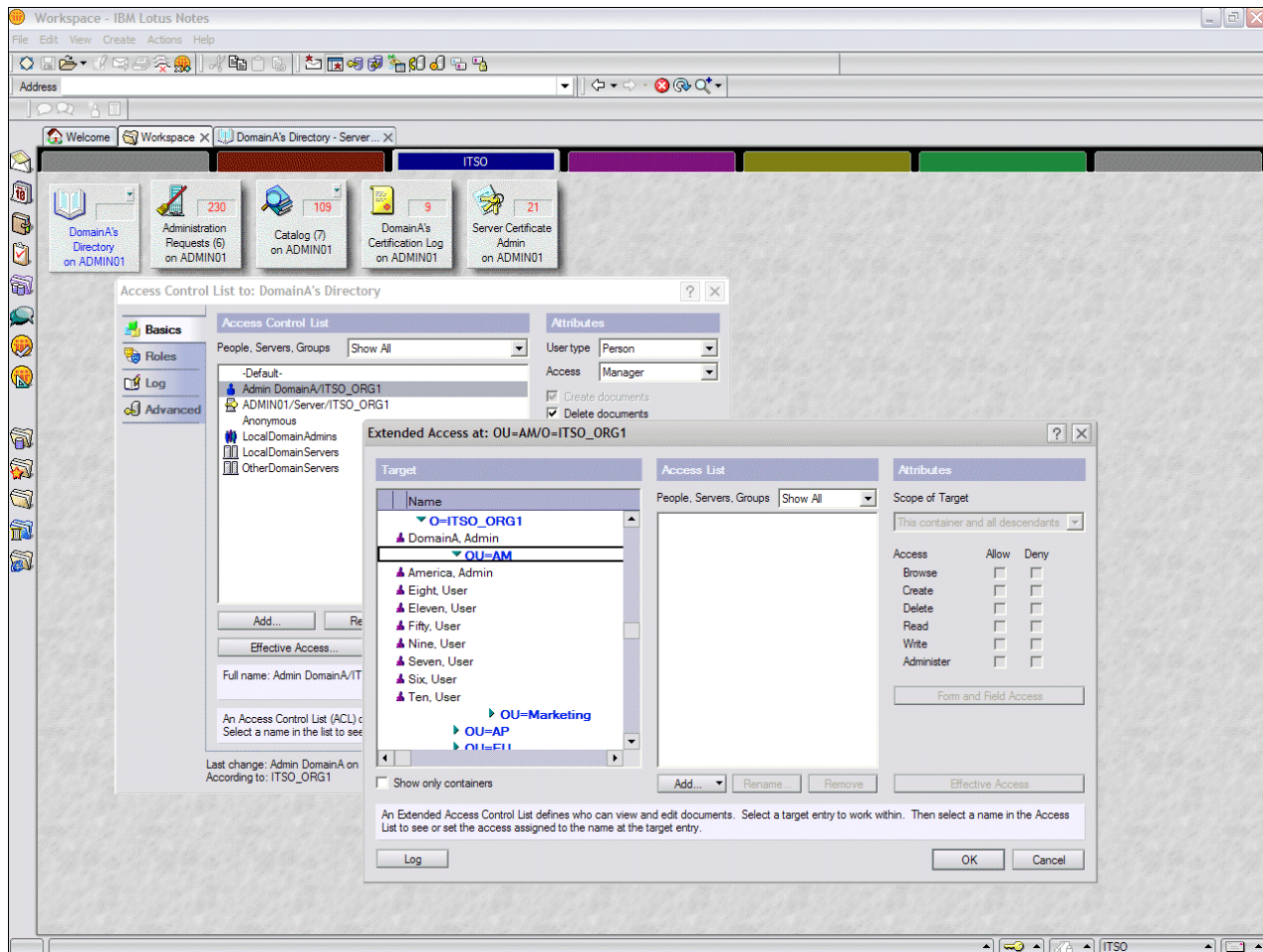


Figure 4-27 Further expansion of the directory tree

5. Next to "People, Servers, Groups" below the Access List box, select one:
 - a. Show Modified: To show only those subjects whose access to the selected target is set at the target.
 - b. Show All: (default) To show subjects whose access to the selected target is set at a higher target using the "This container and all descendants" scope, as well as to show subjects whose access to the selected target is set at the target.
6. To add the subject for which you are setting access to the selected target, do one of the following:
 - a. Select **Add** → **Name** and type or select a subject name, then click **OK** (see Figure 4-28 on page 91). If the subject is a user, server, or group that is not in the directory for which you are controlling access, this prompt appears: "Subject cannot be found in the directory. To continue, please specify the subject's type: Person, Server, Group." Select one of the options presented, then click **OK**.
 - b. Select **Add** → **Default** to add the subject -Default-.
 - c. Select **Add** → **Self** to add the subject Self.
 - d. Select **Add** → **Anonymous** to add the subject Anonymous.

If a subject's access to the selected target is set at a higher target through the scope "This container and all descendants" and you add the subject to the selected target with new access settings, the new access settings then control the subject's access to the selected target.

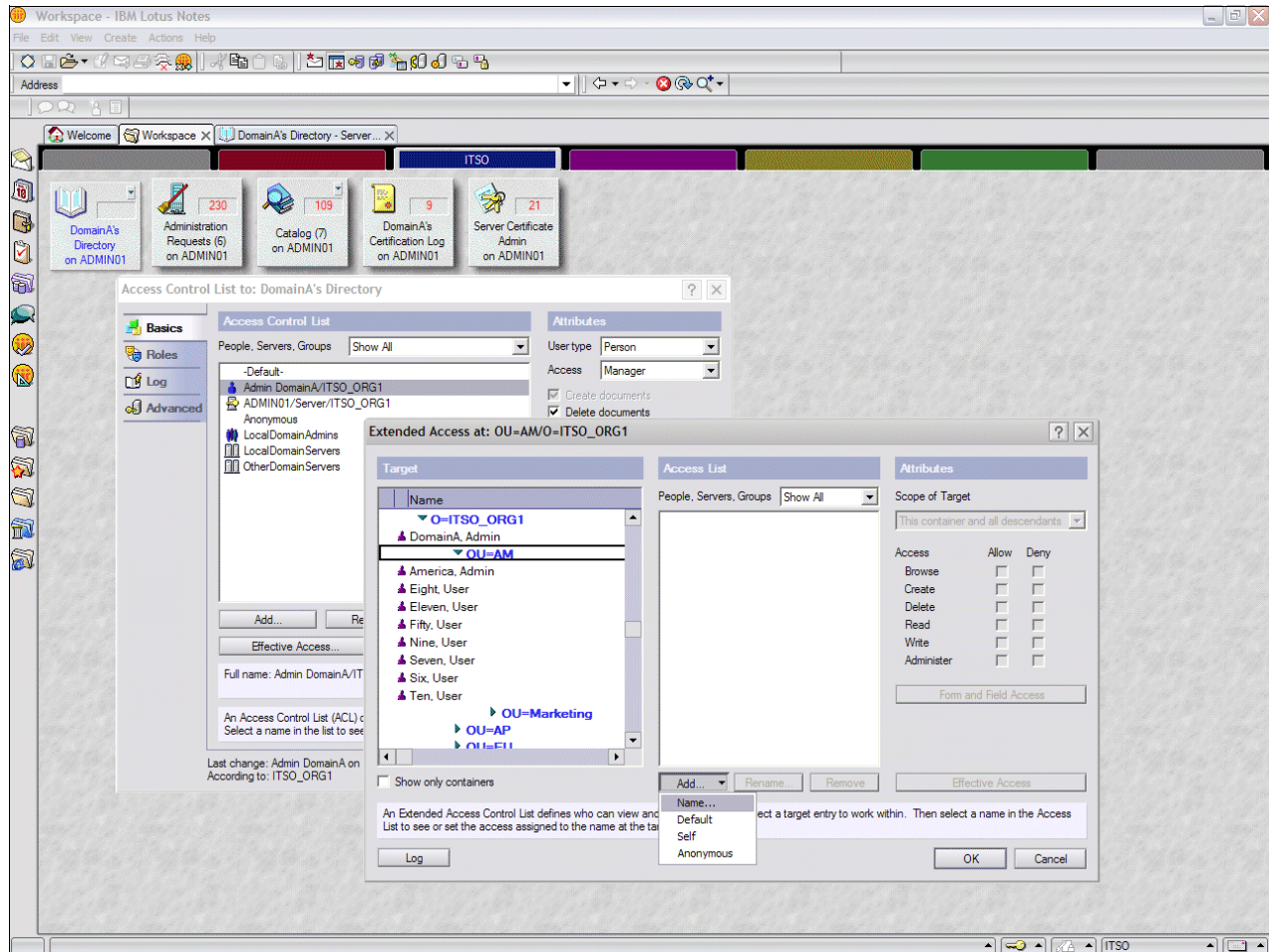


Figure 4-28 Selecting the target

After selecting the target, the subject is added, as shown in Figure 4-29.

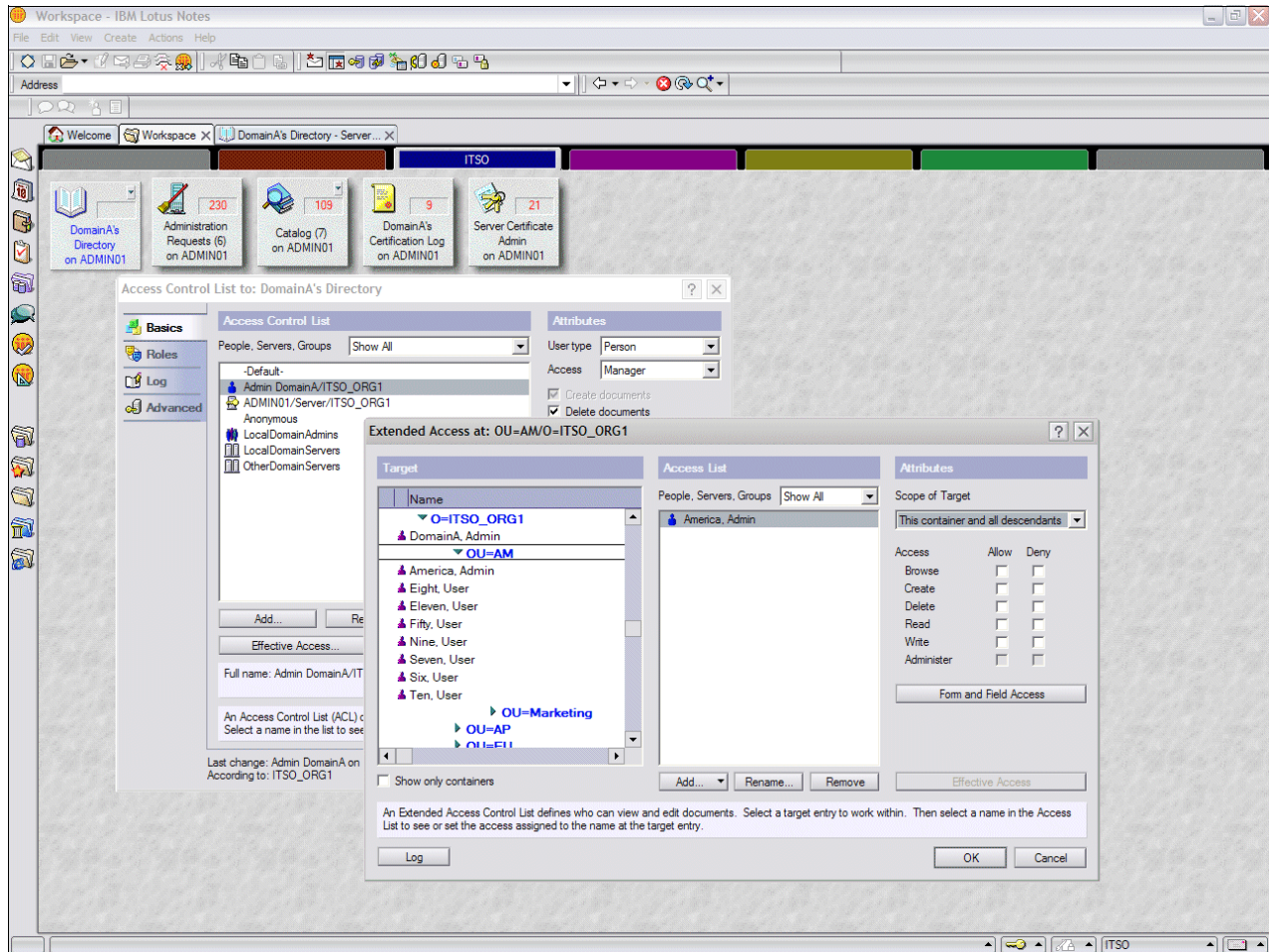


Figure 4-29 Target linked with Subject

7. Below the Scope of Target box at the top, and right of the "Extended Access at target" box, select one of the following to specify the scope of the subject's access at the selected target.
 - a. This container and all descendants (default). This applies the subject's access to the selected target and to all targets subcategorized below it.
 - b. This container only. This applies the subject's access to the selected target only and not to targets subcategorized below it.

Note: If you selected a single document as a target, the "This container and all descendants" option is not available.

8. Below the Attributes section at the right of the "Extended Access at target" box, for each of the following, select **Allow** or **Deny** to set the selected subject's default access to the selected target, as shown in Figure 4-30 on page 93:
 - Browse
 - Create
 - Delete

- Read
- Write
- Administer

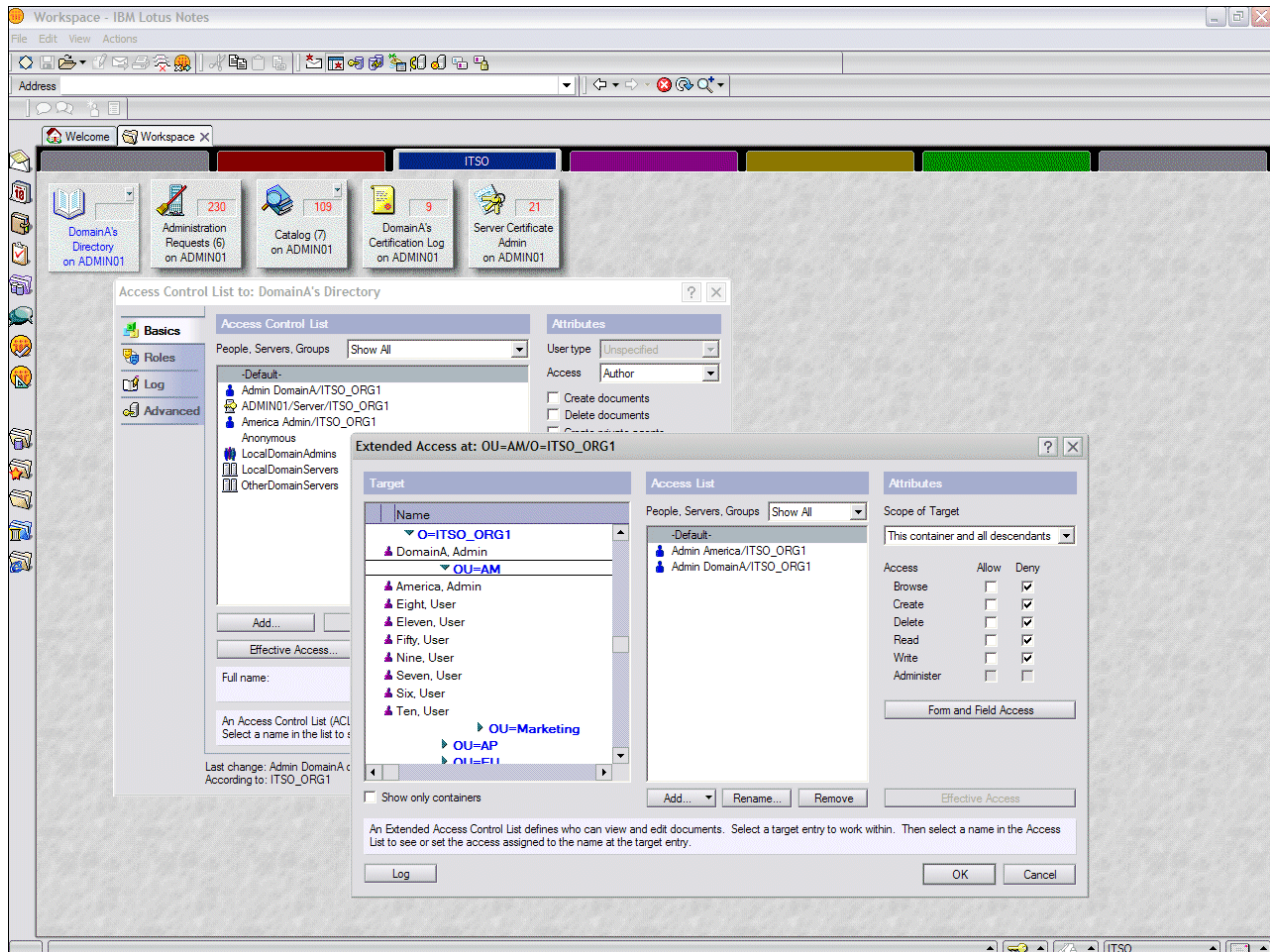


Figure 4-30 Selecting rights for the Subject Default

Types of allowed Subjects

You can specify any of the following as subjects in an extended ACL:

- ▶ Individual user or server
- ▶ Group
- ▶ Wildcard that represents documents at a specific location in the directory name hierarchy, for example, */Users/ITSO_ORG1
- ▶ Anonymous
- ▶ -Default-
- ▶ Self

With the exception of Self, these are the same types of entries that are acceptable in a database ACL.

You specify more than one subject at a target to give each subject its own access to the target. For example, the group Admins/AM/ITSO_ORG1 and the group Admins/EU/ITSO_ORG1 might each have access set at the / (root) target. You can also add the same subject at multiple targets, to give the subject different access to each target.

If the database ACL and an extended ACL both list a particular subject, Administration Process requests can rename or delete the subject in the extended ACL, as well as in the database ACL.

Anonymous as subject

As in the database ACL, the subject Anonymous controls the access of all users and servers that access a server without first authenticating. Anonymous access applies to access via all the supported protocols.

Self as a subject

The subject Self is available only for an extended ACL and not the database ACL. As a target category only, you can use Self to define the access that all users have to their own documents that fall under the target category. A user's own document is one with a distinguished name that matches a distinguished name presented by the user. Use Self so that you can use one subject to control all users' access to their own documents at a target category.

-Default- as a subject

Adding and setting access for the -Default- subject at a target is optional. If you set access for -Default- at a target, all users and servers whose access is not determined by another subject at the selected target get the access set for -Default-. If you add the -Default- subject to a target and you want some users to have different access to the target than the -Default-access, add a subject or subjects that represent those users to the target with the desired access.

Lotus Domino 7 servers as subjects

In general, an extended ACL cannot restrict access to a Domino 6 server. The exception is granting a Domino 7 server Administer access to a target category that represents a particular location in the directory name hierarchy. Doing so allows the server to be an extended administration server that can carry out Administration Process requests for documents under the selected target category. For more detailed information, please see 4.8, "Using an extended administration server" on page 95.

Advantages to using subjects that represent a group of users

When possible, use subjects that represent groups of users (-Default-, Self, groups, and wildcard subjects) rather than use individual users as subjects. For example, set access for the group Admins/ITSO_ORG1, rather than setting access for ITSO_ORG1 administrators individually. When you use subjects that represent groups of users, you minimize the number of subjects in the extended ACL to add and manage and you optimize access-checking performance.

Final steps for implementing extended ACL

1. (Optional) Set form-specific access to make exceptions to the default access.
2. Click **OK** to save the extended ACL changes and close the "Extended Access at target" box.

4.8 Using an extended administration server

An extended administration server is an administration server that processes Domino Directory administration requests. The target documents in the Domino Directory are added to, modified, or deleted only if they belong to a particular namespace within the Domino Directory. A namespace is defined by a certification hierarchy, for example, OU=Sales/ITSO_ORG1, where the organization is ITSO_ORG1 and the organizational unit is Sales. You can specify the organization or one or more organizational units as a namespace for which an extended administration server is used to process administration requests.

Attention: The traditional administration server modifies all of the target documents in the Domino Directory that either do not belong to any namespace or to which an extended administration server has not been assigned.

You can designate extended administration servers for one Domino Directory by selecting a namespace in the Domino Directory's extended access interface and designating a particular server as an administrator for that namespace. The new interface allows you to specify the exact namespace that an individual administration server is responsible for. This is shown in 4.7.10, "Setting a subject's access to an extended ACL target" on page 86. In this case, the Subject is the extended administration server.

The extended administration server distributes the administration responsibilities across multiple servers, which is especially useful for remote administration of servers that are geographically dispersed. The concept of the extended administration server was developed in order to make remote administration available to administrators.

Important: All of the Domino servers in the domain must be Lotus Domino 7 servers or newer to use the extended administration server feature.

In a decentralized Domino environment (see 4.4.3, "Model - two locations with multiple administrators and isolated administration tasks" on page 59 and 4.4.4, "Model - two locations with multiple administrators and cross administration tasks" on page 61), there is the option to use multiple servers to maintain the Domino Directory.

If your domain is geographically dispersed, having a single administration server for the Domino Directory means all administration requests for Domino Directory changes have to replicate to this one server and the resultant changes have to replicate back.

If your company is organized hierarchically, that is, it is composed of multiple organizations and organizational units, extended administration servers can be assigned to maintain the directory documents associated with people, groups, and servers whose names have that organization or organizational unit component.

This method supports decentralized administration and responsibilities ensuring that administrators can only work within their part of the hierarchical namespace they are granted access rights to.

4.8.1 Example 1: Extended ACL organizational segregation

With this very simple example, we will introduce the extended ACL to our ITSO organization where we want to separate two OUs within the same directory.

The ITSO organization uses the following name hierarchy within its Domino directory:

- ▶ O=ITSO_ORG1 (Organization)
- ▶ OU=AP (Organizational unit)
- ▶ OU=EU (Organizational unit)

The ITSO organization's goal is to prevent users registered under OU=AP from accessing documents within OU=EU, and to prevent users registered under OU=EU from accessing documents within OU=AP.

ITSO does the following to accomplish these security goals:

1. Sets the -Default- access in the Domino Directory database ACL to Reader.
2. Denies the subject */AP/ITSO_ORG1 all access to the target OU=EU.
3. Denies the subject */EU/ITSO_ORG1 all access to the target OU=AP.

4.8.2 Example 2: Extended ACL and administrator delegation

With this example, we get into an area where it is more interesting in terms of server consolidation and administration models. Here the distributed model is introduced based on administrators having different responsibilities and again, as described in 4.4, "Examples of typical administration models" on page 56, it can be applied on whatever setup your company wants to implement.

The ITSO organization uses the following name hierarchy within its Domino directory:

- ▶ O=ITSO_ORG1 (Organization)
- ▶ OU=AP (Organizational unit)
- ▶ OU=EU (Organizational unit)

The directory includes the following administrator groups:

- ▶ The Admins/ITSO_ORG1 group
 - Responsible for managing documents throughout the directory
- ▶ The Admins/AM/ITSO_ORG1 group
 - Responsible for managing documents that fall under OU=AM and that have names ending in AM/ITSO_ORG1
- ▶ The Admins/EU/ITSO_ORG1 group
 - Responsible for managing documents that fall under OU=EU and that have names ending in EU/ITSO_ORG1

The mission of the ITSO organization with this setup is to establish the following rules:

1. Allow members of the Admins/ITSO_ORG1 group to:
 - Have full access to all documents in the directory
 - Manage access at any target in the extended ACL
2. Allow members of the Admins/AM/ITSO_ORG1 group to:
 - Read all fields in all documents in the directory

- Create, modify, and delete only documents that fall under OU=AM
 - Manage the extended ACL at the OU=AM target
3. Allow members of the Admins/EU/ITSO_ORG1 group to:
 - Read all fields in all documents in the directory
 - Create, modify, and delete only documents that fall under the OU=EU
 - Manage the extended ACL for the OU=EU target.
 4. Allow authenticated users not in any of the administration groups to browse and read only Person, Group, and Resource documents throughout the database but not other documents, and prevent these users from creating, deleting, and modifying any documents.
 5. Prevent anonymous users from accessing the directory.

Table 4-3 through Table 4-6 on page 98 describe how the ITSO sets up the Domino directory database ACL and the extended ACL to accomplish its mission.

Database ACL

Table 4-3 Database ACL

Subject	Access	Description
-Default-	Reader	Required to allow non-administrators to browse and read Person, Group, and Resource documents.
Admins/ITSO_ORG1	<ul style="list-style-type: none"> ▶ Manager ▶ Delete ▶ All administration roles 	Allows members of Admins/Acme to manage all documents and the entire extended ACL; no extended ACL settings needed.
Admins/AM/ITSO_ORG	<ul style="list-style-type: none"> ▶ Editor ▶ Create, Delete ▶ All administration roles 	Required to allow members of Admins/West/Acme to create, modify, delete, and manage the extended ACL for West/Acme documents.
Admins/EU/ITSO_ORG1	<ul style="list-style-type: none"> ▶ Editor ▶ Create, Delete ▶ All administration roles 	Required to allow members Admins/East/Acme to create, modify, delete, and manage the extended ACL for East/Acme documents.
Anonymous	No Access	Prevents anonymous users from accessing any information in the directory. No extended ACL settings are needed.

/ (root) target in extended ACL

Table 4-4 /root target

Subject	Access	This container and all descendants?	Description
-Default-	Default: <ul style="list-style-type: none"> ▶ Deny: all Person, Group, and Resources ▶ Allow: Browse, Read ▶ Deny: Create, Delete, Write, Administer 	Yes	Allows non-administrators to read only Person, Group, and Resource documents.
Admins/AM/ITSO_ORG	Default: <ul style="list-style-type: none"> ▶ Allow: Browse, Read ▶ Deny: Create, Delete, Write, Administer 	Yes	Prevents members of the Admins/AM/ITSO_ORG1 group from modifying documents at the / (root) and O=ITSO targets.
Admins/EU/ITSO_ORG1	Default: <ul style="list-style-type: none"> ▶ Allow: Browse, Read ▶ Deny: Create, Delete, Write, Administer 	Yes	Prevents members of the Admins/EU/ITSO_ORG1 group from modifying documents at the / (root) and O=ITSO targets.

OU=AM target in extended ACL

Table 4-5 AM target

Subject	Access	This container and all descendants?	Description
Admins/AM/ITSO_ORG	Default: <ul style="list-style-type: none"> ▶ Allow all 	Yes	Allows members of Admins/AM/ITSO_ORG1 to have full access to documents under OU=AM.

OU=EU target in extended ACL

Table 4-6 EU target

Subject	Access	This container and all descendants?	Description
Admins/EU/ITSO_ORG	Default: <ul style="list-style-type: none"> ▶ Allow all 	Yes	Allows members of Admins/EU/ITSO_ORG1 to have full access to documents under OU=EU.

4.8.3 Disabling extended ACL

Disabling extended access takes effect immediately and irreversibly removes any extended ACL restrictions that have been set and so will alter security checking for the database.

You will remove all restrictions set on forms and fields, and the database ACL will no longer be restricted by extended ACL access settings.

In addition, the database ACL will no longer be enforced for Notes client lookups to the directory, and the domain Configuration Settings will resume as the access control mechanism for anonymous LDAP searches of the directory.

Disabling extended access removes all evidence of extended ACL settings, information that cannot be recovered unless you restore it from a recent backup or archive of the directory, or unless you write down the settings prior to disabling them and then reapply them manually later.



Project planning overview for performing server consolidation

This chapter is intended to help project managers and IT architects develop an overall consolidation project plan. It covers some standard project management topics, as well as very specific information about what will be needed to get the project running.

Since no two consolidation projects are alike, we strongly recommend that the information in this Redpaper be used as input for the project, but not as the final word on exactly how the project should be run.

We discuss several project scenarios and high level considerations for the project plan. The steps and activities described in this chapter will assist the project team in consolidating their Lotus Domino 7 environment.

Attention: This chapter is not meant to be a complete project management handbook, even for a consolidation project. Every organization, environment, and project is different, and expert project management skills are needed to manage the project successfully. The goal of this chapter is to increase your awareness of the topics you should consider and act on when planning and implementing the project.

For information about project management, refer to the Project Management Institute Web site at:

<http://www.pmi.org>

5.1 The key steps in a consolidation project

The following high-level steps are the keys to successfully planning and implementing a Lotus Domino domain or server consolidation project:

- ▶ Have a project sponsor that is involved in the project.
- ▶ Define the project vision.
- ▶ Assemble the right project team.
- ▶ Develop and maintain the project schedule.
- ▶ Project scope management.
- ▶ Document requirements.
- ▶ Establish a communication plan.
- ▶ Set project expectations.
- ▶ Document the current Lotus Domino infrastructure.
- ▶ Assessment of current administration model and service levels.
- ▶ Develop the training plan.
- ▶ Plan, design, and document the consolidated Domino and Notes environment.
- ▶ Develop a migration and coexistence plan during consolidation.
- ▶ Risk analysis.
- ▶ Change Management.
- ▶ Test and validation of consolidation approach, and run pilot.
- ▶ Run consolidation activities.
- ▶ Final phase - project closure.

An overview of each step follows; a thorough discussion of these topics is discussed later in this Redpaper.

Project sponsor involvement

The importance of high-level sponsorship must be strongly emphasized for a project, such as the consolidation of enterprise Lotus Domino infrastructures.

Project vision

The project vision is a high-level, unbound view of the future.

Assemble the right project team

Putting together the right project team is a critical factor in ensuring a successful consolidation. This type of project requires a group with the right technical and management skills to ensure an accurate, high-quality design and a realistic, manageable project schedule.

Develop and maintain the schedule

There is a lot at stake in any consolidation project. Things must occur in a certain order, within a set time frame, to ensure a successful consolidation. Therefore, realistic and achievable schedules must be established for the project.

Project scope management

The project scope defines the boundaries of the consolidation project. The scope statement should enumerate involved infrastructure parts, such as locations, domains, and servers, as well as organizational units.

Document the business requirements

The first task the consolidation project team must tackle is fully documenting the business requirements and the scope of the consolidation. This exercise involves tailoring the individual consolidation approaches and detailing any additional requirements. The result of this step is a set of clearly defined, realistic goals for the project.

The communication plan

The objective of a communication plan is to educate, inform, energize, and engage all parties of a project. Without adequate communication throughout the consolidation project, you run the risk of creating an excellent plan that never has the opportunity to be implemented. Developing a communications plan can be regarded as a internal marketing campaign.

You also need to have a user communication plan. This can include:

- ▶ A general pointer to a central Web site/database for "what is changing" information.
- ▶ A communication warning users 'x' days before their mail files are migrated.
- ▶ A communication warning users 'x' days before high profile applications are migrated.
- ▶ A central Web site/database where users can see when their application(s) will be migrated. This can even include details of the source and target servers to prevent unnecessary help desk calls.
- ▶ A central Web site/database where users can see information that tells them basic "how to" information in case they have problems. (This can prevent a lot of unnecessary calls to the help desk.)

Set project expectations

Setting expectations requires open, honest communication throughout the life of the project. From the top on down, all the people involved need to have a realistic picture of what they will receive and when they can reasonably expect to receive it. Everyone should understand the project and the progress being made on it. Unrealistic expectations and perceptions can be deadly, causing a successful project to be perceived as a failure. You can avoid this by keeping everyone's expectations in sync.

Document the current Lotus Domino infrastructure

This phase of the project involves gathering specific and detailed information about:

- ▶ The enterprise infrastructure
- ▶ e-mail metrics
- ▶ Applications
- ▶ Services

This information defines the current messaging environment. It includes such things as the network topology and the current delivery sites.

Note: Being very thorough here avoids unpleasant problems later, as forgotten or neglected functionality may escalate to be a showstopper.

Document the current administration model and service levels

Since your consolidation project may impact your delivery organization, a detailed view of how it operates and interacts as-is will be important. Additionally, any service and availability commitments for your business should be present prior the consolidation starts.

Develop the training plan

New skills might be required when you are consolidating across locations, changing platforms, or impacting the administration model. Training everyone involved with and affected by this project will be a key factor in its success.

Training should be an ongoing activity throughout the course of the project. Communicating the reasons for the consolidation can be a part of the training, and developing the training plan can actually begin concurrently with the documentation of the current environment. The plan can then be updated during subsequent steps.

Plan, design, and document the consolidated Domino and Notes environment

In this step, the project team designs the future environment based on the chosen consolidation techniques, one that reflects the company's strategic infrastructure plans and meets the current needs. The team must design a well researched and carefully conceived messaging infrastructure to support not only the users' e-mail needs, but a variety of other messaging applications after consolidation.

The activities in this step of the project include:

- ▶ Planning the future environment
- ▶ Choosing the right consolidation approach
- ▶ Designing the consolidation processes
- ▶ Documenting the consolidation approach and the target environment

Develop a migration and coexistence strategy during consolidation

The coexistence and migration strategies are the plans that define how to migrate users and applications to target domains and servers and describe the functionalities to be supported until the consolidation process is finished. These strategies are dependent on:

- ▶ Business requirements and the scope of consolidation
- ▶ Setup of the source and target system or systems
- ▶ The design and implementation of the target Domino and Notes environment

Risk analysis

A proper risk analysis and management is an important factor for the project's success. The more building blocks are affected by the consolidation approach, the more critical success factors impact the project.

Change management

In order to ensure that you run your project within time and budget, as well as meeting the technical requirements, you have to set up proper change management. From a technical perspective, the change management assures that all stakeholders and specialists know and approve the upcoming changes on the infrastructure. Fall back activities should also be defined within the change documentation.

Test and validation of consolidation approach, and run pilot

Running several tests and initiating a pilot phase helps to prove the overall concept, its feasibility, and user acceptance, as well as helps to improve user or application migration processes.

Run consolidation activities

At this point, the consolidation approach has been validated, and the coexistence and migration strategies are defined. Now the actual migration / consolidation of users or applications to the target environment can take place. Key activities in this step are:

- ▶ Training
- ▶ Publishing the consolidation schedule
- ▶ Announcing the kickoff of the consolidation
- ▶ Starting the consolidation activities.

Close the project

When the consolidation is done, there are still a few tasks necessary to close out the project. They are discussed in a later section.

5.2 The sponsor

High-level sponsorship is crucial to a large-scale project like Lotus Domino consolidations.

In addition to making major changes to the IT infrastructure, the consolidation project can affect the way the company does business, as well as causing cultural changes within the company when consolidating Domino domains or across different sites affecting the administration model.

The sponsor should preferably be of executive level, have a clear and complete understanding of the business reasons for the project, and be committed to the vision.

The sponsor's full understanding of the business reasons helps both the sponsor and the project team to provide clear and precise communication about the project and its goals. This enables the sponsor to emphasize the importance of this project and help ensure the project team gets the cooperation they need from all areas of the company. We recommend that the project sponsor work with the project manager to hold an initial kickoff meeting for company management.

The goal of the kickoff meeting is to gain the needed management cooperation to build the project team and potentially initiate a steering committee. Further into the process, having the project sponsor acknowledge the work of the test users and participants in the pilot will foster a positive attitude about the consolidation throughout the company.

5.3 The project vision

The project vision is a high-level, unbound view of the future messaging and collaboration system that is to be created by consolidating the current Lotus Domino infrastructure. The project vision should be aligned with the overall business vision of the company. Such a vision helps to establish both long-term goals and short-term objectives to ensure the success of the consolidation project.

Here is an example of a vision statement:

The vision of the consolidation project is to replace our multiple existing divisional-based messaging domains with an enterprise-wide messaging and collaboration domain that operates on fewer machines. This consolidation will enable all our business units to interoperate seamlessly while adding user functionality and reducing administrative and operational costs. Consolidation will commence within three months, and will be complete within nine months.

5.4 The project team

Assembling the right project team is the key factor in ensuring a successful consolidation project. It is mandatory to assemble a group with the right technical and management skills to ensure an accurate, high-quality design and a realistic, manageable project schedule.

The team will most likely consist of employees from your company along with subject matter experts and consultants from IBM or its business partners.

The team may consist of one or more persons in each of the following roles (and multiple roles may be filled by a single individual):

- ▶ Project manager
- ▶ Sponsor (does not have to be a member of the team, but needs to be kept informed regularly)
- ▶ Domino architect
- ▶ Domino administrator
- ▶ Domino application developer
- ▶ Hardware/operating system specialist (critical if moving to a new platform)
- ▶ Storage specialist
- ▶ Network administrator
- ▶ IT/IS manager
- ▶ Site and data center manager
- ▶ Migration specialist
- ▶ Support team representative
- ▶ Specialists (these individuals may be on call)
- ▶ Users from key interest groups

Experienced users from the organizations being affected by the consolidation should be involved. They can help communicate the progress of the project and assist with choosing appropriate test users. They could also provide early feedback on plans and schedules, as well as ensuring any requirements unique to their areas are accounted for in the design of the consolidation processes.

5.5 The schedule

A realistic, achievable schedule must be created for the project. This schedule should not only consist of a target date for completing the project, but should identify important milestones, deadlines, and the resources needed along the way.

To help you explain the basis of the established schedule to a sponsor or management team, be certain to:

- ▶ Educate management on the steps involved in this type of a project
- ▶ Explain the processes involved
- ▶ Lay out a reasonable, achievable high-level timeline
- ▶ Explain the risks involved in delays in any of the steps or processes

The goal is to gain acceptance from the project sponsor for a realistic, achievable timeline.

5.6 The scope

The project scope sets the boundaries for the consolidation project. The scope statement should define the organizational, geographical, and infrastructural scope as well as the technical consolidation targets within the time given and resources allocated. The scope should differentiate between what the consolidation must include and what is non-essential.

Example of a consolidation project scope:

When consolidation is completed, our new infrastructure will:

- ▶ Decrease the current maintained e-mail servers from 50 to 40 machines and the current application servers from five to four machines
- ▶ Decommission the existing Domino domain A by moving users and applications into Domino domain B on already existing servers
- ▶ Move all e-mail users and applications hosted on four machines at site C to two, newly built servers at site A
- ▶ Change the administration model to fulfill the requirements specified by the SLA of the company

5.7 Documenting requirements

There are many reasons why a company might want to consolidate their Domino infrastructure, as discussed in Chapter 2, “Reasons for consolidation” on page 7.

Documenting the business reasons for the consolidation project and evaluating functional and non-functional requirements to the Lotus Domino infrastructure is one of the first tasks the consolidation project team must undertake. It has to ensure that the consolidation approach does not compromise business needs to the infrastructure.

The project team must also communicate the reasons, goals, and other project information to the user community. Open communication will facilitate cooperation and help ensure success.

5.7.1 Non-functional requirements

Many of the basic requirements for consolidation may have already been presented at a high level during the identification of the consolidation approach. The team must now expand on those requirements and give detailed specifics on each, to ensure they are incorporated into the design and focus of the consolidated environment.

The non-functional requirements include such things as:

- ▶ Messaging server scalability, reliability, and manageability.
- ▶ Lower total cost of ownership (TCO). This refers to the company's cost to run, support, and administer the new messaging environment. It does not refer to the one time costs associated with the consolidation project.
- ▶ Sustaining interoperability with third-party systems and interfaces.
- ▶ Improved throughput.

What is expected in each of these areas by the corporation should be detailed in the requirements. For example, the project sponsor might expect a minimum delivery time for a simple mail message after the consolidation across locations. The project team must ensure this is stated, and that the designers of the consolidation approach meet that goal. Additionally, if the sponsor has a requirement that is unrealistic, this is the time to modify the expectation to be within the boundaries of what is possible or feasible.

5.7.2 Functional requirements

In order to sustain former infrastructure functionality after the consolidation take place, these special requirements have to be defined. They include:

- ▶ Features and functions of e-mail related components, for example:
 - Web access or POP3 or IMAP accessibility
 - User authentication and management
 - Languages supported
 - Resource reservation
 - Quota settings
 - Encryption or other security features
 - Archiving and e-mail retention
- ▶ Applications and their features and functions that have to be available after consolidation into the target environment
 - Web access and load balancing
 - Indexing and housekeeping functionalities
 - Access regulations

These requirements definition can also be input to the training plan, to ensure administrators know how to deliver services within the target environment.

At this point, it is necessary to realign the expectations. After studying the current environment and making plans for what functionality will be available in the target environment, at a later stage, or not at all, the revised expectations should be communicated to the sponsors and the user community.

5.8 The communication plan

The objective of a communication plan is to educate, inform, energize, and engage all parties of the project. Without adequate communication throughout the planning process, you run the risk of creating a fabulous plan that never has the opportunity to be implemented. The communication should begin at the beginning—at the point where you assemble your project team and begin the planning process.

To create your communication plan:

- ▶ Identify who to inform about the project (key individuals, decision makers, and strategic groups).
- ▶ Decide who is responsible for reaching each person or group.
- ▶ Determine when, what, and how communication will take place. That is, try to identify each communication step.
- ▶ Identify the communication vehicles you have available and any communication vehicles you may want to create.
- ▶ Pay attention to any feedback you receive.

Reach everyone who will play a role in implementing the project. If you identify additional players part of the way through the planning process, do not hesitate to include them in your communication from that point forward, and be sure to catch them up and include them on the process.

Some of the topics you should consider communicating about:

- ▶ Consolidation project in general
- ▶ Goals set for the project
- ▶ Implementation schedule
- ▶ Pilot project
- ▶ Target environment
- ▶ Where and how the education is available
- ▶ How to contact support
- ▶ Progress of the project

5.9 Setting the expectations

Setting the correct expectations is crucial to the success of a consolidation project. If the expectations are not set correctly, you run the risk of having very low client satisfaction from the users.

Just because one consolidation approach worked in one environment does not mean that it will be successful in another. By assuming that a new consolidation project is identical to a previous one, there is a danger that significant differences in stakeholder expectations and requirements will be ignored or actively suppressed. Project outcomes must support the specific structures, processes, people, and existing systems and locations in a particular organization, not some generic version.

One of the most powerful strategies for keeping a project on track is to set the stage properly. This means more than distributing the project plan. Complement the plan by stating the

project vision and goals. Describe the final result and how the project team will conduct itself to get to that result.

It is important to set the expectations early in your project management activities. Incorporate these concepts in kickoff meetings and initial meetings with specific project teams.

Examples of expectations set for the consolidation:

- ▶ All mail present on servers will be moved to target environment.
- ▶ Mail will not be coexisted.
- ▶ Calendar and scheduling information be moved.
- ▶ Calendar and scheduling information will not be coexisted.
- ▶ Access to target infrastructure will be verified in advance.
- ▶ Delegation access and free time search during consolidation will be available.

Examples of expectations set for the target environment

- ▶ Delivery of messages internally: 90% < 5 sec, 5% < 20sec
- ▶ Open mailbox view: 90% < 5 sec, 8% < 20 sec
- ▶ Send file and store: 90% < 5 sec, 8% < 15 sec
- ▶ (Sums not equal to 100%; remainders are for special exceptions)

5.10 Document the current Lotus Domino infrastructure

This section is supposed to help you gather and document specific, detailed information about the current Lotus Domino infrastructure as an addition to the already introduced building block model (see 3.1, “Domino architecture topologies” on page 30).

In addition to the requirements definition, a detailed documentation about your current Lotus Domino infrastructure will be the foundation that will help you to build a complete and accurate design of the consolidation processes.

In this section, we describe the steps for documenting the following:

- ▶ Lotus Domino environment
- ▶ Network infrastructure

5.10.1 Documenting the Lotus Domino environment

Whether you have a small, medium, or large Domino environment, it is important that you gather all the data recommended here. Having all this information will ensure nothing is missed in the design of the consolidation processes. Many details may already be documented, so this phase of the project may be just verifying the existing information.

The documentation must be performed for both source and target system to identify the best consolidation approach.

Lotus Domino server topology

To document the Lotus Domino server topology, you need to know:

- ▶ The version of Domino servers running
 - If different versions are being used, then state why. There might be a very specific reason that a newer or older version is used.
- ▶ The operating system/version/SP level the servers are running on
 - If different versions are being used, then state why. There might be a very specific reason that a newer or older version is used.
- ▶ Performance and utilization reporting (memory allocation, storage availability, and use)
- ▶ The current Domino topology
 - Based on the building block model document, visualize your current server topology by identifying:
 - Site names
 - Network segments (if applicable)
 - Server's host names
 - Server's Domino names
 - Domino domain
 - The organization's names (per server or per domain)
- ▶ Connections to other internal/external systems
 - SMTP servers and connections
 - LDAP services
 - POP3 and IMAP services
 - Inter domain connections
 - Replication connections (path, schedule, and options)
 - Mail routing connections (protocol and domains)
- ▶ Calendaring and scheduling services
- ▶ Directory services (Directory Assistance and Directory Cataloger)
- ▶ Access and distribution lists
- ▶ Type of servers (hub, spoke, and pass through)

Lotus Notes client topology

To document the Lotus Notes client topology, we will need to know:

- ▶ Kind of clients are connecting these machines?
 - Lotus Notes.
 - Web mail.
 - Domino Web Access (DWA).
 - Third-party mail systems.
- ▶ Versions and language of clients
- ▶ Number of users accessing a particular server / domain
- ▶ Are there mobile users?
 - Document type of service and amounts of mobile devices.

- Users in replication mode having local replicas.
- How is access to mobile users provided?
- Detail the functionality used with the mobile devices (for example, Blackberry).
Be detailed; losing functionality will act as a showstopper to the mobile workers.

- ▶ List of users per locations (include mobile)

Lotus Domino messaging and application services

Services, such as those in the following list, are also key elements of the messaging infrastructure and must not be overlooked when planning a consolidation. Be sure to document how each of these services is used in the existing environment and whether that use will change in the target environment.

- ▶ Calendar and Scheduling
- ▶ Mail-in databases
- ▶ Holidays
- ▶ Resource databases
- ▶ Team calendars
- ▶ Performance and utilization reporting
 - Existing active/concurrent users
 - Peak times
If possible, try to obtain statistics that show the peak number of users on an hourly basis for a full month. There might be very big variations in different companies. This information will be used for the feasibility of consolidation or defining the right target system.
 - How many mail items, on average, are sent per day (average per user)?
If there are variances in how the users act on different sites, then state this as well.
 - Average size of a typical e-mail.
 - Average size of the users' mail file.
 - Mail quota in use (If yes, state the limit).
- ▶ Attachment restrictions
- ▶ Are there any procedures/applications using Lotus APIs?
These might be plug-ins, third-party software, or in-house developed software. Maintaining this kind of functionality might involve the developers or other separate handling.
- ▶ User Directory
 - What types of customized fields are kept in the Domino directory?
- ▶ Event monitoring
- ▶ Other services:
 - Instant messaging
 - Is there an e-mail enabled fax solution?
Document functionality and dependencies to Domino
 - Are there other applications running on the Domino Servers? If yes, list the applications and the servers those applications are available on.

- Is antivirus software being used? If yes, gather details on the antivirus software and where it runs.
- Is backup software being used? If yes, gather detail on the backup software. Record the backup schedule for incremental and full backups.

Important: The project plan for backups needs to consider the minimum window of backups that is required for applications, mail files and specific business critical applications during the cutover/migration phase. The application and mail backups on the old systems should stay in place until the new system backups have reached the minimum level of backups before the old systems can be decommissioned.

- Is there a automated mechanism for software distribution (Tivoli® or SMS) affecting Domino?

Domino application inventory

Important: If you plan to consolidate servers hosting Domino applications, you must be aware of any application related impacts, for example:

- ▶ Already available replicas and replication topology across servers domains and locations
- ▶ Domino data path directory structure
- ▶ Hardcoded server names, links, and so on within the application
- ▶ DNS aliases for Web-enabled applications

We recommend creating an application inventory to record all applications running on servers that are in the scope of the consolidation. You should create such an inventory for both source and target servers by collecting:

- ▶ Application name
- ▶ Server and data path of location
- ▶ Replicas
- ▶ Replication settings (especially if selective replication is used)
- ▶ Application quotas
- ▶ Agent settings for applications in cases where there are multiple replicas of an application
- ▶ Any third-party software required by applications (like MQ series or LEI)
- ▶ Business relevance
 - Financial business impact
 - Security relevant
 - Availability
- ▶ Special requirements, for example, specific platform needs or system files
- ▶ Business owner (to have a business related point of contact)
- ▶ Domino administrator (if available for special application)

5.10.2 Documenting the network infrastructure

You need to have a complete description of the network and a overview of the actual network configuration. This should include:

- ▶ Central/distributed location with number of users
- ▶ Type of connections (leased lines and switched lines)
- ▶ Bandwidth of the lines
- ▶ Are lines shared with any other functionality (phone or other)?
- ▶ LAN configurations
- ▶ Available network protocols (TCP/IP, NetBIOS, IPX/SPX, and so on)
- ▶ Connection to a public network provider (Internet)
- ▶ Routers
- ▶ DNS host files
- ▶ Firewalls and their open ports
- ▶ Quality of service supported
- ▶ Other essential functionality

Tip: Capture the existing network load on each segment of the network. This will be useful in pinpointing network design problems if the consolidation does affect the network services.

5.11 Assessment of current administration model and service levels

As already covered in Chapter 4, “Administration models” on page 53, there are different administration models to manage your Lotus Domino infrastructure. Depending on the size of your current infrastructure and organization as well as on the scope of your consolidation project, the administration model is more or less affected.

To determine any impact on the infrastructure administration, you will need to know how the administration and support model is built. It is essential to make sure that, as a minimum, you keep the service on the current level. If SLAs are in place, they might be considered as well when planning the consolidation.

5.11.1 Administration model

To identify those parts of your Lotus Domino Infrastructure administration that will be affected by the consolidation approach, you must have an overview of which part of the infrastructure is maintained by which unit, whether centralized or distributed.

You may use the topology model in “Lotus Domino server topology” on page 111 to map your delivery units to each infrastructure part. This will ease the identification of affected units as well as to identify the scope and amount of potential training necessities.

The following key data according to each delivery unit should be documented:

- ▶ Location
- ▶ Site responsibility

- ▶ Building blocks or systems supported
 - Hardware and data center infrastructure
 - Network back end
 - Operating system
 - Storage, backup, and system management
 - Domino server
 - Other applications or services
- ▶ Special application in place to provide service
- ▶ Number of resources
- ▶ Number of workstations
- ▶ Shift models and service times
- ▶ Skill level
- ▶ Responsible manager
- ▶ Contingency planning

5.11.2 Support model

To obtain your support services, such as *User Help Desk (UHD)*, or downstream support levels during and after the consolidation project, it is important to identify in which manner these are operating. This will also be required to determine the consolidation impact to these units.

Analogous to the administration model assessment, you have to analyze your support organization.

Important: Your support organization especially must be included in the consolidation schedule and upcoming changes to fulfill their support functions and help users during the consolidation realization.

5.11.3 Delivered services

To outline possible changes and improvements to the administration and support model due to the consolidation approach, the relevant Service Level Agreements (SLAs) must be known:

- ▶ Infrastructure availability metrics
- ▶ Response times
- ▶ Maintenance windows

Attention: The SLA needs to be very clearly defined. Most SLAs guarantees a percentage server availability, but the definitions are not clear enough as to what time slot this percentage is.

- ▶ Is the availability the OS level availability?
- ▶ Is the availability the Domino server availability?
- ▶ Is the availability a specific Domino application's availability?
- ▶ Does the percentage availability include or exclude the standard maintenance windows for the OS?
- ▶ Does the percentage availability include or exclude the standard maintenance windows for Domino?

Of course, all other services provided by these units are important, for example:

- ▶ User management
- ▶ Monitoring
- ▶ Backup and recovery
- ▶ User communication about service status
- ▶ Reporting
- ▶ Data maintenance
- ▶ Application deployment

Important: Determine all related *Policies, Standards, Processes, and Guidelines (PSPG)* whether enterprise wide or Domino related, to identify any constraints within the consolidation project.

5.12 Developing the training plan

There are three types of training to covered by the consolidation project:

- ▶ User training
- ▶ Support staff training
- ▶ Administration staff training

It depends on the scope and planning of the consolidation project which groups require training effort. You have to ensure that the right people get the necessary technical training to enable them to use, support, or maintain the consolidated infrastructure.

User training may be required if your consolidation approach is to migrate all components into a newly built infrastructure, as shown in 3.3.1, “Approach 3 - Domain consolidation by consolidating servers across domains” on page 44.

Support staff training seems to be necessary for each consolidation approach, but varies in its complexity. This is dependent on the amount of changes users have to face. The better your support staff is trained on consolidation related issues, the greater the user acceptance.

Training of your administration staff will be required if cross-location or cross domain consolidation will be applied. Any changes in the administration model will also require training effort for the administration staff to fulfill the Service Level Agreements.

A training schedule must be included in your project plan to ensure in-time realization.

5.13 Plan, design, and document the consolidated Domino and Notes environment

Now that the project team knows what is required, how the as-is infrastructure is configured, and how it is maintained and supported, they must determine how to deliver it. This means establishing the planning and design of the consolidated Lotus Notes and Domino environment. The amount of effort spent on planning and designing directly correlates to the success of the consolidation project.

Based on the three given components (non-functional and functional *requirements* definition, *current infrastructure* documentation, and outlined *administration and support model*), the door to find the appropriate *consolidation approach* (Chapter 3, “Approaches to consolidation” on page 29) should be open (see Figure 5-1).

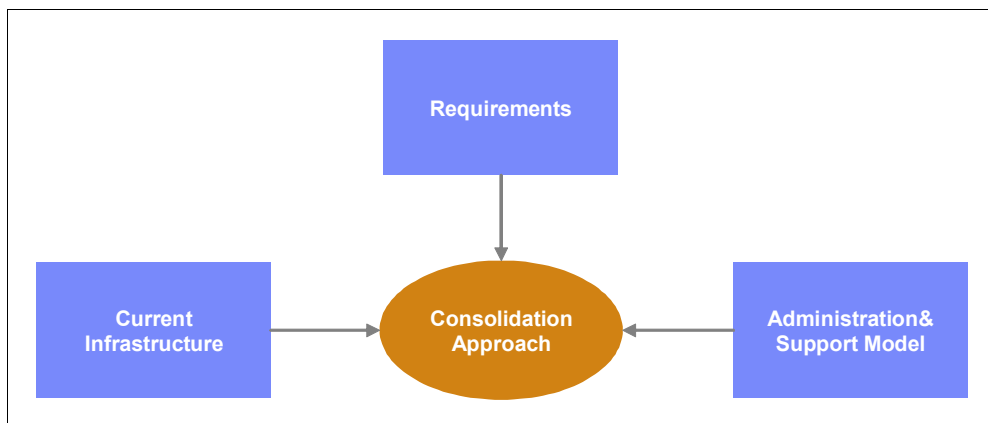


Figure 5-1 Finding the right consolidation approach

During this process, frequent review sessions should be scheduled to keep the project team up to date and provide feedback on the planned consolidation steps. By completing the planning and design work, a final review should be held and a sign-off on the consolidation approach received from all project team members and the sponsor.

As already mentioned, the proper consolidation approach for your individual conditions may be a mixture of the different techniques we discussed in Chapter 3, “Approaches to consolidation” on page 29. Based on your current infrastructure documentation (see 5.10, “Document the current Lotus Domino infrastructure” on page 110), reporting data, user analysis, and application inventory, you can identify the specific consolidation potentials.

Once the different techniques are chosen, you will be able to start the detailed consolidation planning as well as the design of the future infrastructure. The technical references we covered with each consolidation technique as well as the considerations within this chapter should help in this task.

If multiple consolidation techniques are supposed to be applied, we recommend performing them step by step to minimize operational risks as well as to watch closely their impact on the overall infrastructure. Respective time slots should be reflected in the project plan. Document each consolidation step and define its acceptance criteria. If applicable to your infrastructure and consolidation plans, do not mix consolidation techniques within one implementation step.

5.14 Develop a migration and coexistence plan during consolidation

For all server consolidation techniques, you may run into a *migration and coexistence period* once you start moving users or application between Domino servers, locations, and domains.

The *migration period* is defined as the time you start moving users, applications, or servers during you consolidation process and is related to each item you move. That means the migration period for User A is finished once the user is within the target environment and all related tasks for this particular user are completed. But at the same time, User B is still in migration or has not yet migrated.

The *coexistence period* is defined by the time one consolidation cycle (consolidation by move, across locations, or domains) is ongoing. That means, users or applications already moved into their target environment may have dependencies or need access to the source environment and vice versa. We have to cover different needs of such overlapping requirements in order to assure uninterrupted services during consolidation.

5.14.1 Migration plan during consolidation

Based on the consolidation technique you have chosen and the research activities you performed as described in 5.10, “Document the current Lotus Domino infrastructure” on page 110, you should now plan how the migration for each cycle should be performed. This includes the definition of the following actions:

- ▶ User communication and information
- ▶ Continuous administrator and server access to data
- ▶ Technical order of consolidation steps (when to change)
- ▶ Preconditions, content, and exit criteria for each consolidation step (what to change)
- ▶ User interaction and how to handle this (e-mail with active content, on-site, and so on)
- ▶ Data migration strategy and technical realization
- ▶ Test and completion criteria for consolidation steps
- ▶ Tracking of consolidation progress
- ▶ Recovery planning

5.14.2 Coexistence plan during consolidation

Coexistence between the source and target environments plays one of the most critical roles in ensuring seamlessness of the consolidation process for both administrators and users. During that time, users in both environments must be able to continue communicating with one another as well as with users external to both environments. Failure to provide this ability to users will have an adverse effect on any consolidation project.

Important: Coexistence between the source and target environments plays one of the most critical roles in ensuring seamlessness of the consolidation process for both administrators and users.

Depending on the type of consolidation you plan to perform, the coexistence period may vary in content, complexity, and duration.

Consider the following when planning the coexistence:

- ▶ Continuous e-mail routing during consolidation
- ▶ Database replication
- ▶ User access to e-mail and applications
- ▶ System response times and maintenance windows
- ▶ Free time search functionality between users in source and target environment
- ▶ Delegation access from source environment to mail files in target environment
- ▶ Availability of resources and reservations
- ▶ Replication of data during coexistence period
- ▶ Exit criteria out of coexistence period

If domain consolidation is part of the consolidation project, you need to consider the effect of co-existence during migrations on the directory solutions. If you are using a directory catalog or an extended directory catalog, it is critical that you plan for all eventualities during the migration cutover process to ensure you do not have duplication of user entries or directory catalogs that get out of synchronization. The safest approach (if people are moved from one domain to another) would be:

- ▶ Disable replication of the target domain address book on the server that builds the directory catalog(s) in the target domain.
- ▶ Copy the person document(s) from the source (old) domain address book into the target domain address book (Note: Not into the address book on the server that builds the directory catalog).
- ▶ Update the servername (new target server), mail file name (mail directory and mail file), and domain name (to the new domain) in the person document(s).
- ▶ Delete the person document(s) from the source domain address book on the server where the directory catalogs are built (or change the person documents to not allow foreign directory synchronization).
- ▶ Rebuild the directory catalog(s) and replicate them into the source and target domains' servers. (This removes the person documents from the directory catalogs.)
- ▶ Enable replication of the source domain address book (on the server that builds the directory catalogs) and replicate all the changes into it.
- ▶ Rebuild the directory catalog(s) and replicate them into the source and target domains servers. (This adds the 'new' corrected copies of the person documents into the directory catalogs.)

5.14.3 Consolidation and migration tools

Migration tools provide a smooth and easy way to migrate the server and related data from an existing mail server to the target messaging environment. There are various tasks involved when migrating from an old mail server to a new one. These tasks include the conversion of users' mail data and calendaring and scheduling information stored on the server, directory propagation and, in some cases, the client. A good migration tool should be able to perform these basic tasks successfully with the least amount of effort. In addition, migration tools should also support the most possible consolidation approaches. Depending on the size of your consolidation project, it may be valuable to invest in a tool to support your consolidation activities and to simplify migration tasks.

Tip: The tooling should also cater to the creation of replicas in clustered environments, the ability to maintain or transfer quotas between old and new replicas (re-applying it on the new replicas) and the ability to synchronize unread marks between source and target replicas.

There are a couple of IBM Business Partners providing such tools. You may find them via the IBM Partner World home page at:

<http://www.ibm.com/partnerworld/pwhome.nsf/weblook/index.html>

5.15 Risk analysis

Proper risk management during the complete project lifetime is strongly recommended. Since consolidation projects have a huge impact on the messaging and collaboration infrastructure, the impact on your business is not remote. Identifying risks, rating, tracking, and planning risk mitigation activities may lower this impact.

Risk management

Risk is a natural part of any IT related project and its proper management can determine the success or failure of the project. You should begin risk management during the proposal process by identifying foreseeable risks in the project and developing an associated Risk Management Plan, which quantifies the risk and includes your recommendations for handling it.

Here are some actions you can choose to take to deal with a certain risk:

- ▶ **Avoidance:** Eliminates the cause of the risk through clearly-defined actions/events/tasks.
- ▶ **Mitigation:** Acknowledges that the risk is not avoidable, but defines steps to mitigate the level of risk.
- ▶ **Acceptance:** Acknowledges the risk and documents the associated consequences.

If new or different risks are identified during the implementation of the project, they should be added to your risk management plan. The project manager utilizes this plan as an instrument to verify the progress against avoidance or mitigation plans, with the focus being to reduce the overall risk of the initiative.

5.16 Test and validation of consolidation approach

An original set of success criteria were defined for the pilot project, and you should review them now. Are they still appropriate, in light of lessons learned during the previous sections? If so, include them in your deployment planning. If not, discuss the success criteria and update the criteria so they continue to be relevant. The success criteria should also be included in the final deployment plan document.

Ensure that any consolidation project expectations are realigned and communicated. This type of communication is most crucial part, since these will be the expectations users are measuring the results against. Deviations from the expectations can impact your project in a negative way.

5.17 Run consolidation activities

Once your planning and design for the consolidation approaches are finished, you may start to execute the particular tasks.

Depending on the consolidation approaches you utilize, the project execution schedule and its phases may vary. The important thing to remember is that the strategy's success will depend on good planning more than the method you choose. As always, you should be prepared for unforeseen events.

Meeting the prerequisites

Before you can start your consolidation activities, you need to be certain that all prerequisites of the Domino consolidation approach have been completed. Be sure that target servers, network capacities, and other infrastructure elements are in place and prepared prior to starting consolidation.

It may be the case that parts of this is handled by another unit of the IT department, but it is critical the project manager understands what needs to happen, so that he or she can ensure it has been completed.

Staged consolidation realization

In this type of implementation, the consolidation team takes a step-by-step approach. This approach is quite common to smaller companies, where resources may be limited.

The staged consolidation is also used in larger companies, if the implementation can be subdivided neatly. This is supported by coexistence during the actual migration of users or applications.

The major advantage to this approach is that the risk if any given step goes wrong is minimal, since it is only a fraction of the total project. The biggest disadvantage is that the total migration project can take a long time. Be aware that there tends to be a short span of time left between steps to determine if the one step has been successfully implemented before performing the next step.

Especially when utilizing different consolidation approaches, we recommend executing them successively to avoid any cross-technique impacts.

Instantaneous rollout

This refers to a methodology where the entire consolidation scope is done all at once, in one major step. Several underlying or background steps may have been performed prior to the implementation, though.

The biggest advantage with this type of implementation is that there are shorter periods of coexistence or, when moving whole servers between domains, no coexistence at all. Be advised that for this type of rollout, your organization needs to be prepared for system downtimes. These downtimes are required to perform several steps all at once.

Most instantaneous projects are scheduled to run over a weekend or long weekend, and if there are problems, the rollout may run into Tuesday or even Wednesday. Your business must be aware of these circumstances. Consider performing tasks separately, in controllable steps, to minimize the risk.

Backup and disaster recovery

Backup schedules and disaster recovery plans must be observed during the consolidation to avoid any time frames where particular data will not be backed up.

Recovery planning

In addition to an overall recovery planning for your Lotus Domino infrastructure, you should include rollback plans in the list of your deliverables, especially for consolidation approaches with a high impact on several systems, where rollback plans, in case of unforeseen failures, are mandatory.

5.18 Final phase: closure

This phase will close the consolidation project, transitioning the systems back to ongoing operations and support. This phase includes:

- ▶ Acceptance report from the sponsor
- ▶ Finalization of all project documentation
- ▶ Completion of all technical documentation updates for the target environment
- ▶ Completion of a post-migration review and analysis of lessons learned
- ▶ Decommission of the original environment.
- ▶ Disposal or reallocation of any hardware or software remaining from the replaced system



Performing server consolidation - step by step examples

This chapter builds on the concepts discussed throughout this Redpaper, and gives practical examples of two common consolidation models:

- ▶ Example 1: Server consolidation
- ▶ Example 2: Domain consolidation

Each consolidation example will be mapped to the approach discussed in this Redpaper, followed by a description of the technical instructions to implement the consolidation:

1. Reasons for consolidation
2. The consolidation approach
3. The administrative model - before and after the consolidation
4. Project overview
5. Steps to implement

The goal of this chapter is to show how the approach discussed throughout this Redpaper can be used to implement real practical consolidation project examples. It provides step by step instructions for the consolidation in the example scenarios.

6.1 Example 1: Server consolidation

For the sake of presenting a realistic scenario example, we present a fictional company named ITSOK Insurance.

ITSOK Insurance is a company with many small offices and mobile users located throughout the US.

Lotus Notes was implemented in this organization with Release 4 in the mid 1990s. At the time, the main business drivers for the implementation of Lotus Notes were:

- ▶ Project teams needed a place to store project deliverables and to discuss the projects.
- ▶ Support teams and business users needed a repository for documentation.
- ▶ ITSOK Insurance saw benefits to providing e-mail access for their business users to share information with each other.

At that time, the organization chose to implement a hub server, a mail server, and an application server at their main head office site, and a small workgroup server at each of their small regional offices. Each of these regional general servers was configured as a shared Notes (Domino) server and file and print server for the local users at the site. The servers were connected by modem in a hub and spoke topology back to the hub server at the head office site, as shown in Figure 6-1.

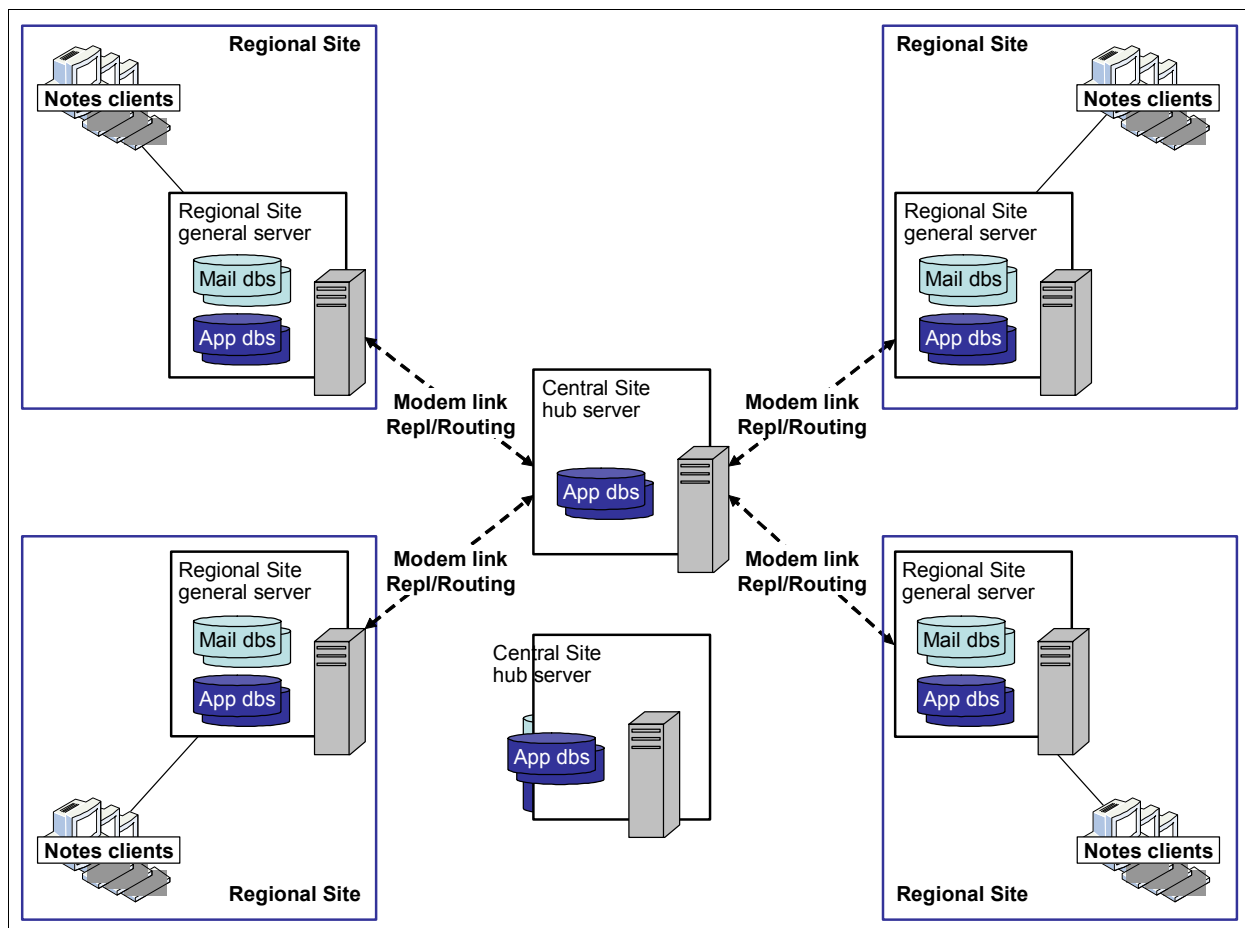


Figure 6-1 Before consolidation: regional servers connected via modem to central hub

The main reasons for this approach were:

- ▶ Bandwidth costs were prohibitive for connecting the servers directly to each other, and for connecting via WAN link. Modem connection to the main hub was cheap and easy to implement.
- ▶ ITSOK Insurance already had relatively new workgroup servers at the regional sites. The architects designing the Notes server topology concluded that these servers had adequate capacity to handle both Notes and the file and print services. Although not technically a “supported” configuration, this was the only practical way in which the organization could cost-effectively implement their Notes environment.

Over time, the distributed nature of the ITSOK Insurance has remained relatively static. The Lotus Notes and Domino environment has grown and evolved to include several applications that are now considered business critical, the Internet and intranet site servers, and mail-in databases for interaction with ITSOK Insurance’s clients.

For the sake of simplicity, we will assume that ITSOK Insurance is currently using Lotus Notes and Domino 6.5.x.

6.1.1 Reasons for consolidation

The technical and cost barriers that existed when ITSOK Insurance originally planned their Notes environment are no longer relevant factors for the architectural planning of their current and future Lotus Notes and Domino environment.

ITSOK Insurance has reviewed Chapter 2, “Reasons for consolidation” on page 7 of this Redpaper. The ITSOK Insurance Management was particularly interested in reducing TCO and increasing ROI.

Cost reduction - Total Cost of Ownership (TCO) benefits

The ITSOK Insurance Business Unit Owners are interested in the cost-saving (TCO) opportunities that the consolidation will provide, since the IT Department directly cross-charges each department for the IT services they use.

ITSOK Insurance expects to realize real TCO benefits from the consolidation of their Domino servers. ITSOK Insurance has identified that the cost reduction opportunities associated with the consolidation of their Domino servers mean that server consolidation is now feasible and desirable for ITSOK Insurance. Some of the main tangible, short-term savings they identified were:

- ▶ Server hardware: Costs for server hardware has reduced in real terms, and processing power has increased relative to the power required by the Notes and Domino software.
- ▶ Communications: The cost of fast wide area network (WAN) links has reduced dramatically, making network links between sites a viable option.
- ▶ Server software: Consolidation will result in fewer software licenses required for the Domino servers, and possibly for the operating system and other third-party software (such as backup software, virus scanning, and so on). In addition, the newer Domino server versions allow for higher scalability per server.

Note: Domino server licensing and maintenance uses a per-CPU model for servers accessed by Notes users. As long as the server consolidation results in fewer server CPUs overall, cost savings will result in most situations.

ITSOK Insurance's Lotus Notes and Domino environment has grown and evolved over time, both in terms of the business use of the technology and the features available within the technology. The small, shared workgroup servers in a distributed architecture is no longer technically viable or cost effective to manage.

ITSOK Insurance has decided to consolidate to the head office servers, consisting of:

- ▶ A Mail Cluster containing two clustered Domino mail servers
- ▶ An Application Cluster containing two clustered Domino application servers

The small workgroup Domino servers at the regional sites will be decommissioned after the consolidation process is complete.

Business benefits - Return On Investment (ROI)

ITSOK Insurance's Business Unit Owners are also focussed on ROI opportunities that the consolidation will provide.

The main business unit of ITSOK Insurance is the Customer Service Department. This department consists of 80% of the organization's overall user population. Most of these users work directly with the organization's clients (the people who purchase insurance from them) via telephone and e-mail contact. All client, relationship, and case tracking related to this contact is recorded in Domino databases, which are considered to be business critical. If these users cannot connect to Domino for e-mail access, or for access to the applications, they cannot do their work. The Customer Service Department has therefore developed a very clear model for calculating the cost associated with Domino server data loss or unavailability.

The Business Analyst for the Customer Service Department worked with the Domino architecture team and the Business Unit Owner to map specific consolidation opportunities to improved ROI for this business unit. These are two of the many ROI benefits they saw:

- ▶ **Domino clustering:** Recently, the older regional Domino servers have experienced some reliability issues. The new centralized mail and application servers are clustered using Domino clustering, to provide failover in the event of single server outage.

ROI benefit: With the consolidated architecture in place, users will be able to continue to work even when a single mail or application server is unavailable. As the Customer Service department has calculated the cost of outage per minute, per user, investing in the consolidated Domino environment is expected to provide huge returns.

- ▶ **Centralized backup and maintenance:** Currently, each regional server has its own backup tape unit. A local non-technical Notes user is tasked with changing the tape each day. The older tape drive technology, old tape media, and human interaction is prone to errors and problems. Several important database updates have been lost due to media failure or human error. The new centralized infrastructure will include high-speed backup technologies that are expected to back up the data more reliably and more quickly.

ROI benefit: For the Customer Service department, loss of data means rekeying, which has direct staff costs. Even worse, some critical Insurance data has been lost in the past, and this may have legal implications for ITSOK Insurance. The new consolidated backup and server maintenance routines will reduce rekeying, which will allow the staff to spend more time pursuing new clients and contacting existing ones. Ensuring data backup integrity and completeness could also reduce ITSOK Insurance's legal liability if they are called on to produce data for an insurance assessment.

6.1.2 The consolidation approach

For the sake of simplicity, the remainder of this example scenario uses the following assumptions:

- ▶ ITSOK Insurance would like to consolidate their Domino servers onto the central head office site.
- ▶ Each of the sites is now connected via WAN link to the others (no original modem links remain).
- ▶ ITSOK Insurance management and business representatives are satisfied that the critical factors of reliability, availability, and serviceability will not suffer, and that Service Level Agreements (SLAs) will still be met with the new environment. They are clear about the expected TCO and ROI opportunities that the project is expected to realize for the organization.

The ITSOK Insurance Domino Architect reviewed 3.2, “Server consolidation models and techniques” on page 32 of this Redpaper. The decision was made to use the model for consolidating servers across two or more locations, since this most closely matched their requirements. The ITSOK Insurance Domino topology after server consolidation is shown in Figure 6-2.

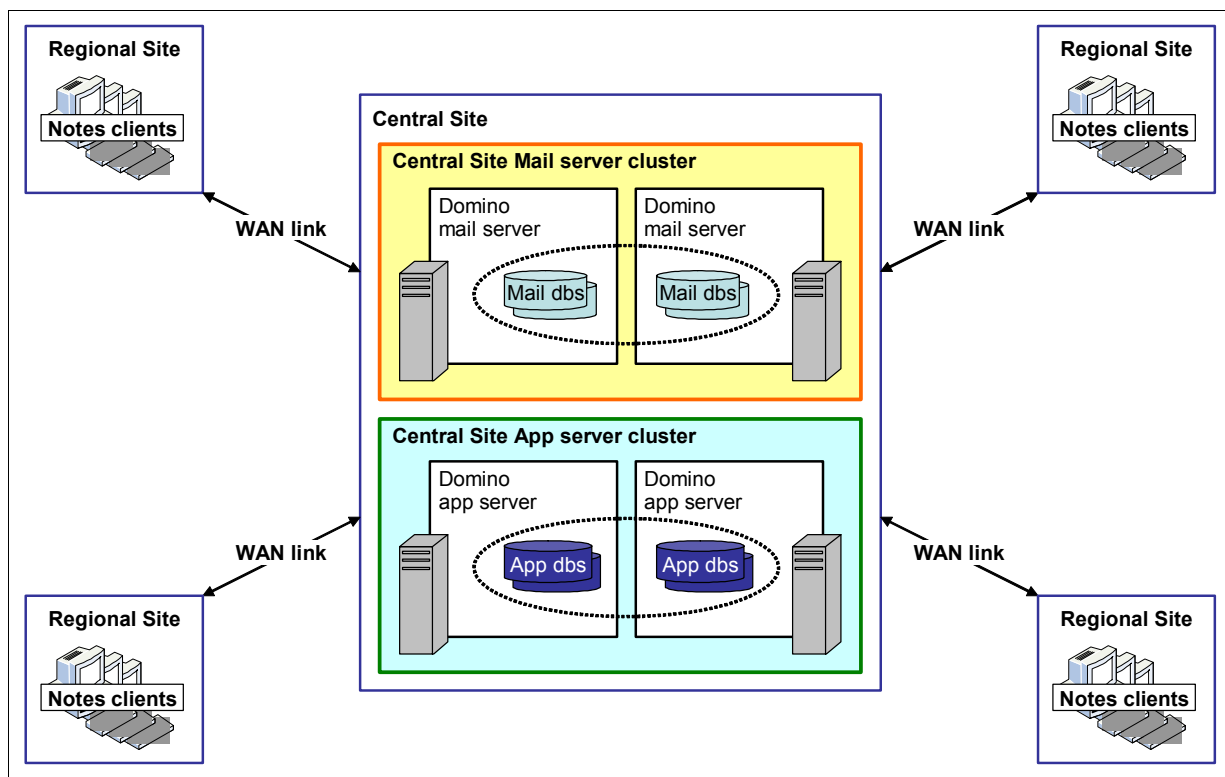


Figure 6-2 After consolidation: Regional users connect to central Domino clustered servers via WAN

6.1.3 The administration model - before and after the consolidation

When undergoing a server consolidation it is important to also review the model of administration to see whether it will fit the consolidated infrastructure or will need to be modified.

The ITSOK Insurance Domino Architect and the Administration Team Manager reviewed the administration model together to determine whether the server consolidation would necessitate changes to the administration model. They reviewed Chapter 4, “Administration models” on page 53, and in particular 4.6, “How to select an administration model” on page 65.

The core ITSOK Insurance Domino administration function is already centralized. The server consolidation will not necessitate changes to this model.

Some peripheral support tasks will move with the server consolidation from being distributed in each regional location to being centralized at the head office site. For example, the server backup process for the regional servers is currently the responsibility of a non-technical representative on each regional site. After the consolidation, this task will no longer be required. The head office Network Operations team will be responsible for backups on the Domino servers.

6.1.4 Project overview

The Consolidation Project Team has reviewed Chapter 5, “Project planning overview for performing server consolidation” on page 101 of this Redpaper and plan to follow this general project approach. The following is a short, high level summary of the steps that ITSOK Insurance will perform:

- ▶ Have a project sponsor that is involved in the project.

Based on the TCO and ROI benefits discussed in 6.1.2, “The consolidation approach” on page 127, the Business Unit Owner of the Customer Service department has agreed to be the project sponsor. As the manager of the largest and most critical Business Unit, the project sponsor has a clear understanding of the overall business strategy, objectives, and requirements.

- ▶ Define the project vision.

The project vision for ITSOK Insurance’s consolidation project is:

To provide guaranteed access to data from a centralized, fast, and well maintained messaging and collaboration environment. This consolidation will improve the efficiency of our business processes by reducing rework, thus providing opportunities for our staff to spend more time pursuing new Insurance business. Consolidation will commence within three months, and will be complete within nine months.

- ▶ Assemble the right project team.

The principal members of the project team are the Project Sponsor, Project Manager, Domino Architect, Domino Administrator, Domino Developer, and pilot user group. The team will also seek support and assistance from the Server Administration team, Network Administration team, and Help Desk team.

- ▶ Develop and maintain the project schedule.

The Project Manager has completed the project schedule, which allows ITSO Insurance to complete the project well within the nine month time frame. Additional time has been allowed after completion of the project for contingencies.

- ▶ Project scope management.

The project scope has been agreed to by the Project Sponsor and the business, the project team members, and the Help Desk. Scope changes will be submitted by the Project Manager on a Scope Change Request document, so that Project Sponsor can agree to the changes, and the project team made aware of the change in scope.

- ▶ Document requirements.

The business requirements of the ITSOK Insurance project are to consolidate the Domino servers, to reduce cost, and increase reliability. This will be done by migrating regional site Notes users and mail, and Domino applications to the head office Domino cluster servers, and then decommissioning the regional Domino servers.

- ▶ Establish a communication plan.

The communication plan involves informing the ITSOK Insurance users on regional sites of the upcoming changes and the expected impact on them during the migration. Communication among the project team and the other supporting teams will occur through twice-weekly project update meetings, and establishment of a Project Quickplace to store project documentation, issues, tasks, and discussions.

- ▶ Set project expectations.

The project communication plan is designed to set and maintain realistic project expectations among the project team, supporting teams, the ITSOK Insurance management, and the users involved in the change. This communication, along with the regular project team meetings, is designed to ensure that expectations are clear and that there are no surprises during the project.

- ▶ Document the current Lotus Domino infrastructure.

The current Lotus Domino infrastructure and metrics have been thoroughly documented by the Domino architect, with the assistance of the Domino administrator, Server Administration team, and Network Administration team.

- ▶ Assessment of current administration model and service levels.

The ITSOK Insurance Domino Architect and Domino Administration Team manager reviewed the current administration model and made minor adjustments, as discussed in 6.1.3, "The administration model - before and after the consolidation" on page 128.

- ▶ Develop the training plan.

The server consolidation project does not involve upgrading the Notes client, so users do not require training in new functionality. The communication plan is designed to educate the users about what to expect during the server consolidation project, and will provide any steps required of the users to facilitate the transition to the new servers. It is also important that the communication includes instructions on how users can contact the help desk if they need assistance during the transition. No further separate training plan is required.

- ▶ Plan, design, and document the consolidated Domino and Notes environment.

The consolidated Lotus Domino infrastructure is already in place. It was designed with sufficient capacity for the current head office users and the users who will be added during the server consolidation project. The new environment is consistent with ITSOK Insurance's strategy of providing high availability through Domino clustering and failover, and reliable backup and recovery on the central servers.

- ▶ Develop a migration and coexistence plan during consolidation.

The server consolidation will be carried out one regional server at a time. The migration plan separates the actual migration process for each server into a number of discrete steps. The coexistence period is expected to be around six months, but this should be transparent to users and is not expected to cause disruption or necessitate changes in normal work practices for users.

- ▶ Risk analysis.

The server consolidation will take a staged approach, with the migration being subdivided by regional server. This is expected to minimize the risk associated with the consolidation. The built in administrative features of Domino (for example, the Administration Process, the Decommission Server Analysis Tool, and Dynamic Client Configuration on the Notes client) are being used to automate and simplify the consolidation process, and to reduce the chance of human error.

With these factors in mind, ITSOK Insurance analyzes the risk of the consolidation project to be low.

- ▶ Test and validation of consolidation approach.

After the consolidation approach and technical steps were planned by the Domino architect, these were validated by testing the entire process in the ITSOK Insurance test environment. This provided validation of the process, and an understanding of the time that the real migration would be expected to take.

- ▶ Run consolidation activities.

Consolidation activities are described in 6.1.5, “Steps to implement the server consolidation” on page 130.

- ▶ Final phase - project closure.

Project closure consists of two components: technical and project management. The technical task is concerned with making sure that the ITSOK Insurance regional servers are successfully decommissioned after the consolidation, and checking that any remaining issues are addressed. The project management closure task will ensure that project documentation is completed, a post implementation review is completed, and the Project Sponsor agrees to sign off that the project is complete.

6.1.5 Steps to implement the server consolidation

This section details the technical implementation tasks required to perform the server consolidation.

ITSOK Insurance has already implemented a large mail server cluster at the head office site. The plan is to migrate users from the regional Domino servers to this central mail cluster. In this example, we will discuss the migration of users’ mail from one such site server (SmlSvr1/ITSOKinsurance) onto the new mail cluster, in particular to BigMail/ITSOKinsurance server, as shown in Figure 6-3 on page 131.

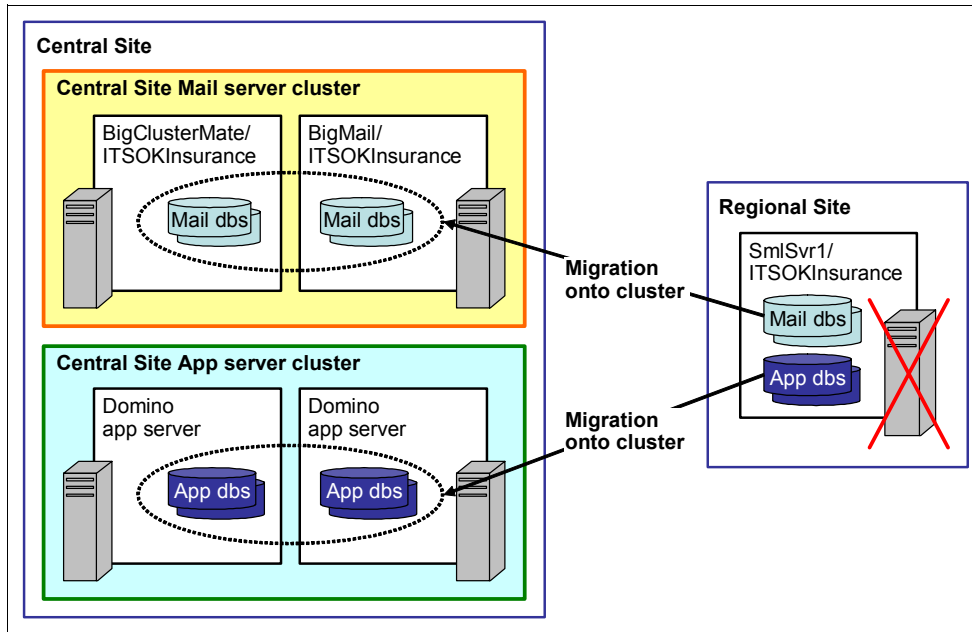


Figure 6-3 The server consolidation: moving one regional site to the central mail cluster

For the purpose of this example, we will assume that the non-technical project tasks have been addressed. They will only be discussed here in reference to the technical parts of the project. Of the high level steps described in 5.1, “The key steps in a consolidation project” on page 102, the technical tasks for the project are undertaken in the “Run Consolidation Activities” stage of the project. These are the tasks that are described below.

Meeting the prerequisites

The focus of this task is:

Be sure that target servers, network capacities and other infrastructure are prepared prior to starting consolidation.

In this task, the ITSOK Insurance Domino administrator needs to ensure that all the prerequisites for the move are in place at the head office site. The simple checklist in Table 6-1 was used for this purpose.

Table 6-1 Checklist for meeting the prerequisites

Prerequisite	Team responsible	Comments	Done (Tick)
Destination servers	<ul style="list-style-type: none"> ▶ Domino Admin ▶ Server Admin 	<ul style="list-style-type: none"> ▶ Disk capacity checked. ▶ Change window agreed with teams. 	
Network Capacities	Network Admin	<ul style="list-style-type: none"> ▶ Mail file moves across WAN link must be done outside business hours so interactive traffic is not impacted (for example, SAP). ▶ Change window agreed with team. 	
Other Infrastructure	Operations team	Backup window checked, backup capacity checked.	

Move methodology: staged or instantaneous

ITSOK Insurance has decided that a staged methodology will be used to migrate the users onto the BigMail/ITSOKinsurance server. They made this decision for the following reasons:

1. The small regional servers each have between five and 50 users on them. The migration can be neatly subdivided and contained by server unit.
2. Using a staged approach will reduce the risk involved in the move.
3. Spreading the move over a longer time period will reduce the burden on the WAN link of the mail file moves.
4. The help desk will be able to better cope with any user issues that arise, since each group of users is likely to have issues only shortly after their migration.

Completing the move

Important: The steps used to complete the SmlSvr1/ITSOKinsurance mail users move were tested in a test environment first. We recommend that all production system changes are thoroughly tested in a non-production environment prior to rollout.

The procedures covered in this section describe one way in which a Domino server consolidation may be undertaken. The purpose of this section is to give you some ideas and guidelines for consolidating servers. Domino server consolidation can be done in other ways as well. For example, different or additional steps may be required to accommodate your specific Domino environment, or you may choose to reorder the steps described below to fit your own requirements.

The procedures described here are guidelines only, and are designed to help you with your Consolidation Project.

To complete the move for the SmlSvr1/ITSOKinsurance server, the Domino Administrator completes these tasks:

- ▶ Step 1: Prepare the users' Notes clients.
- ▶ Step 2: Prepare for the AdminP mail file moves.
- ▶ Step 3: Run the Decommission Server Analysis Tool.
- ▶ Step 4: Move Resource Reservations.
- ▶ Step 5: Run mail user move procedure.
- ▶ Step 6: Manually move shared mail files and mail-in databases.
- ▶ Step 7: Move application databases.
- ▶ Step 8: Validate the move.
- ▶ Step 9: Decommission the server.

Step 1: Prepare the users' Notes clients

The ITSOK Insurance Domino Administrator plans to use the Domino Administration Process (AdminP) to move the mail users. The "Move to another server" Administration Process automates the tasks required to move a mail user from one server to another within a Domino domain, including the updating of users' Location document fields.

Tip: This task is not time critical; it can be completed any time prior to the planned user migration. We recommend completing this task well in advance of the actual migration.

It is important to ensure that the Dynamic Client Configuration (DCC) process is enabled on each user's Notes client. This process is responsible for updating the Location document fields after AdminP has completed the other mail move tasks. If this task is not enabled, the user will continue to use their mail file on the old server. When the old server is decommissioned, they will receive an error when they try to use their mail.

Tip: DCC is enabled by default on Notes clients (for all R5 and newer client versions). Therefore, DCC will be enabled in your environment unless it has specifically been disabled for some other purpose.

Checking that DCC is enabled

To check that DCC was enabled on the ITSOK Insurance Notes clients, do the following:

1. On a Notes client, open the local Address Book (names.nsf).
2. Open the Advanced → Locations view.
3. Highlight the Location document currently in use on the client (usually “Office”).
4. From the menu, select **File** → **Document Properties**.
5. Go to the Fields tab in the Document Properties dialog, highlight the **AcceptUpdates** field, and check the value of the field, as shown in Figure 6-4.

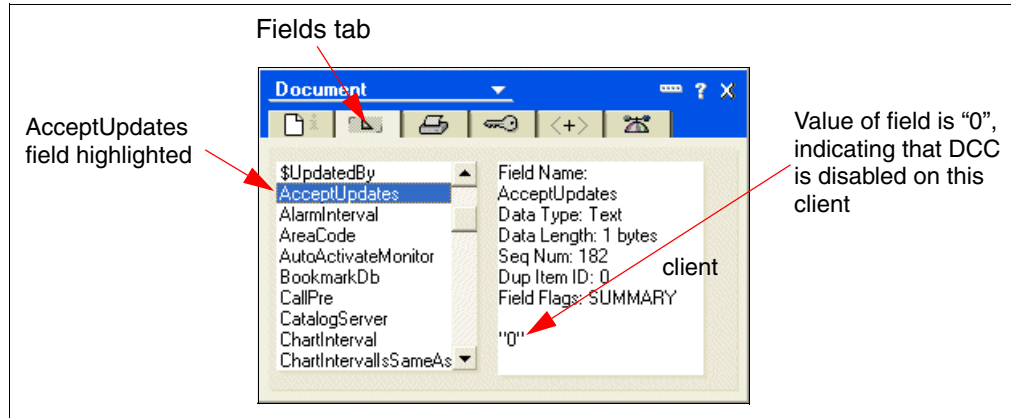


Figure 6-4 Checking whether DCC is enabled on the Notes client

6. The value of the AcceptUpdates field will be either:
 - 0: DCC is disabled.
 - 1: DCC is enabled.

Checking that DCC is actually running

If DCC is enabled, check that it is actually running on the PC:

1. On the Notes client, open the local log file (log.nsf).
2. Open the Miscellaneous Events view.
3. Open a recent log document and search for “Dynamic”.

Tip: It may be easiest to search for “Dynamic” in the view. DCC usually runs shortly after the Notes client is started, but if other background tasks are running or the users closes the client almost immediately, DCC may not get a chance to run (or may show further down in the log document).

4. If DCC is running on the client, you will see log entries similar to those shown in Figure 6-5.

```
03/05/2006 09:11:39 AM Dynamic Client Configuration started
03/05/2006 09:11:40 AM Initializing Dynamic Client Configuration
03/05/2006 09:11:40 AM Dynamic Client Configuration updating policy information
03/05/2006 09:11:40 AM Dynamic Client Configuration updating location information
03/05/2006 09:11:40 AM Dynamic Client Configuration shutdown
```

Figure 6-5 Client log.nsf showing DCC has run

If DCC is enabled but not running, or you require further information, refer to Technote #1212699 “Frequently Asked Questions About Dynamic Client Configuration (DCC)” at:

<http://www.ibm.com/support/docview.wss?rs=899&uid=swg21212699>

How to enable DCC if it is not currently running

To enable DCC if it is not running on a single Notes client:

1. On the Notes client, edit the current Location document by clicking the **Location** in the Location Status Bar (bottom right corner of the client) and selecting **Edit Current...**
2. From the menu, select **Options** → **Advanced** → **Set Update Flag**.

Note: Choosing this option does not actually tell you what the flag is currently set to (that is, you cannot discover whether DCC is already enabled using this procedure). To determine whether DCC is already enabled, use the procedure described in “Checking that DCC is enabled” on page 134.

3. In the Location Update Settings dialog, select **Yes** to enable DCC, as shown in Figure 6-6.

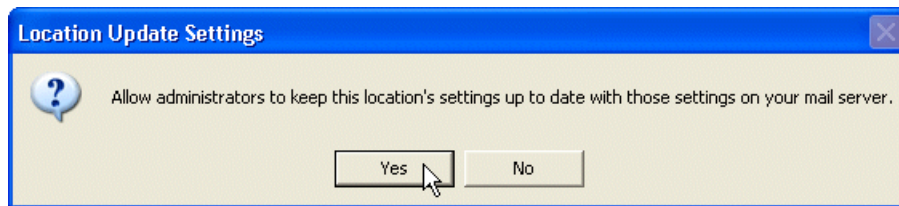


Figure 6-6 Location Update Settings dialog: select Yes to enable DCC

4. Check the Document Properties to ensure that the AcceptUpdates field is now set to “1”.

Note: If you find that all your users currently have DCC disabled, it may be possible to enable it for all users using a PostOpen script or similar on a database that every user opens (such as the mail files or bookmark.nsf), to update the AcceptUpdates field.

For further information and sample code to do this function, refer to Technote 1092794 “How to use LotusScript to change fields in all Location documents” at:

<http://www.ibm.com/support/docview.wss?rs=899&uid=swg21092794>

Step 2: Prepare for the AdminP mail file moves

For the Administration Process to successfully complete the Move to Another Server AdminP tasks, the source server (SmlSvr1/ITSOKInsurance) for the moves must have the authority to be create new replicas on the destination server (BigMail/ITSOKInsurance).

To enable SmlSvr1 to create the mail file replicas on the BigMail server, the ITSOK Insurance Administrator did the following:

1. In the Domino Administrator client, go to the Configuration tab and open the Administration server (AdminSvr/ITSOKInsurance).
2. Select the **Server** -> **All Server Documents** view.
3. Highlight the destination server for the mail move (BigMail/ITSOKInsurance) and click the **Edit Server** button.

- Go to the Security tab, and in the Server Access section, in the Create new replicas field, fill in the name of the server, or the server group, as shown in Figure 6-7.

Server Access	Who can -
Access server:	<input type="checkbox"/> users listed in all trusted directories
	and
	⌵ ⌵
Not access server:	⌵ ⌵
Create databases & templates:	⌵ LocalDomainServers LocalDomainAdmins ⌵
Create new replicas:	⌵ LocalDomainServers LocalDomainAdmins ⌵
Create master templates:	⌵ ⌵
Allowed to use monitors:	⌵ * ⌵

Figure 6-7 Setting the Server Access fields to enable Adminp mail file moves

Tip: In most cases, it is safe to fill in both the Create databases & templates field and the Create new replicas field with the LocalDomainServers and LocalDomainAdmins groups. This will ensure that future database and replica creation processes will work. The example shown in Figure 6-7 has both these fields populated.

- Save and close the Server document.
- Replicate the Domino Directory from the Administration server (AdminSvr/ITSOKinsurance) to the source (SmlSvr1/ITSOKinsurance) and destination (BigMail/ITSOKinsurance) servers.

Step 3: Run the Decommission Server Analysis Tool

The Decommission Server Analysis Tool (introduced in Domino R5) produces a report that contains an analysis of the differences between the source and destination servers, and potential areas requiring attention. It allows experienced Domino administrators to quickly see where to focus their manual and automatic move tasks.

The tool produces a report that contains the categories shown in Figure 6-8.

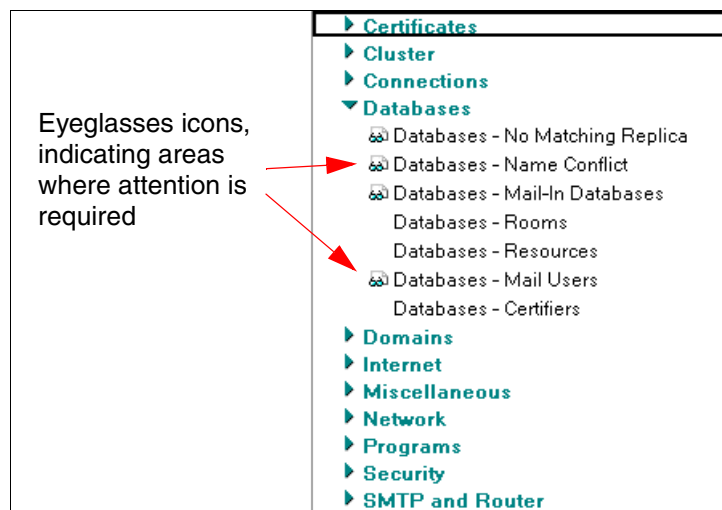


Figure 6-8 Decommission Server Analysis - results categories

Each comparison area that resulted in a difference or indicates that attention is required is shown with the eyeglasses icon (refer to Figure 6-8 on page 136).

For additional information about the Decommission Server Analysis Tool, refer to the topic “Decommissioning a Server” in the Lotus Domino Administrator 7 Help database.

How to produce a Decommission Server Analysis report

The ITSOKinsurance Domino administrator wants to run the Decommission Server Analysis Tool prior to moving any of the databases or users from the SmlSvr1 server. The administrator knows that the mail files will need to be moved to the destination BigMail server, but wants to ensure that other areas such as local Teamrooms and mail-in databases are included in the move.

To create a Decommission Server Analysis report, the ITSOK Insurance Administrator did the following:

1. In the Domino Administrator client, open the BigMail/ITSOKinsurance server.
2. Select **Server** and then the **Analysis** tab.
3. From the menu, select **Analyze** → **Decommission Server...**
4. In the Decommission Server Analysis dialog:
 - a. In the Source Server field, select the server to be decommissioned (SmlSvr1).
 - b. In the Target Server field, select the consolidation server (BigMail).
 - c. Click **Results Database** to choose a server location and database name for the results database.
 - d. Select a radio button to **Append to the database** or **Overwrite the database**.

Tip: If this is the first report you have created, select **Overwrite the database**. This will automatically create the database using the location and database name specified in the “Results database” setting (Step c of this procedure). Selecting **Append to this database** will result in an error indicating that the database does not exist.

- e. The completed dialog box is shown in Figure 6-9 on page 138. Click **OK** to create the report and open the Results database.

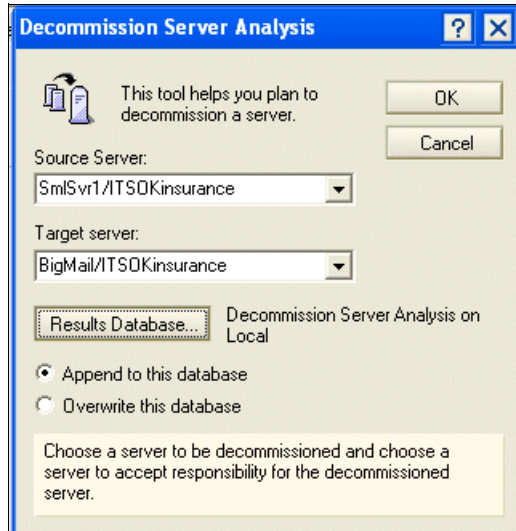


Figure 6-9 Decommission Server Analysis dialog

How to Use the Decommission Server Analysis report

Tip: If you are using the Decommission Server Analysis Tool to analyze many servers, create a view to categorize the reports by Source Server (categorize based on the SourceServer field). An example of such a view is shown in Figure 6-10.

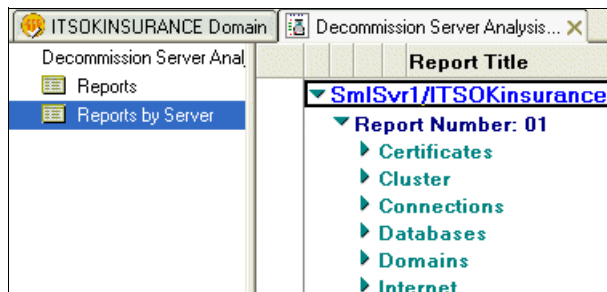


Figure 6-10 Reports categorized by source server

Not all of the categories in the report are of interest to the ITSOK Insurance Administrator, as some are more relevant for domain merges, SMTP servers, clustered servers, and so on. The main areas of interest for the SmlSvr1 are shown in Table 6-2.

Table 6-2 Server Analysis Tool - areas of interest for small Domino server migration

Category	What to check
Connections	Check that Connection Documents exist between the source and destination server, for replication and mail routing during the co-existence period. Create Connection documents if they do not exist.
Databases	This shows where there are mismatches in several areas. Of interest are: <ul style="list-style-type: none"> ▶ No matching replicas: Non-mail databases that exist on the source but not the destination. This will help the Administrator manage the move of non-mail databases ▶ Mail-in databases: Shows where they exist on the source but not the destination. It is important to manage the move of these databases and the associated configuration manually ▶ Rooms and Resources: The organization will need to decide how rooms and resources will be migrated. For example, will they be recreated on the destination server? Will future reservations be lost? ▶ Mail users: Provides a list of users with their Mail server set as the source server. This is a useful list to use for the mail move process

Note: Different categories in the Decommission Server Analysis Tool report may be of interest to your organization. The areas of interest will depend on the size and purpose of the source server. Check the report carefully to understand your own server’s areas of interest.

Step 4: Move Resource Reservations

Each regional Domino server at ITSOK Insurance has its own Resource Reservations database. There are three ways in which the move of Resource Reservations can be handled during the consolidation. The options and advantages of each are described in Table 6-3.

Table 6-3 Advantages and disadvantages of Resource Reservation move options

Option	Advantages	Disadvantages
1. Move existing source server’s Resource Reservation database to the destination server, and retain it on the destination server.	<ul style="list-style-type: none"> ▶ This is relatively simple to implement; it requires only replication of the database and update of the Mail-in Database documents for the Rooms and Resources (to reflect the new server location). ▶ Existing reservations are retained. 	This is the most difficult option to administer ongoing; it requires management of many separate Resource Reservation databases instead of just one.

Option	Advantages	Disadvantages
<p>2. Migrate the resources and reservations in the source server's Resource Reservations database to the existing Resource Reservations database on the destination server.</p>	<ul style="list-style-type: none"> ▶ Easy to administer ongoing; it requires management of only one Resource Reservations database. ▶ Existing reservations are retained. 	<ul style="list-style-type: none"> ▶ This is the most difficult option to implement; it requires careful planning, and several implementation steps to ensure that Sites, Resources, Rooms, and Reservations are properly moved and that autoprocessing works after the move.
<p>3. Create new Site, Room, and Resource documents in the existing destination server's Resource Reservations database. Decommission the source server database without migrating the existing reservations.</p>	<ul style="list-style-type: none"> ▶ Simplest option to implement; it requires only the creation of the new Sites, Rooms, and Resources in the destination server's Resource Reservations database ▶ Produces a "clean start" result; this may be desirable for organizations where users have created repeating meetings years into the future, or otherwise booked up meeting rooms inappropriately. 	<ul style="list-style-type: none"> ▶ Requires communication to users so they understand that they will need to recreate reservations. ▶ Is likely to be the most disruptive option for users.

The ITSOK Insurance project team has decided to choose option 1, so the Domino Administrator needs to migrate the existing Resource Reservations database from the source server to the destination server.

Tip: This task is not time critical; it can be completed any time prior to the planned user migration. It should, however, be done outside of normal office hours so that the complete migration occurs without users attempting to make reservations.

We recommend completing this task well in advance of the actual migration.

To complete the Resource Reservations migration, do the following:

1. Replicate the SvrSvr1 Resource Reservations database to the BigMail server, giving it a new file name (so it does not clash with the Resource Reservations database already on the destination server).
2. Update the Mail-in Database documents in the Domino Directory for the Rooms and Resources that have been moved:
 - a. Open the Domino Directory on the destination server (BigMail) and go to the Mail-in databases and resources view.
 - b. Edit each Mail-in Database document for the Rooms and Resources that have been moved.

- c. Update the “Server” field to the destination server name, as shown in Figure 6-11.

Resource: SmlRoom/SmlSite1			
Basics Other Administration			
Basics		Location	
Resource type:	Room	Domain:	ITSOKInsurance
Resource name:	SmlRoom/SmlSite1	Server:	BigMail/ITSOKInsurance
		File name:	ResourceSmlSvr1.nsf

Figure 6-11 Changing the Server and file name fields when moving the Resource Reservations database to a new server

- d. Save and close the document.

Note: If there are many Mail-in Database documents to update, you may choose to write a simple agent to change them all. The agent could use the Simple Action “Modify Field” to replace the MailServer field and the MailFile field on selected documents. A sample of such an agent (showing the MailServer field change) is shown in Figure 6-12. Notice that the new value has the full hierarchical name of the server (that is, CN=<CommonName>/O=<OrgName>).

Edit Action

Action: Modify Field

Modify by: Replacing Appending

The value in field: MailServer

With the new value: CN=BigMail/O=ITSOKInsurance

Figure 6-12 Sample agent to modify Server field in Mail-in Database documents

3. Replicate the Domino Directory from the destination server (BigMail) to the source server (SmlSvr1).
4. Servers may need to be restarted (or type `te11 sched va1` at the server consoles to reload the scheduler configuration).

Step 5: Run mail user move procedure

Note: This procedure should be completed outside of normal business hours. This will minimize the impact of the mail file moves on the WAN links, and ensure that the process is ready for user interaction when users next log on to their Domino Home/mail server.

How to Initiate the user and mail file moves

To complete the move of mail users and files from the source server (SmlSvr1) to the destination server (BigMail), the ITSOK Insurance Domino administrator used the “Move to another server” tool. The administrator did the following:

1. In the Domino Administrator client, open the source server (SmlSvr1), and go to the People & Groups tab.

2. Open the **People** view.
3. In the view, select the users to move, as shown in Figure 6-13.

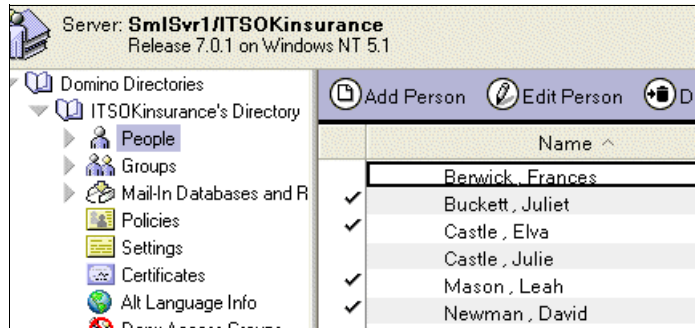


Figure 6-13 Selecting users to move

4. From the Tools panel, select **People** → **Move to another server...**
5. The Move User(s) to Another Server dialog will be displayed (shown in Figure 6-14).

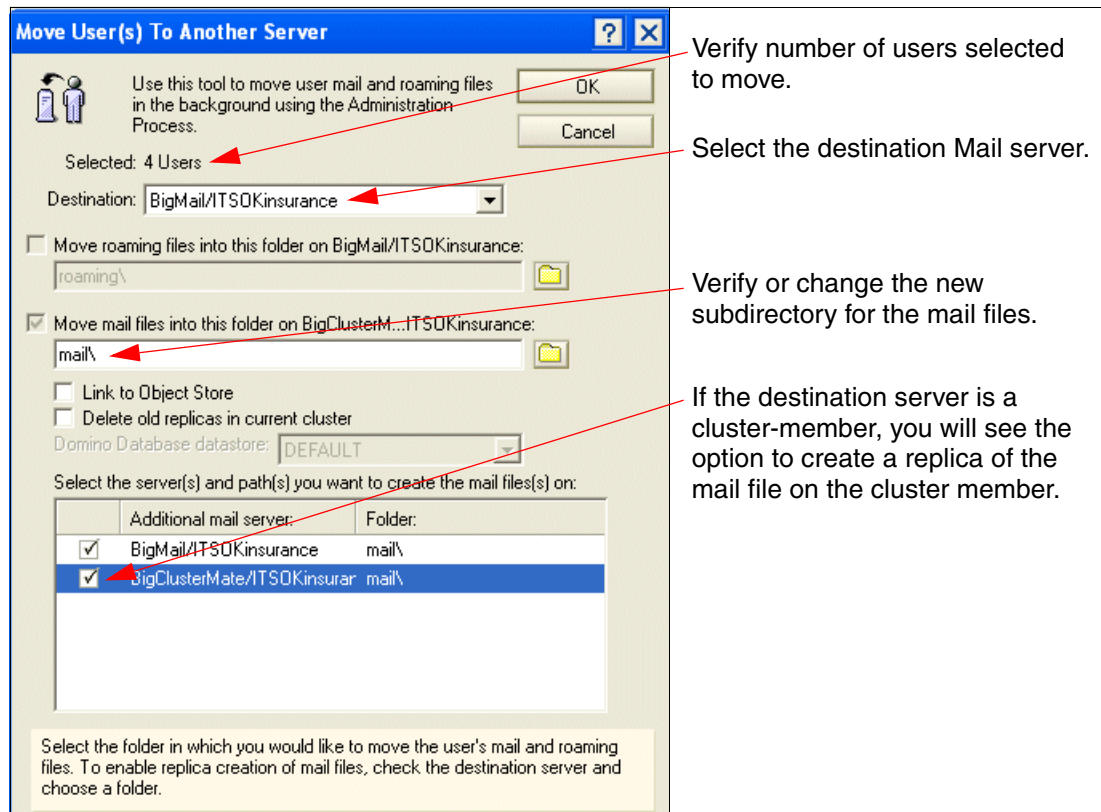


Figure 6-14 Move User(s) to Another Server dialog

Note: The ITSOK Insurance Domino administrator has selected to create a replica of the mail files on the other server in mail cluster.

6. Click **OK** to submit the request to AdminP. A dialog will display to indicate that the request has been submitted.

- Ensure that replication of the Domino Directory and Administration Requests databases is occurring between the source and destination servers (replicate these two databases manually if desired).

How AdminP processes the move

The Administration Requests database contains a record of all the requests generated for each Move to Another Server request. Check the Administration Requests database to ensure the tasks have completed successfully for your users, and that no requests are in error or are continually in a pending state.

Figure 6-15 shows a successfully completed Move to Another Server request for a single user. Each request should be present and have an action with a either tick icon next to it, or an eyeglasses icon to indicate that the request is completed with comments. For further information about the Administration Requests involved in the Move to Another Server request, refer to the topic “Move a Mail File from one server to another” in the Lotus Domino Administrator 7 Help database.

David Newman/ITSOKinsurance			
05/12 01:48 AM		▼ Check Mail Server's Access	Julie Castle/ITSOKinsurance
05/12 01:48 AM		SmlSvr1/ITSOKinsurance performed action on: 05/12 01:48 AM	
05/12 01:48 AM		▼ Create New Mailfile Replica	Julie Castle/ITSOKinsurance
05/12 01:48 AM		SmlSvr1/ITSOKinsurance performed action on: 05/12 01:48 AM	
05/12 01:48 AM		▼ Add New Mailfile Fields	Julie Castle/ITSOKinsurance
05/12 01:48 AM		BigMail/ITSOKinsurance performed action on: 05/12 01:56 AM	
05/12 01:48 AM		▼ Monitor New Mailfile Fields	Julie Castle/ITSOKinsurance
05/12 01:48 AM		BigMail/ITSOKinsurance performed action on: 05/12 02:02 AM	
05/12 01:48 AM		▼ Replace Mailfile Fields	Julie Castle/ITSOKinsurance
05/12 01:48 AM		BigMail/ITSOKinsurance performed action on: 05/12 02:03 AM	
12/05 02:48 AM		▼ Push Changes to New Mail Server	Julie Castle/ITSOKinsurance
12/05 02:48 AM		SmlSvr1/ITSOKinsurance performed action on: 05/12 02:08 AM	
12/05 02:48 AM		▼ Get Mail File Information for Deletion	Julie Castle/ITSOKinsurance
12/05 02:48 AM		SmlSvr1/ITSOKinsurance performed action on: 05/12 02:09 AM	
12/05 02:48 AM		▼ Approve Mail File Deletion	Julie Castle/ITSOKinsurance
12/05 02:48 AM		Julie Castle/ITSOKinsurance performed action on: 05/12 03:22 AM	
12/05 02:48 AM		▼ Request Mail File Deletion	Julie Castle/ITSOKinsurance
12/05 02:48 AM		BigMail/ITSOKinsurance performed action on: 05/12 03:37 AM	
12/05 02:48 AM		▼ Delete Mailfile	Julie Castle/ITSOKinsurance
12/05 02:48 AM		SmlSvr1/ITSOKinsurance performed action on: 05/12 03:44 AM	

Figure 6-15 Administration Requests associated with a successfully completed Move to Another Server request

If a request has failed, a red cross will show in the view, and subsequent dependent requests may not be created. Open the response document for the failed request and check the error text in the document for clues about the problem.

Completing the move

To complete the Move to Another Server process, the Domino administrator must approve the “Approve mailfile deletion” request. Do this in the Administration Requests database, in the Pending → Pending By Server view, as shown in Figure 6-16 on page 144.

Note: A single request cannot be approved from within the view. To approve a single request only, edit the Approve Mail File Deletion document and use the Approve Mail File Deletion button in the document.



Figure 6-16 Approving a Mail File deletion request in the Administration Requests database

What happens on the Notes client

During the Move to Another Server process, AdminP updates the fields in the Notes user's Person Document in the Domino Directory relating to the mail file location. When the Notes user next opens their Notes client and Dynamic Client Configuration (DCC) runs, the following events take place on the Notes client:

1. The Location documents in the Local Address Book (names.nsf) that have DCC enabled are updated with the new server name in the Home/mail server field.

Note: All Location documents that have DCC enabled will be updated, not just the current Location document.

2. The Bookmark Bar mail icon and the Workspace icon are updated to point to the destination server.
3. If the user already has their mail file open on the source server, they will continue to use the mail file on the source server until they close the file. When the file is closed, the Workspace icon for the source server is removed.
4. The next time the user opens their mail file on the server, the replica on the new mail server (the destination server) will be opened.

This process occurs in the background, so is basically transparent to the user (the status bar does indicate that the client is connecting to the destination server).

To check whether the process has occurred on the Notes client, check any (or all) of the following:

- ▶ The Status Bar on the Notes client will indicate the initial connection to the source server, then a second connection, to the destination server, as shown in Figure 6-17.

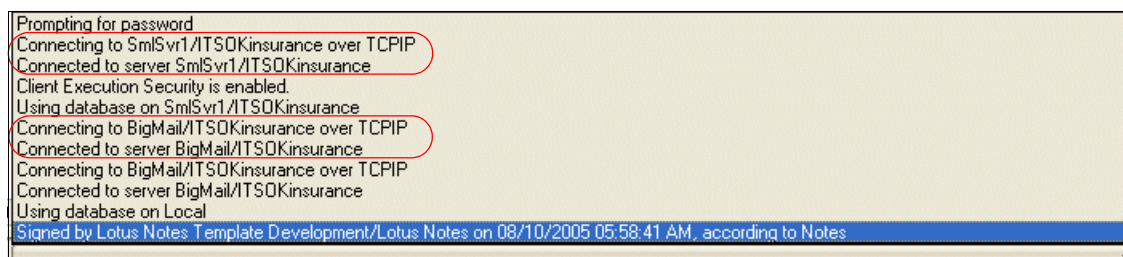


Figure 6-17 Status bar while Move to Another Server process is occurring on the client

- ▶ The local log file on the Notes client (log.nsf) will indicate that DCC has run and has updated the Location document fields, as shown in Figure 6-18.

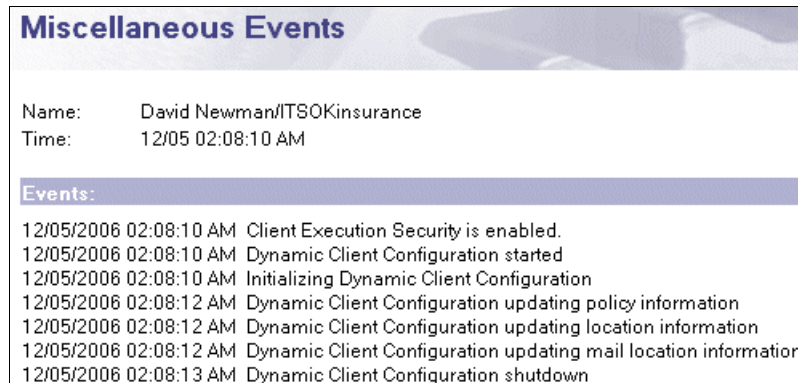


Figure 6-18 Log messages for DCC updating Home/mail server in Location documents

- ▶ The Location documents that have a connection to a Home/mail server (usually “Office”, “Travel”, “Home”, and so on) will have the Home/mail server field populated with the destination server.

Tip: This section has described the procedure for updating standard Notes (non-roaming) users. For information about moving Roaming Notes users to a new server, refer to Technote 1099795 “How To Move a User’s Roaming Files to Another Domino Server” at:

<http://www.ibm.com/support/docview.wss?rs=899&uid=swg21099795>

Step 6: Manually move shared mail files and mail-in databases

Shared mail files that are accessed by a group of people need to be moved manually by the Domino administrator. In addition, unlike personal mail files, the Bookmark and Workspace icons for shared mail files need to be manually updated on the Notes client.

The two most common shared mail file configurations are:

1. Mail-in databases that are accessed by a group of users.
2. Mail databases that are accessed by a group of users, and have a Person document associated with them that specifies the shared mail file in the Mail File field.

The SmlSvr1/ITSOKinsurance server has several mail-in databases that are accessed by a group of users. Here is how one such database, the Customer Service Feedback database, was moved by the Domino administrator:

1. In the Domino Administrator client, open the source server (SmlSvr1), and go to the Files tab.
2. Highlight the Customer Service Feedback database in the view.
3. From the Tools window, select **Database** → **Move...**
4. Replicate the Administration Requests database between the source and destination servers
5. Check the Administration Requests database for the “Approve Deletion of Moved Replica” request in the Pending Administrator Approval → Individual Approval Required view. Existence of this request shows that the new replica has been created and the old replica is ready to be deleted

6. Edit the Approve Deletion of Moved Replica document and click the **Approve Mail File Deletion** button.

Tip: Replica deletion is a “Timed” type Administration request. To initiate the deletion immediately, at the server console of the source server, type:

```
tell adminp process timed
```

7. Check that Administration Request database to ensure that the entire move process completed with no errors. The result of a successful Move Database process is shown in Figure 6-19.

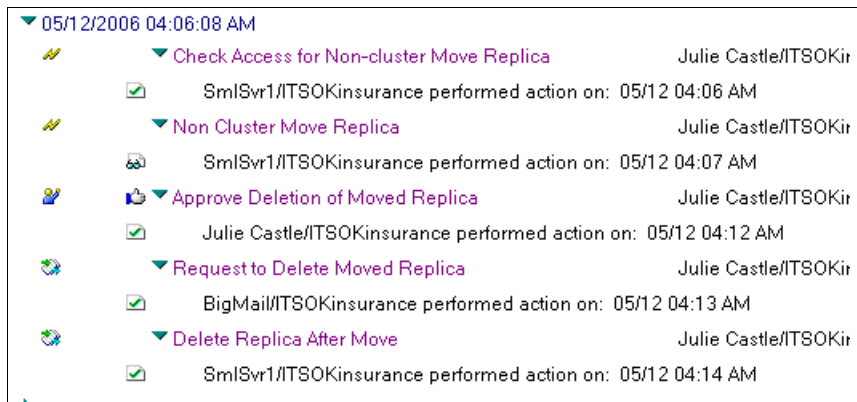


Figure 6-19 Move Database Administration Request documents

8. While still in the Domino Administrator client, open the **People & Groups** tab.
9. Go to the Mail-in Databases & Resources view.
10. Edit the Mail-in Database document for the database that has been moved (the Customer Service Feedback database).
11. Update the Server field to the destination server name.
12. Save and close the document
13. Replicate the Domino Directory between the source and destination servers.

Tip: To move a shared mail database that has a Person document associated with it, use the same procedure as described above, but in steps 9 to 12, instead of updating the Mail-in Database document, update the Person document associated with the shared mail file.

The procedure above will ensure that any new mail sent to the database will be successfully delivered. Users who try to access the database on the old (source) server will, however, be prompted with the dialog shown in Figure 6-20.

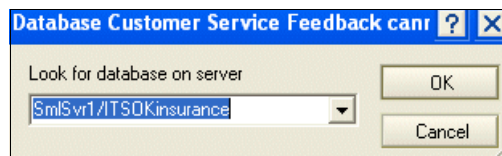


Figure 6-20 Database not found dialog

Users will need to choose the name of the new (destination) server in this dialog to enable them to open the database on the new server. This procedure only needs to be completed once by each user for each database that is moved.

Tip: It may be possible to use a tool to automatically update database icons or redirect users to the replica on the new server. For one example of such a tool, refer to Technote #1094781 “Is there a way to automatically update Db icon/bookmark to point to different Domino server if database has been moved?” at:

<http://www.ibm.com/support/docview.wss?rs=899&uid=swg21094781>

Third-party tools for this purpose also exist.

Step 7: Move application databases

Prior to moving application databases, analyze the database to search for hardcoded server references. Have the developer of the database update the code to remove the hardcoded server references (or update them for the new server). Also, make a list of agents that are currently set to run on the source server.

Attention: It is beyond the scope of this Redpaper to describe the full database testing that may be required for a server move. Be aware that each custom database in your Domino environment may have specific testing and validation requirements. Work with your Domino Application Development team to develop and implement a full test plan for business critical applications.

Application databases may be moved using the “Move database” Administration Tool, as described in the previous procedure (“Step 6: Manually move shared mail files and mail-in databases” on page 145), omitting Steps 8 to 13.

Tip: Use the Decommission Server Analysis report created in “Step 3: Run the Decommission Server Analysis Tool” on page 136 to determine which application databases exist on the source server but not the destination server. These will be listed in the “Databases - No matching replica” document.

After the database has been moved, change the agents to run on the new (destination) server.

Step 8: Validate the move

It is important to validate that all users, mail files, resources, application databases, and other documents have been moved to the destination server prior to server decommissioning.

To validate that the SmlSvr1 server is ready for decommissioning, the ITSOK Insurance Domino Administrator used the simple checklist shown in Table 6-4.

Table 6-4 Checklist for server decommissioning

Area to check	Comments	Complete (tick)
Decommission Server Analysis report	Check all the documents in the report that show the eyeglass icon in the view. Ensure that all noted differences and potential problems have been addressed during the move. You may choose to run another report, to check whether any differences or problems are still noted.	
Administration Requests database	Check the Administration Request documents for: <ul style="list-style-type: none"> ▶ Move database requests ▶ Move To Another Server requests (moving mail files) ▶ Any other Administration requests you generated for the migration 	
Help desk records	Check for recurring problems logged by users to your organization's help desk. Meet with the Help Desk Manager to discuss any outstanding issues they are aware of (and tell them you plan to decommission the source server soon).	

Step 9: Decommission the server

If possible, it is worthwhile retaining the old (source) server for a short while after it has been officially decommissioned. Once all tasks in the “Step 8: Validate the move” on page 148 have been completed, the server can safely be decommissioned.

We recommend that the server be switched off outside of normal business hours in case a problem does result.

After the server has been switched off:

- ▶ Disable any Connection documents in the Domino Directory with a Source or Destination server set as the decommissioned server.
- ▶ Check the log or server console on the new (destination) server and any other servers that previously interacted with the decommissioned servers. Look for errors trying to route or replicate with the decommission server. Fix the cause of these problems.
- ▶ Check on the destination server for errors relating to the decommissioned server, such as agents that are not running.

- ▶ Monitor the Help Desk problem queue and work with the Help Desk team to resolve any remaining issues.

6.2 Example 2: Domain consolidation

For the sake of presenting a realistic scenario example, we present a fictional company ITSObig, a large retail organization.

ITSObig is a large retail organization that has invested heavily in both Notes and Domino technologies, and in business expansion. They recently purchased a smaller retailer, ITSOsmall, which also uses Notes and Domino for e-mail and collaboration.

After the acquisition, ITSObig's administrators cross-certified the two Domino domains, so that direct Notes to Notes mail routing could occur, and some simple discussion databases could be shared. ITSOsmall's users and existing servers are now physically co-located with ITSObig's, at the head office site. The current topology is shown in Figure 6-21.

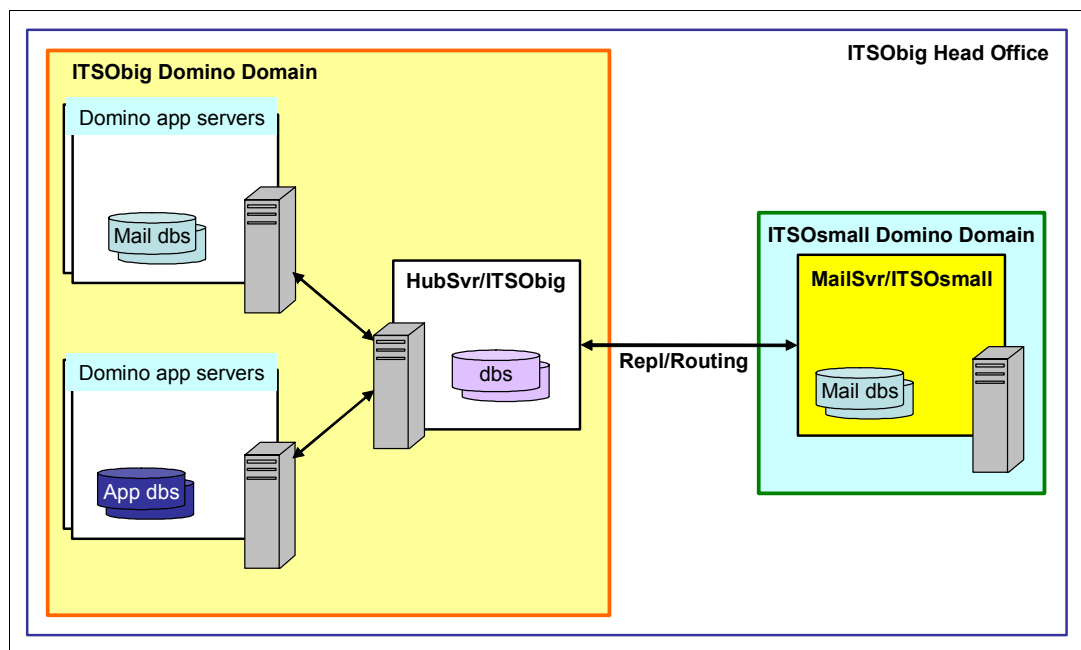


Figure 6-21 Topology prior to domain consolidation

For the sake of simplicity, we will assume that both these organizations are currently using Lotus Notes and Domino 6.5.x.

6.2.1 Reasons for consolidation

With the acquisition of ITSOsmall, the extra Domino domain has added complexity and overhead to the Domino environment. ITSObig has reviewed Chapter 2, “Reasons for consolidation” on page 7 of this Redpaper.

ITSObig considered the main reasons for domain consolidation to include:

- ▶ Reduction or control of IT costs

Support staff: The ITSOsmall Domino administrator and other ITSOsmall support staff will be redeployed into other positions after the domain consolidation, as the current ITSObig Administration team will be able to manage the consolidated domain with current resource levels.

- ▶ Improved data access and protection

Improved enterprise data security: The Domino security model will be consistent across all servers and all applications, reducing administration complexity while improving overall security.

- ▶ Reduced technical complexity

Consolidation will help to reduce the technical complexity of the environment by reducing the number of groups, domains, certifiers, cross certificates, and other components required to manage a multi-domain environment.

6.2.2 The consolidation approach

For the sake of simplicity, the remainder of this example scenario uses the following assumptions:

- ▶ The steps described in this procedure represent those required to merge the users in the MailSvr/ITSOsmall Domino server in the ITSOsmall domain into the ITSObig Domino domain.
- ▶ All users are currently co-located on the same physical site, and the servers in the two domains have already been cross-certified. Connection documents for mail routing and replication are in place for connection between MailSvr/ITSOsmall and HubSvr/ITSObig, and the Resource Reservations database in the ITSObig domain is being used by users in both domains.

The ITSObig Domino Architect reviewed 3.3, “Domino domain consolidation models and techniques” on page 43 of this Redpaper. The decision was made to use model for consolidating Domino domains by moving whole servers. The ITSObig domain after consolidation is shown in Figure 6-22 on page 151.

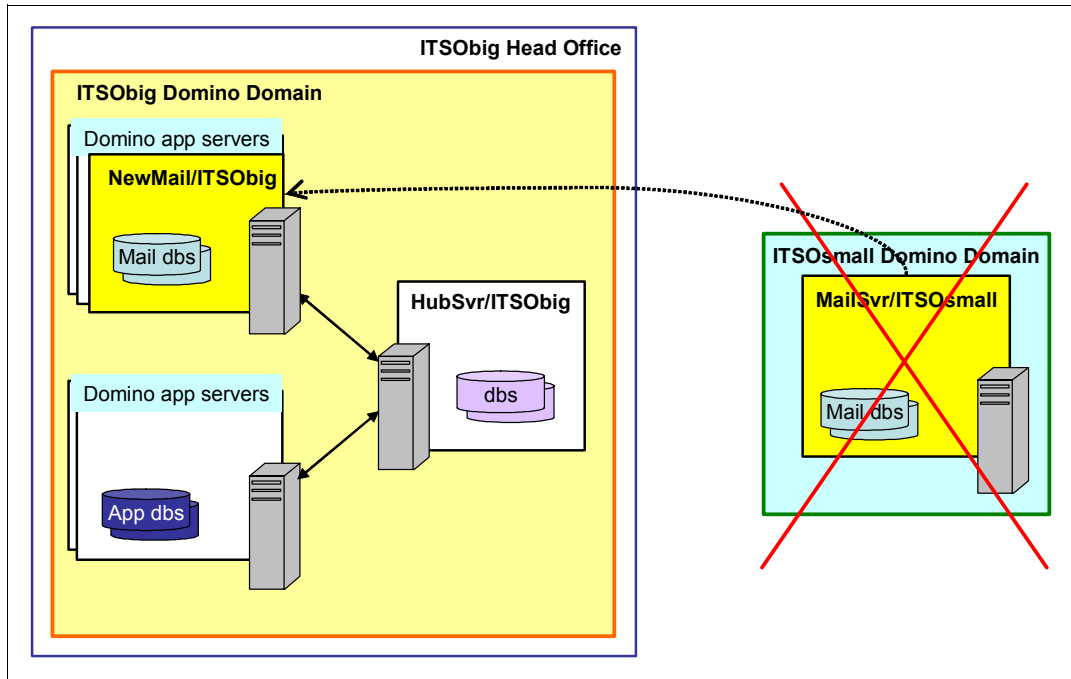


Figure 6-22 ITSObig Domino domain after consolidation

The ITSObig management was comfortable with this approach because they considered it less risky to merge the ITSOsmall domain without moving users onto different servers at the same time. They have decided to separate the server consolidation into a separate project phase (where they will use the procedures described in 6.1, “Example 1: Server consolidation” on page 124).

6.2.3 The administrative model before and after the consolidation

When undergoing a domain consolidation, it is important to also review the model of administration to see whether it will fit the consolidated infrastructure or will need to be modified.

The ITSObig Domino Architect and the Administration Team Manager reviewed the administration model together to determine whether the domain consolidation would necessitate changes to the administration model. They reviewed Chapter 4, “Administration models” on page 53, and in particular 4.6, “How to select an administration model” on page 65.

The ITSOsmall Domino domain was originally administered by the Domino administrator from the ITSOsmall company. Prior to the domain consolidation, this administrator has continued to administer the ITSOsmall domain. When the two domains were cross certified and began sharing databases, the ITSObig Administrators were added to the administration groups in the ITSOsmall Domino Directory to enable them to help manage the domain until consolidation occurred.

The domain consolidation is an opportunity for ITSObig to streamline the administration process. The merged domain can be managed by the same number of administrators as were already used to manage the ITSObig domain, so the ITSOsmall administrator will most likely be retrained and relocated to another role within the ITSObig IT department.

6.2.4 Project overview

The Consolidation Project Team has reviewed Chapter 5, “Project planning overview for performing server consolidation” on page 101 of this Redpaper and plan to follow this general project approach. The following is a short, high level summary of the steps that ITSObig will perform:

- ▶ Have a project sponsor that is involved in the project.

The CIO has agreed to sponsor the domain consolidation project, as the cost savings and benefits of the consolidation are considered significant. The CIO will work to emphasize the importance of this project and help ensure the project team gets the cooperation they need from all areas of the company.

- ▶ Define the project vision.

The project vision for ITSObig’s consolidation project is:

To streamline and simplify the Domino environment, and to provide a consistent, secure and easily manageable collaboration environment for all ITSObig staff. Consolidation will commence within two months, and will be complete within seven months.

- ▶ Assemble the right project team.

The principal members of the project team are the Project Sponsor, Project Manager, Domino Architect, Domino Administrators (one from ITSObig domain and one from ITSObig domain), Domino Developer, and pilot user group. The team will also seek support and assistance from the Server Administration team, Network Administration team, and Help Desk team.

- ▶ Develop and maintain the project schedule.

The Project Manager has completed the project schedule, which allows ITSObig to complete the project well within the five month time frame. Additional time has been allowed after completion of the project for contingencies.

- ▶ Project scope management.

The project scope has been agreed to by the Project Sponsor and the business, the project team members, and the Help Desk. Scope changes will be submitted by the Project Manager on a Scope Change Request document, so that Project Sponsor can agree to the changes, and the project team made aware of the change in scope.

- ▶ Document requirements.

The requirements of the ITSObig project are to consolidate the Domino domains, to reduce cost, streamline administration, and improve Domino security. This will be done by migrating the ITSObig Domino servers and users into the ITSObig Domino domain and into the ITSObig Domino Organizational Certificate structure. Consolidating the actual servers will be done at a later date as a separate project.

- ▶ Establish a communication plan.

The communication plan involves informing the ITSObig users of the upcoming changes and the expected impact on them during the migration. Communication among the project team and the other supporting teams will occur through twice-weekly project update meetings, and establishment of a Project Quickplace to store project documentation, issues, tasks, and discussions.

- ▶ Set project expectations

The project communication plan is designed to set and maintain realistic project expectations among the project team, supporting teams, the ITSObig management, and the users involved in the change. This communication, along with the regular project team

meetings, is designed to ensure that expectations are clear and that there are no surprises during the project.

- ▶ Document the current Lotus Domino infrastructure.

The current Lotus Domino infrastructure and metrics have been thoroughly documented by the Domino architect, with the assistance of the Domino administrator, Server Administration team, and Network Administration team.

- ▶ Assessment of current administration model and service levels.

The ITSObig Domino Architect and Domino Administration Team manager reviewed the current administration model and plan to make some adjustments after the consolidation, as discussed in 6.2.3, “The administrative model before and after the consolidation” on page 151.

- ▶ Develop the training plan.

The domain consolidation project does not involve upgrading the Notes client, so users do not require training in new functionality. The communication plan is designed to educate the users about what to expect during the domain consolidation project, and will provide any steps required of the users to facilitate the transition to the new domain. It is also important that the communication includes instructions on how users can contact the help desk if they need assistance during the transition. No further separate training plan is required.

- ▶ Plan, design, and document the consolidated Domino and Notes environment.

The consolidated Lotus Domino infrastructure is already in place. No physical server hardware will be added or removed from the Domino environment as part of the domain consolidation project. The areas of change in the consolidated environment have been documented. These changes include the security model, cross domain administration, certificates and certifier IDs, management of user IDs, and groups and group management. The ITSObig Domino policies, procedures, and standards documentation was reviewed and either validated or updated as needed, as part of this process.

- ▶ Develop a migration and coexistence plan during consolidation.

The migration plan separates the migration process into a number of discrete steps. The coexistence period is expected to be less than five months, but this should be transparent to users and is not expected to cause disruption or necessitate changes in normal work practices for users.

- ▶ Risk analysis.

The approach of breaking down the consolidation into discrete steps allows a minimization of the risk associated with this project. The project is broken into discrete steps that can each be completed without dependencies on preceding or subsequent steps. This minimizes the risk associated with the consolidation project, and allows each step to be completed within a reasonable time frame, in a planned outage period (outside of normal business hours) where backout time is available.

The built in administrative features of Domino (for example, the Administration Process, Policies, and Dynamic Client Configuration on the Notes client) are being used to automate and simplify the consolidation process, and to reduce the chance of human error.

With these factors in mind, ITSObig analyzes the risk of the consolidation project to be low.

- ▶ Test and validation of consolidation approach.

After the consolidation approach and technical steps were planned by the Domino architect, these were validated by testing the entire process in the ITSObig test environment. This provided validation of the process, and an understanding of the time that the real consolidation would be expected to take.

- ▶ Run consolidation activities.

Consolidation activities are described in 6.2.5, “Steps to implement the server consolidation” on page 154.

- ▶ Final phase - project closure.

Project closure consists of two components: technical and project management. The technical task is concerned with making sure that the ITSOsmall Domino domain servers and users are successfully integrated into the ITSObig Domino domain (including the ITSObig Organizational Certificate structure), and checking that any remaining issues are addressed. The project management closure task will ensure that project documentation is completed, a post implementation review is completed, and the Project Sponsor agrees to sign off that the project is complete.

6.2.5 Steps to implement the server consolidation

This section details the technical implementation tasks required to perform the server consolidation.

For the purpose of this example, we will assume that the non-technical project tasks have been addressed. They will only be discussed here in reference to the technical parts of the project. Of the high level steps described in 5.1, “The key steps in a consolidation project” on page 102, the technical tasks for the project are undertaken in the “Run Consolidation Activities” stage of the project. These are the tasks that are described below.

Meeting the prerequisites

The focus of this task is:

Be sure that target servers, network capacities and other infrastructure are prepared prior to starting consolidation.

In this task, the ITSObig Domino administrator needs to ensure that all the prerequisites for the Domain merge are in place. The simple checklist in Table 6-5 on page 155 was used for this purpose.

Table 6-5 Checklist for meeting the prerequisites

Prerequisite	Team responsible	Comments	Done (Tick)
Destination servers	<ul style="list-style-type: none"> ▶ Domino Admin ▶ Server Admin 	Destination servers are not being changed for this project. Change window for the Domain merge has been agreed with teams.	
Network Capacities	Network Admin	Databases are not being moved for this project. Replication of the Domino Directory and Administration Requests database will be required. Change window has been agreed with team.	
Other Infrastructure	Network	Changes to DNS and mail (MX) records need to be arranged (if Internet mail domains are also being changed).	

Completing the move

Important: The steps used to merge the ITSOsmall Domino domain were tested in a test environment first. We recommend that all production system changes are thoroughly tested in a non-production environment prior to rollout.

The procedures covered in this section describe one way in which a Domino domain merge may be undertaken. The purpose of this section is to give you some ideas and guidelines for merging domains. Domino domain merging can be done in other ways as well. For example, different or additional steps may be required to accommodate your specific Domino environment, or you may choose to reorder the steps described below to fit your own requirements.

Use the procedures described here guidelines to help you with your Consolidation Project.

In this example, The ITSObig administrator will be merging a single server, MailSvr/ITSOsmall@ITSOsmall, into the ITSObig Domino domain. All users on the ITSOsmall server will also be merged into the ITSObig domain, and both the server and users will be renamed under the /ITSObig certifier.

To complete the domain merge for the ITSOSmall Domino domain, the Domino Administrator completed these tasks:

- ▶ Step 1: Prepare the users' Notes clients
- ▶ Step 2: Change the ITSOSmall domain to ITSObig
- ▶ Step 3: Create a cluster for the servers
- ▶ Step 4: Rename the Domino server and add it to the cluster
- ▶ Step 5: Ensure that users can connect to the new server name
- ▶ Step 6: Rename the users with the ITSObig certifier
- ▶ Step 7: Validate the changes

Step 1: Prepare the users' Notes clients

The ITSObig Domino Administrator plans to utilize the Dynamic Client Configuration (DCC) background task on the Notes clients to update the user's Location document fields during the domain merge.

Tip: This task is not time critical; it can be completed any time prior to the planned domain merge. We recommend completing this task well in advance of the actual merge.

It is important to ensure that the Dynamic Client Configuration (DCC) process is enabled on each user's Notes client. This process is responsible for synchronizing the Location document fields in the local Address Book (names.nsf) with those in the user's Person document on the Domino server. If the DCC task is not enabled, the user may have difficulty addressing mail properly after the merge has taken place.

Tip: DCC is enabled by default on Notes clients (for all R5 and newer client versions). Therefore, DCC will be enabled in your environment unless it has specifically been disabled for some other purpose.

Checking that DCC is enabled

To check that DCC was enabled on the ITSOSmall Notes clients, do the following:

1. On a Notes client, open the local Address Book (names.nsf).
2. Open the Advanced → Locations view.
3. Highlight the Location document currently in use on the client (usually "Office").
4. From the menu, select **File** → **Document Properties**.
5. Go to the Fields tab in the Document Properties dialog, highlight the **AcceptUpdates** field, and check the value of the field, as shown in Figure 6-23 on page 157.

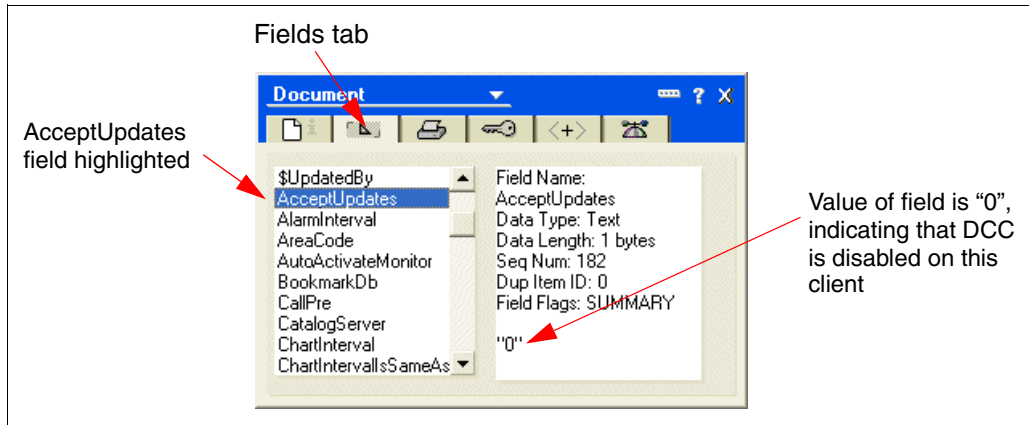


Figure 6-23 Checking whether DCC is enabled on the Notes client

6. The value of the AcceptUpdates field will be either:
 - 0: DCC is disabled.
 - 1: DCC is enabled.

Checking that DCC is actually running

If DCC is enabled, check that it is actually running on the PC:

1. On the Notes client, open the local log file (log.nsf).
2. Open the Miscellaneous Events view.
3. Open a recent log document and search for “Dynamic”.

Tip: It may be easiest to search for “Dynamic” in the view. DCC usually runs shortly after the Notes client is started, but if other background tasks are running or the users closes the client almost immediately, DCC may not get a chance to run (or may show further down in the log document).

4. If DCC is running on the client, you will see log entries similar to those seen in Figure 6-24.

```
03/05/2006 09:11:39 AM Dynamic Client Configuration started
03/05/2006 09:11:40 AM Initializing Dynamic Client Configuration
03/05/2006 09:11:40 AM Dynamic Client Configuration updating policy information
03/05/2006 09:11:40 AM Dynamic Client Configuration updating location information
03/05/2006 09:11:40 AM Dynamic Client Configuration shutdown
```

Figure 6-24 Client log.nsf showing DCC has run

If DCC is enabled but not running, or you require further information, refer to Technote #1212699 “Frequently Asked Questions About Dynamic Client Configuration (DCC)” at:

<http://www.ibm.com/support/docview.wss?rs=899&uid=swg21212699>

How to enable DCC if it is not currently running

To enable DCC if it is not running on a single Notes client:

1. On the Notes client, edit the current Location document by clicking on the Location in the Location Status Bar (bottom right corner of the client) and selecting **Edit Current...**
2. From the menu, select **Options** → **Advanced** → **Set Update Flag**.

Note: Choosing this option does not actually tell you what the flag is currently set to (that is, you cannot discover whether DCC is already enabled using this procedure). To determine whether DCC is already enabled, use the procedure described in “Checking that DCC is enabled” on page 156.

3. In the Location Update Settings dialog, select **Yes** to enable DCC, as shown in Figure 6-25.

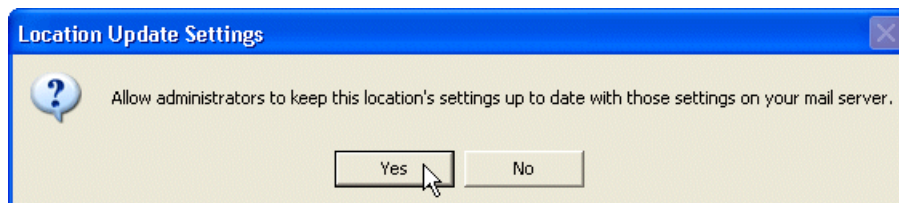


Figure 6-25 Location Update Settings dialog: select Yes to enable DCC

4. Check the Document Properties to ensure that the AcceptUpdates field is now set to “1”.

Note: If you find that all your users currently have DCC disabled, it may be possible to enable it for all users using a PostOpen or similar script on a database that every user opens (such as the mail files or bookmark.nsf) to update the AcceptUpdates field.

For further information and sample code to do this function, refer to Technote 1092794 “How to use LotusScript to change fields in all Location documents” at:

<http://www.ibm.com/support/docview.wss?rs=899&uid=swg21092794>

Step 2: Change the ITSOSmall domain to ITSObig

The purpose of this procedure is to move the ITSOSmall documents into the ITSObig domain’s Domino Directory, and to update the Domain to ITSObig. At the end of this step, the ITSOSmall server will be using the ITSObig’s Domino Directory as its primary directory (names.nsf), and the server and users will be in the ITSObig domain.

Important: This procedure should be completed outside of normal business hours, after a system backup has been performed on both Domino servers. The change should take place in an agreed change window that provides enough time for backout if required.

Copy ITSOSmall documents into the ITSObig Domino Directory

To copy the ITSOSmall documents into the ITSObig Domino Directory, the ITSObig Domino administrator completed the following steps:

1. On the MailSvr/ITSOSmall server:
 - a. Open the mail.box file and ensure there is no mail pending.
 - b. If there is mail pending, force it to send by typing **route <destinationSvrname>** at the server console.
 - c. Shut down the router process, by typing **te11 router quit** at the server console.
2. On the HubSvr/ITSObig server, complete the steps in step 1 above.

3. In a Notes client (logged on as the ITSObig administrator), copy all required documents from the ITSOsmall Domino Directory to the ITSObig Domino Directory:
 - a. Open the ITSOsmall Domino Directory, and go to the People view.
 - b. Select all the Person documents in the view and copy them to the clipboard.
 - c. Open the ITSObig Domino Directory and go to the People view.
 - d. Paste the documents into the People view.
 - e. Go back to the ITSOsmall Domino Directory and go to the Groups view.
 - f. Select the groups that you wish to copy into the ITSObig Domino Directory, and copy those documents to the clipboard.

Important: Be selective with the groups that are copied across. For example, do not choose groups with conflicting names in each directory. Do not copy over the standard LocalDomainServers, LocalDomainAdmins, and OtherDomainServers groups, as they will cause duplicate group document names in the destination Directory. You may need to plan this step prior to completing this process, if there are many groups involved.

- g. Complete the copy-paste process described above for all Server documents, Configurations (except for the * - [Default] Configuration document), Connections, Domains (except for the adjacent Domain document for ITSObig), Mail-in Databases, and Cross certificates.
 - h. In the destination Domino Directory, delete the Adjacent Domain document for the old (ITSOsmall) domain.
 - i. Check through the remaining views (for example, Policies) to determine whether other documents need to be copied across in your environment.
4. When all required documents have been copied across, replicate the ITSObig Domino Directory between MailSvr/ITSOsmall and HubSvr/ITSObig.
5. Shut down MailSvr/ITSOsmall.
6. On the MailSvr machine, in Windows Explorer (or equivalent):
 - a. Rename the current Domino Directory (\Domino\Data\names.nsf) file name to oldnames.nsf, and move the file outside of the \Domino\Data directory.
 - b. Rename the ITSObignames.nsf (ITSObig's Domino Directory) to names.nsf.
7. Restart MailSvr/ITSOsmall, and check the server console during startup for any obvious errors.
8. Shut down the router process by typing **te11 router quit** at the MailSvr server console.

Change the Domain from ITSOSmall to ITSObig

To change the Domain from ITSOSmall to ITSObig for the documents that were just copied into the Domino Directory, the ITSObig Domino administrator did the following:

1. Update the domain fields in the ITSOSmall documents in the ITSObig Domino Directory. Table 6-6 contains a list of the document types and the relevant Domain field name to change in each one. These may be used in agents (if there are many documents to change) or the documents may be updated manually.

Table 6-6 Domain fields to change to merge one domain into another

Document type	Field display name	Field name (for use in Agent)
People	Domain	MailDomain
Groups	Mail Domain	MailDomain
Servers	Domain name	Domain
Connections	Destination domain Source domain	DestinationDomain SourceDomain
Mail-in databases	Domain	MailDomain

2. Shut down the MailSvr Domino server by typing **quit** at the Domino server console.
3. Open the Domino\notes.ini file on the MailSvr.
4. Search for the Domain= parameter, and update it with the new domain name (that is, Domain=ITSObig).
5. Restart the MailSvr/ITSOSmall Domino server.
6. Restart the router on HubSvr/ITSObig by typing **load router** at the server console.
7. Test sending a mail message from a ITSOSmall user to a ITSObig user, and from an ITSObig user to an ITSOSmall user. Ensure that the e-mails are both successfully received.

(Optional) If Directory Catalog is in use, reconfigure and rebuild it

If Directory Catalog is in use, additional tasks need to be completed at this point to ensure that duplicate, obsolete entries from the old (ITSOSmall) Domino Directory are no longer listed in the Directory Catalog. To do this, complete these steps:

1. If the dircat task is configured to run on one of the old domain's servers, disable the task:
 - a. Open the Domino Directory on the old domain server.
 - b. Open the Configuration → Servers → All Server Documents view.
 - c. Select the Server Document for the server that runs the dircat task and click **Edit Server**.
 - d. Go to the Server Tasks → Directory Cataloger tab.
 - e. Delete the entry in the Directory Catalog Filenames field.
 - f. Set the Schedule field to DISABLED.
 - g. Save and close the document.
2. Delete the Directory Catalog database from any servers in the old domain that contain a replica of it.
3. Update the Directory Catalog Configuration on the new domain (ITSObig):
 - a. Open the Directory Catalog database on the ITSObig Directory Cataloger server.

- b. Open the Configuration view.
 - c. Open the Dircat Configuration document and click **Edit Configuration**.
 - d. In the Directories To Include field, find and delete the name of the old domain's Domino Directory (for example, ITSOsmallnames.nsf).
 - e. Save and close the Dircat Configuration document.
4. Rebuild the Directory Catalog on the new domain (ITSObig) by typing at the server console:

```
load dircat dircat.nsf -r
```

where *dircat.nsf* is the file name for the Directory Catalog to be rebuilt.
 5. Replicate the updated Directory Catalog to the old domain (ITSOsmall) servers.

Tip: If there are users from the old domain who replicate the Directory Catalog and use it locally, these users will need to delete the old Directory Catalog, take a new replica of the Directory Catalog from the new domain, and update their Preferences to use the new Directory Catalog for addressing (if the new file name is different from the old).

It may be easiest to use Policies (Desktop Settings) to help make these changes, or send a button out to the users to automate the procedure.

Update the Domain in users' Location documents

In this part of the procedure, we will create a Desktop Settings document and Policy to change the domain in Location documents for ITSOsmall users to ITSObig. This will be done by first adding extra fields to the design of the Desktop Settings document to change the Domain field in the Location document.

Restriction: This part of the procedure involves making design changes to the Domino Directory system database. It is important to note that making changes to the design of system databases is officially unsupported. This means that if you have a problem with this database, Support may ask you to return to using the standard template design before providing additional help with your issue.

1. Open the Domino Directory in Domino Designer® client and go to the Forms view.
2. Open the Policy Settings\Desktop Settings form.
3. On the Basics tab, add an extra row to table in the Server Settings section.

- In the extra row, create fields, as shown in Figure 6-26. Note the field names and field types. These must be exactly as shown (“LocAll” indicates Location document, “Domain” is the field name in the Location document, \$IP indicates inherit setting from parent, and \$PO indicates enforce in child).

Server Options		Inherit from parent policy:	Enforce in child policies:
Catalog/Domain Search server:	<input type="text" value="LocAllCatalogServer"/> <Computed Value>	<input type="checkbox"/> LocAllCatalogServer\$IP	<input type="checkbox"/> LocAllCatalogServer\$P
Domino Directory server:	<input type="text" value="LocAllDirectoryServer"/> <Computed Value>	<input type="checkbox"/> LocAllDirectoryServer\$IP	<input type="checkbox"/> LocAllDirectoryServer\$P
IBM Lotus Instant Messaging server:	<input type="text" value="LocAllSametimeServer"/> <Computed Value>	<input type="checkbox"/> LocAllSametimeServer\$IP	<input type="checkbox"/> LocAllSametimeServer\$P
Local mail file:	<input type="checkbox"/> LocalReplica	<input type="checkbox"/> LocalReplica\$IP	<input type="checkbox"/> LocalReplica\$PO
Mail Domain	<input type="text" value="LocAllDomain"/> T	<input type="checkbox"/> LocAllDomain\$IP	<input type="checkbox"/> LocAllDomain\$PO

Label for the row “LocAllDomain” Text field “LocAllDomain\$IP” Checkbox field “LocAllDomain\$PO” Checkbox field New row

Figure 6-26 Creating fields to change the Domain field in Location documents via a Policy

- Save and close the Desktop Settings form.
- In the Domino Administrator client, open HubSvr/ITSObig and go to the People & Groups tab
- Open the ITSObig’s Directory → Settings view and click **Add settings** → **Desktop** to create a new Desktop Settings document.
- On the Basics tab, in the Name field, type “ChangeDomain” (without the quotes).
- Page down to the Server Settings section and find the Mail Domain row you created in Step 4.
- Fill in the name of the new mail domain you want to push out to users (ITSObig), as shown in Figure 6-27.

Server Options	
Catalog/Domain Search server:	<input type="text"/>
Domino Directory server:	<input type="text"/>
IBM Lotus Instant Messaging server:	<input type="text"/>
Local mail file:	<input type="checkbox"/> Create local mail file replica
Mail Domain	<input type="text" value="ITSObig"/>

Figure 6-27 Mail Domain field in Desktop Settings document

- Save and close the Desktop Settings document.
- Go to the Configuration → Policies view.
- Click **Add Policy**.
- In the Policy name field, fill in the Organization name (ITSOsmall). Change the Policy type to Organizational.
- In the Desktop Setting field, select the Desktop Settings document (ChangeDomain).

16. Save and close the Policy document. The completed document is shown in Figure 6-28 on page 163.

The screenshot shows the Domino Policy document configuration interface. At the top, the title is "Policy : */ITSOsmall". Below the title, there are tabs for "Basics", "Comments", and "Administration". The "Basics" tab is selected. The "Policy name" field contains "*/ITSOsmall" and the "Policy type" dropdown is set to "Organizational". A "Create Child" button is located to the right of the "Policy name" field. Below the "Policy type" field, there is a "Description" field. A table of settings is displayed below, with columns for "Setting Type" and "Setting Name". The settings are: "Registration" (New...), "Setup" (New...), "Archiving" (New...), "Desktop" (ChangeDomain), and "Security" (New...). The "Desktop" setting is highlighted with a red circle.

Figure 6-28 Policy document to change Domain in Location documents

17. Replicate the Domino Directory between MailSvr/ITSOsmall and HubSvr/ITSObig.

The next time the ITSOsmall users authenticate with their Home/mail server, all Location documents that have DCC enabled in the local Address Book (names.nsf) will be updated with the new domain name.

Tip: After completing the above procedures, allow some time (perhaps a couple of weeks) for users to log in and update their domain, before going on to the remainder of the Domain merge.

Organizations who do not want to change the Organizational Certifier of the users they have merged (that is, /ITSOsmall) may choose to stop after the above steps are completed. The remainder of this scenario describes the procedure for recertifying users into the new Organizational Certifier (/ITSObig).

Step 3: Create a cluster for the servers

In this procedure, we will create a cluster for MailSvr/ITSOsmall and HubSvr/ITSObig.

The purpose of this procedure is so that when the /ITSOsmall server is renamed into the /ITSObig certifier, users can fail over to the HubSvr, have DCC update the Home/Mail server name in their Location documents, and then they will fail over to the new server name.

To create the cluster:

1. In the Domino Administrator client, open HubSvr/ITSObig.
2. Go to the Configuration tab and select the Server → All Server Documents view.
3. In the view, select the servers to include in the new cluster: HubSvr/ITSObig and MailSvr/ITSOsmall.

4. Click the **Add to Cluster** button, and then **Yes** to continue.
5. In the Cluster Name dialog, click **OK** to create a new cluster.

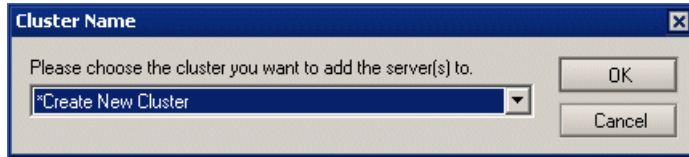


Figure 6-29 Create new cluster dialog

6. Type in the name of the new cluster, DomainMerge, and then click **OK**.

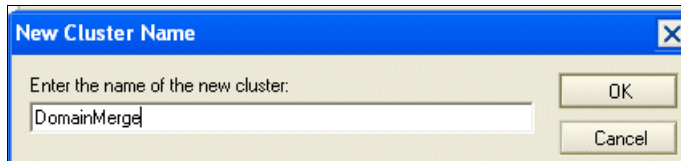


Figure 6-30 Typing a name for the new cluster

7. Select **Yes** to create the cluster immediately, then **OK** to the Request Successful dialog.
8. Replicate the names.nsf and admin4.nsf between MailSvr and HubSvr.

Important: After this procedure has been completed, wait for some time (perhaps a couple of weeks) to ensure that users have authenticated with their home server. This is required for the Notes client to be aware of the new cluster. At first authentication after the new cluster has been created, cluster information will be cached on the Notes client. At the next Notes client exit, this information will be written to a cluster.ncf file created on the workstation in the notes\data directory. This file contains the information required for the Notes client to fail over to cluster member servers in the event of a home server outage.

Step 4: Rename the Domino server and add it to the cluster

This is the second part of the renaming and cluster failover procedure. The purpose of this part of the procedure is to create the new identity for the ITSObig server and update the cluster so that Notes clients can find their mail server at its new identity.

Important: This procedure should be completed outside of normal business hours, after a system backup has been performed on both Domino servers. The change should take place in an agreed change window that provides enough time for backout if required.

In this procedure, we will do the following tasks:

- ▶ Create a new server ID for the MailSvr using the /ITSObig certifier.
- ▶ Swap to the new server ID on the server.
- ▶ Add the new server to the DomainMerge cluster.
- ▶ Update the Domino Directory documents to reflect the server's new identity.
- ▶ Update the Home/mail server field in the users' Location documents.
- ▶ Update the user mail file ACLs with new server name.

Create a new server ID for the MailSvr using the /ITSObig certifier

Important: Prior to completing this step, it is important to have a new IP address available for the new server identity. If you keep the old IP address for the new identity, this procedure will not work, as users will not be able to fail over to the HubSvr server.

Request a new IP address from your Network Administration team, and ensure that they update the DNS and other relevant configurations for your organization before you complete the steps below.

To create the new server ID, the ITSObig Domino administrator did the following:

1. In the Domino Administrator client, open the HubSvr/ITSObig server.
2. Go to the Configuration tab, and in the Tools panel, select **Registration** → **Server**.
3. In the Choose a Certifier dialog, select the Registration Server and Organizational Certifier ID (for ITSObig), as shown in Figure 6-31.

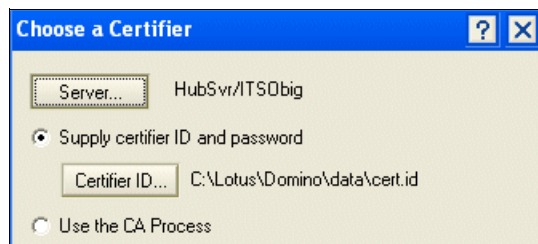


Figure 6-31 Choose a certifier dialog

4. Enter the certifier password.
5. In the Register Servers dialog, check that the Registration server (HubSvr/ITSObig) and certifier (/ITSObig) are correct, then click **Continue**.
6. In the Register New Server(s) dialog, fill in the Server name for the new server, and select to store the ID file in a file, as shown in Figure 6-32.

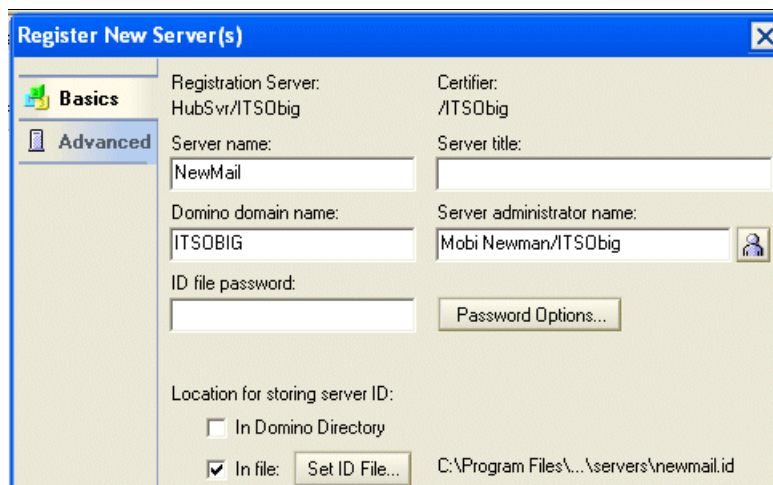


Figure 6-32 Register new server(s) dialog

7. Click **Register** to create the new server, and then **Done** to close the dialog box.

8. Update the Server document for the new server:
 - a. While still in the Domino Administrator client, on the Configuration tab, select the NewMail/ITSObig Server document and click **Edit Server**.
 - b. On the Basics tab, fill in the Full Qualified Internet host name field with the host name of the server.
 - c. On the Security tab, fill in the required security settings for your organization, for example, fill in the Create new databases & templates field and the Create new replicas field with “LocalDomainServers” and “LocalDomainAdmins”.
 - d. On the Ports tab, fill in the Port, Notes Network, and Net address details for the new server, and change the port to Enabled, as shown in the example in Figure 6-33.

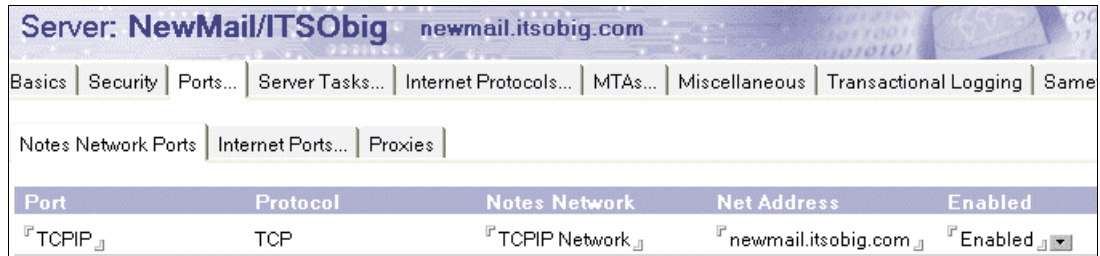


Figure 6-33 Port details in Server document for new server

- e. Save and close the Server document.

Swap to the new server ID on the server

Prior to completing this procedure, analyze the databases on the server to search for hardcoded server references. Have the developer of the database update the code to remove the hardcoded server references (or update them for the new server). Also, make a list of agents that are currently set to run on the current server name (MailSvr/ITSOsmall). This includes Out Of Office Agents in users' mail files.

Attention: It is beyond the scope of this Redpaper to describe full database testing that may be required for a Domain merge and Organizational recertification. Be aware that each custom database in your Domino environment may have specific testing and validation requirements. Work with your Domino Application Development team to develop and implement a full test plan for business critical applications.

To swap the old MailSvr/ITSOsmall to its new identity, NewSvr/ITSObig, the ITSObig Administrator completed these steps:

1. Shut down the MailSvr server by typing **quit** at the server console.
2. In Windows Explorer (or equivalent):
 - a. Copy the ID file for the new server from the location you saved it (on the Domino Administrator client workstation's file system) into the Domino\Data directory on the MailSvr machine.
 - b. Copy admin4.nsf file from the Domino\Data directory on the HubSvr to the same location on the MailSvr.
3. Open the Domino\notes.ini file on the MailSvr.
4. Search for the KeyFileName parameter and ServerKeyFileName parameter, and update the lines to the new ID file name, as shown in Figure 6-34 on page 167.

```

KeyFilename=C:\Lotus\Domino\data\NewMail.id
CertifierIDFile=C:\Lotus\domino\data\cert.id
MailServer=CN=MailSvr/O=ITSOsmall
NAMELOOKUP_TRUST_DIRCAT=0
FirstServerInDomain=1
ServerKeyFileName=NewMail.id

```

Figure 6-34 Changing Server ID file name in notes.ini

5. Save and close the notes.ini file.
6. Change the IP address for the server, in the operating system's network configuration (or have your Network or Server Administrator complete this step).
7. Start the Domino server. Check the Title Bar of the server console to ensure that the new server name is shown (NewMail/ITSObig). Check the console messages for any obvious errors.

Add the new server to the DomainMerge cluster

To add the NewMail server to the existing DomainMerge cluster, the ITSObig Domino administrator did the following:

1. In the Domino Administrator client, go to the Configuration tab.
2. Go to the Server → All Server Documents view.
3. Select the NewMail server in the view, then select **Add to Cluster**.
4. Select **Yes** to continue, then in the Cluster name dialog, select the DomainMerge cluster, as shown in Figure 6-35.

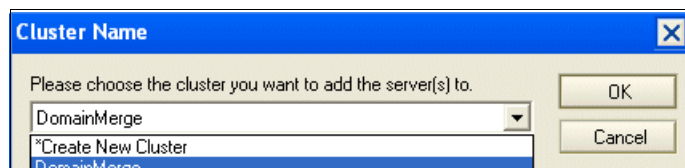


Figure 6-35 Adding new server to existing cluster

5. Click **OK** and then **Yes** to update the cluster immediately.
6. Delete or disable any Connection documents with the old server listed (MailSvr/ITSOsmall).
7. Delete the Server document for the old server (MailSvr/ITSOsmall).
8. Create a Connection document for scheduled replication between the two clustered servers: NewMail/ITSObig and HubSvr/ITSObig.
9. Open the Cluster Directory database (cldbdir.nsf) and ensure that the NewMail server's databases have been added (use the Databases by Server view).

Update the Domino Directory documents to reflect the server's new identity

In this part of the procedure, Domino Directory documents pointing to the old server name are updated to the new server name (NewMail/ITSObig).

To do this procedure:

Update the Server name fields in Domino Directory documents that point to the old server name (MailSvr/ITSOsmall), so they point to the new server name (NewMail/ITSObig).

Table 6-7 contains a list of the document types and the relevant Server Name field to change in each. These may be used in agents (if there are many documents to change) or the documents may be updated manually.

Table 6-7 Server name fields to change in the Domino Directory to reflect the server's new identity

Document type	Field display name	Field name (for use in Agent)
People	Mail server	MailServer
Configurations	Group or Server name	ServerName
Connections	Destination Server Source Server	Destination Source
Programs	Server to run on	Source
Mail-in Databases	Server	MailServer

Important: If there are many of one document type to update, you may choose to write a simple agent to change them all. If you do this, make sure that the new value is the full hierarchical name of the server (that is, CN=<CommonName>/O=<OrgName>).

The agent could use the Simple Action “Modify Field” to replace the server name field on selected documents. A sample of such an agent (showing the MailServer field change in Person documents) is shown in Figure 6-36.

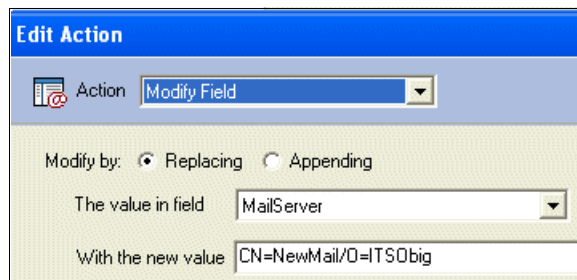


Figure 6-36 Agent to change MailServer field in Person documents

Update the Home/mail server field in the users' Location documents

In this part of the procedure, we will update the Desktop Settings document created in the “Update the Domain in users' Location documents” on page 161 to change the Home/mail server field to “NewMail/ITSObig” in users' Location documents. This will be done by first adding extra fields to the design of the Desktop Settings document to change the Home/mail server field in the Location document.

Restriction: This part of the procedure involves making design changes to the Domino Directory system database. It is important to note that making changes to the design of system databases is officially unsupported. This means that if you have a problem with this database, Support may ask you to return to using the standard template design before providing additional help with your issue.

1. Open the Domino Directory in Domino Designer client and go to the Forms view.
2. Open the Policy Settings\Desktop Settings form.
3. On the Basics tab, add an extra row to table in the Server Settings section.

- In the extra row, create fields, as shown in Figure 6-37. Note the field names and field types. These must be exactly as shown (“LocAll” indicates Location document, “MailServer” is the field name in the Location document, \$IP indicates inherit setting from parent, and \$PO indicates enforce in child).

Server Options		Inherit from parent policy:	Enforce in child policies:
Catalog/Domain Search server:	<input type="text" value="LocAllCatalogServer"/> <Computed Value>	<input type="checkbox"/> LocAllCatalogServer\$IP	<input type="checkbox"/> LocAllCatalogServer\$PO
Domino Directory server:	<input type="text" value="LocAllDirectoryServer"/> <Computed Value>	<input type="checkbox"/> LocAllDirectoryServer\$IP	<input type="checkbox"/> LocAllDirectoryServer\$PO
IBM Lotus Instant Messaging server:	<input type="text" value="LocAllSametimeServer"/> <Computed Value>	<input type="checkbox"/> LocAllSametimeServer\$IP	<input type="checkbox"/> LocAllSametimeServer\$PO
Local mail file:	<input type="checkbox"/> LocalReplica	<input type="checkbox"/> LocalReplica\$IP	<input type="checkbox"/> LocalReplica\$PO
Mail Domain	<input type="text" value="LocAllDomain"/> T	<input type="checkbox"/> LocAllDomain\$IP	<input type="checkbox"/> LocAllDomain\$PO
Mail Server	<input type="text" value="LocAllMailServer"/> T	<input type="checkbox"/> LocAllMailServer\$IP	<input type="checkbox"/> LocAllMailServer\$PO

↑ Label for the row ↑ “LocAllMailServer” Text field ↑ “LocAllMailServer\$IP” Checkbox field ↑ “LocAllMailServer\$PO” Checkbox field ↑ New row

Figure 6-37 Creating fields to change the Home/mail Server field in Location documents via a Policy

- Save and close the Desktop Settings form.
- In the Domino Administrator client, open HubSvr/ITSObig and go to the People & Groups tab.
- Open the ITSObig’s Directory → Settings view.
- Select the ChangeDomain Desktop Settings document in the view, and click **Edit Settings**.
- On the Basics tab, page down to the Server Settings section and find the Mail Server row you created in Step 4.
- Fill in the name of the new mail server you want to push out to users (NewMail/ITSObig), as shown in Figure 6-38.

Server Options	
Catalog/Domain Search server:	<input type="text" value=""/>
Domino Directory server:	<input type="text" value=""/>
IBM Lotus Instant Messaging server:	<input type="text" value=""/>
Local mail file:	<input type="checkbox"/> Create local mail file replica
Mail Domain	<input type="text" value="ITSObig"/>
Mail Server	<input type="text" value="CN=NewMail/O=ITSObig"/>

Figure 6-38 Home/mail server field in Desktop Settings document

- Save and close the Desktop Settings document.

Update the user mail file ACLs with new server name

This part of the procedure adds the new mail server as the Administration Server of the ITSOsmall users' mail files.

In the Domino Administrator client:

1. Open the mail server for the users (NewMail/ITSObig).
2. Go to the Files tab and open the \mail subdirectory.
3. Highlight all the mail files in the view.
4. In the Tools panel, select **Database** → **Manage ACL**.
5. In the Manage Multiple ACLs dialog, go to the Advanced tab.
6. Select the check box for the **Modify Administration Server** setting.
7. In the Server field, select or type in the name of the new server (NewMail/ITSObig), as shown in Figure 6-39.

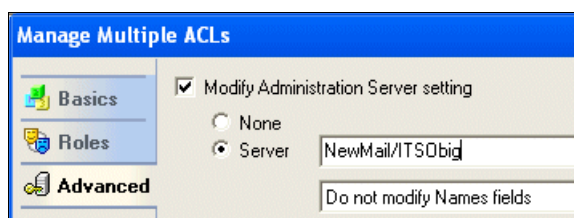


Figure 6-39 Adding the new mail server to mail file ACLs

8. Click **OK**.

Tip: If there are other non-mail databases on the server, we recommend that the above procedure be completed for those databases as well. This will add the new server name to the ACL of those databases, and also set the new server as the Administration Server for each database, allowing any future Administration Requests affecting the databases to be processed by the new server.

Step 5: Ensure that users can connect to the new server name

When users next open their Notes client and click their mail icon on the old mail server, the following changes will occur in the background of the Notes client:

- ▶ The Notes client will search for the user's old mail server, as specified in the Home/mail field of their Location document.
- ▶ The Notes client will be unable to connect to the old server, and will check the cluster.ncf file to find other cluster members.
- ▶ The Notes client will find the HubSvr/ITSObig server and connect to it.
- ▶ The Notes client will check the Cluster Directory database for alternative locations for their mail file, find it on the NewMail/ITSObig server, and open that replica.
- ▶ Dynamic Client Configuration (DCC) will run, and will copy down the updated ChangeDomain Desktop Settings document to the local Address Book (names.nsf).
- ▶ The Home/mail server field in Location documents will be updated from the Desktop Settings document with the NewMail/ITSObig mail server.
- ▶ Thereafter, whenever the user opens their mail file, it will open the replica on the NewMail server (because this is the one now specified in the Location document).

- ▶ When the user next exits the Notes client, the cluster.ncf file will be updated with the NewMail/ITSObig server details.

To check whether this process has occurred, on the Notes client, check any or all of the following:

- ▶ The Log file (log.nsf) shows the mail file fail over and the DCC updates, as shown in Figure 6-40.

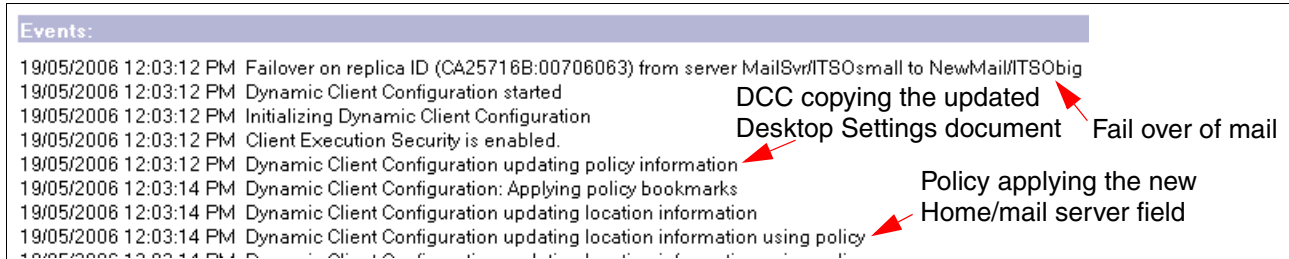


Figure 6-40 Checking in the local log.nsf that the user has successfully failed over to the new server identity

- ▶ The Location documents have been updated to the new value for the Home/mail server field.
- ▶ If you hover with the mouse pointer over the mail file icon on the Bookmark bar, the status bar at the bottom of the client indicates that the mail is on the new server: “Mail is on NewMail/ITSObig”.
- ▶ The notes\data\cluster.ncf file has the new server name listed (after you have exited the Notes client).

Step 6: Rename the users with the ITSObig certifier

Before starting this procedure, ensure you have these prerequisites items:

- ▶ The Certifier ID files and passwords for the old and new certifier.
- ▶ The Certifier document for the old certifier copied into the new domain’s Domino Directory (that is, in our example, the Certifier document for /ITSOsmall has been copied into the ITSObig domain’s Domino Directory).

To rename the ITSOsmall users with the ITSObig certifier, the ITSObig Domino administrator did the following:

1. In the Domino Administrator client, open HubSvr/ITSObig and go to the People & Groups tab.
2. Open the ITSObig’s Directory → People view
3. In the view, select the users that you want to rename.
4. From the Tools panel, select **Rename**.
5. In the Rename Selected Notes People dialog, click **Request Move to New Certifier**.
6. In the Choose a Certifier dialog:
 - a. Click **Server** to change the server to HubSvr/ITSObig.
 - b. Click **Certifier ID** to select the location of the *current* certifier (that is, the /ITSOsmall Certifier ID).
 - c. Click **OK** to continue.
7. Enter the Certifier ID password and click **OK**.

8. In the Request Move for Selected People dialog, select the new certifier (/ITSObig) from the drop-down list, then **OK** to complete the move.
9. Open the Administration Requests database on HubSvr/ITSObig, and go to the Requests → Name Move requests view.
10. In the view, select the names you just processed.
11. Click **Complete Move** for the selected entries.
12. In the Choose a Certifier dialog:
 - a. Check that the correct server (HubSvr) is selected.
 - b. Click **Certifier ID** to select the location of the *new* certifier (that is, the /ITSObig Certifier ID).
 - c. Click **OK** to continue.
13. Enter the Certifier ID password and click OK.
14. In the Certificate Expiration Date dialog, accept or change the new expiration date, then click **OK** to complete.

Tip: The move is completed by the Administration Process (adminP), so some parts of the request will not occur instantly. To check the progress of the rename, open the Administration Requests database and check the person's name in the Requests → All Requests by Name view.

In the Notes client 6.x and later, name changes are automatically accepted without prompting the user, unless this option has been changed by the individual user in their Notes client.

For further information about the rename process described above, refer to the topic "Moving a user name in the name hierarchy" in the Domino Administrator 7 Help database.

Step 7: Validate the changes

It is important to validate that all users, mail files, application databases, and other documents have been correctly migrated to the new domain and certifier prior to closing off the Domain Merge project.

To validate that the domain merge is complete, the ITSObig Domino Administrator used the simple checklist shown in Table 6-8.

Table 6-8 Checklist for Domain Merge project closure

Area to check	Comments	Complete (tick)
Domino Directory	<p>Check the following documents:</p> <ul style="list-style-type: none"> ▶ People: Check the People → By Organization view to check for anyone still using the /ITSOsmall certifier. These people may have been missed in the move, may not have logged on since the rename was initiated, or there may be an adminP error with the move. ▶ Check these other views to ensure that all documents are pointing to the new server and domain name: Groups, Configurations, Connections, Programs, and Mail-in Databases. ▶ Check all views to ensure documents are all still valid and required. Delete any obsolete documents. 	
Administration Requests database	Check the Administration Request documents for Name move requests. Ensure that no errors show for the users who have been renamed to the /ITSObig certifier.	
Help desk records	Check for recurring problems logged by users to your organization's help desk. Meet with the Help Desk Manager to discuss any outstanding issues they are aware of.	

Related publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this Redpaper.

IBM Redbooks

For information about ordering these publications, see “How to get IBM Redbooks” on page 175. Note that some of the documents referenced here may be available in softcopy only.

- ▶ *Domino 7 Performance Tuning: Best Practices to Get the Most Out of Your Domino Infrastructure*, REDP-4182
- ▶ *Domino for IBM eServer xSeries and BladeCenter Sizing and Performance Tuning*, REDP-3851
- ▶ *Lotus Domino for S/390 Release 5: Performance Tuning and Capacity Planning*, SG24-5149

Online resources

These Web sites and URLs are also relevant as further information sources:

- ▶ Lotus Notes and Domino white papers
<http://www-10.lotus.com/1dd/notesua.nsf/White%20Papers?OpenView>
- ▶ Lotus Documentation and Release Notes
<http://www-10.lotus.com/1dd/notesua.nsf/RN?OpenView>
- ▶ Domino performance
<http://www-128.ibm.com/developerworks/lotus/performance/>

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ibm.com/services



Domino 7 Server Consolidation

Best Practices to Get the Most Out of Your Domino Infrastructure

Includes an overview of benefits and representative methods for consolidating

Reviews administration models and the impact of consolidation

Shows planning and executing a server consolidation project

Since the introduction of Domino 7, IBM/Lotus has been highlighting the capabilities of Domino to now do more with less - ultimately using Domino 7 more efficiently to better leverage existing investment - and ultimately reduce the Total Cost of Ownership (TCO). For many companies however, the key issue remains about how and where to begin with a consolidation effort, and what are the best practices and specific steps to get started with this effort. This Redpaper addresses these questions.

The overall goal of Domino consolidation is to provide a better Return on Investment (ROI) for a business' environment while maintaining or improving the system's Quality of Service (QoS). Depending on the current condition of a company's Domino environment, this goal might be reached in different ways.

Since there is no "one-size- fits-all" approach to Domino server consolidation, this Redpaper examines the issue from a best practices perspective. Specifically, it discusses Domino Server Consolidation in terms of the following topics:

Reasons for consolidation: A detailed look at the benefits one should look for when planning or implementing a consolidation project.

Approaches to consolidation: Examine various models and scenarios and give details about the architectural considerations and consolidation methodologies.

Administration model: Define Domino administration models and give details about how those models impact consolidation decisions.

General approach: Give details about techniques to define and execute and effective consolidation project

Performing Server Consolidation: Step by step examples using a scenario based approach

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