

Agenda Key: 25FH

Session #: 580131

# Creating a Domino HA Environment

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# About Amy Hoerle

- Consultant at Kim Greene Consulting, Inc.
- 1<sup>st</sup> “real” job was as an AS/400 administrator in 1997
- Worked on IBM Lotus Domino support team for 11 ½ years
- Specializing in Lotus products on IBM i & Windows since 1999
- XPages development
- Author of numerous technotes, articles and the “Optimizing Domino Administration” IBM Redbooks Wiki
- Email – [ahoerle@kimgreene.com](mailto:ahoerle@kimgreene.com)
- Blog - [www.bleedyellow.com/blogs/ilotusdomino](http://www.bleedyellow.com/blogs/ilotusdomino)
- Twitter - [iLotusDomino](https://twitter.com/iLotusDomino)

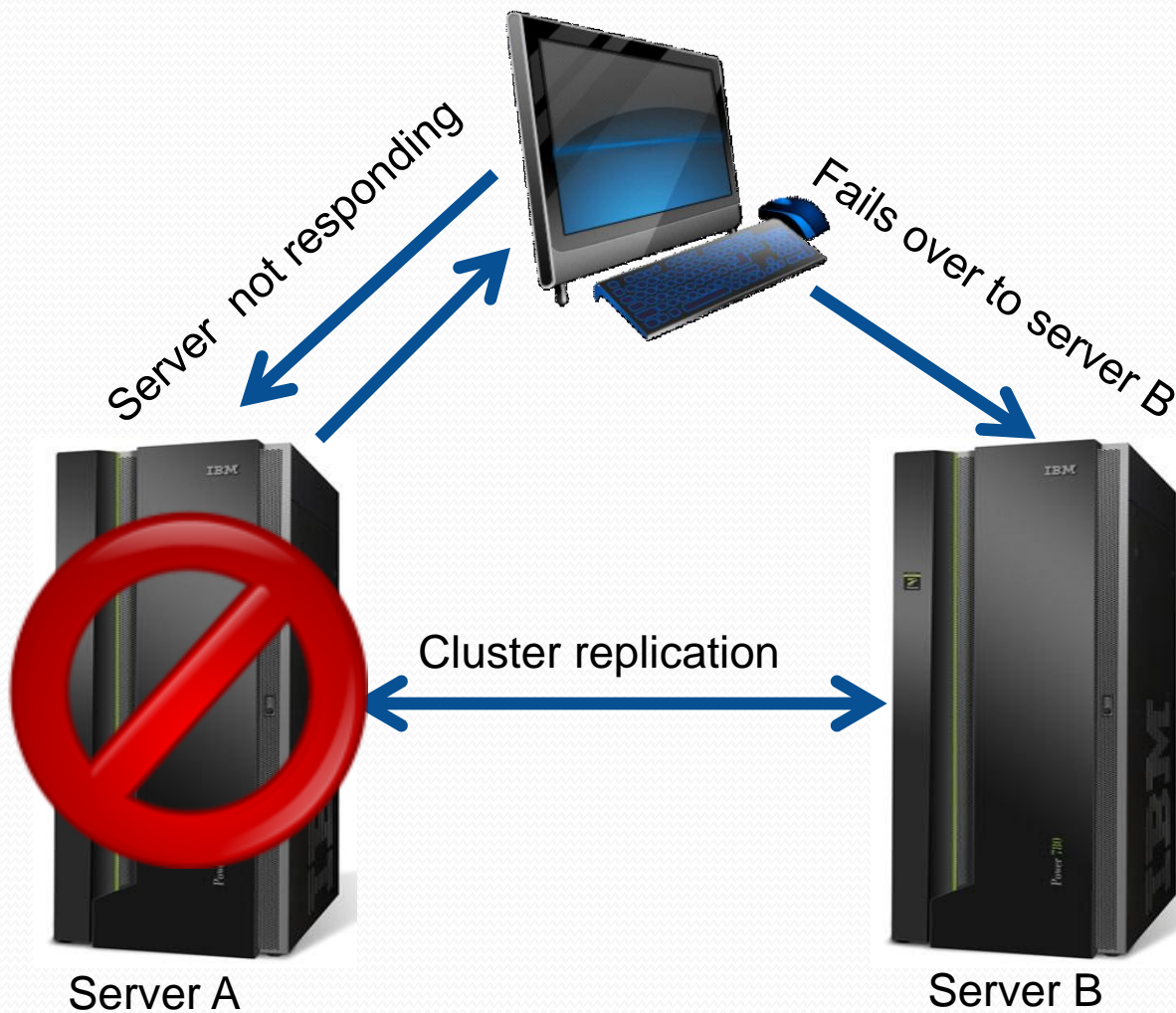
# Agenda

- Planning for HA
- Understanding Domino Replication
- Overview of Domino Clustering
- Clustering Custom Applications

# Planning for HA

- What is the goal?
- What will be clustered?
- Which 3<sup>rd</sup> Party Products are in use?
- Review Backup and Recovery Plan
- Review Firewall, Mail Routing and DNS Configuration

# Failover with the Notes Client



# Clustering Other tasks

- Not using the Notes client?
  - iNotes
  - POP3
  - IMAP
- Hosting web applications?
- Other applications looking up names from the Domino directory (LDAP)?

# Internet Cluster Manager (ICM)

- Why ICM?
  - Way to route browsers to a specific Domino server
  - Understands Domino clustering and thus can identify where cluster replicas exists, availability of server..
- Why not ICM?
  - Requires the browser hit the ICM for the redirection
  - Must cluster the ICM or you just moved your single point of failover
  - Requires unique IP or non-standard port to run on server hosting the web application

# Other Clustering Options

- IP Sprayer
  - Most common method for enabling failover for
    - Web Browsers
    - POP3
    - LDAP
  - Disadvantage
    - Is not aware of which applications are on the server
    - Administrator must ensure that all applications have been replicated to the cluster server



# Other Clustering Options

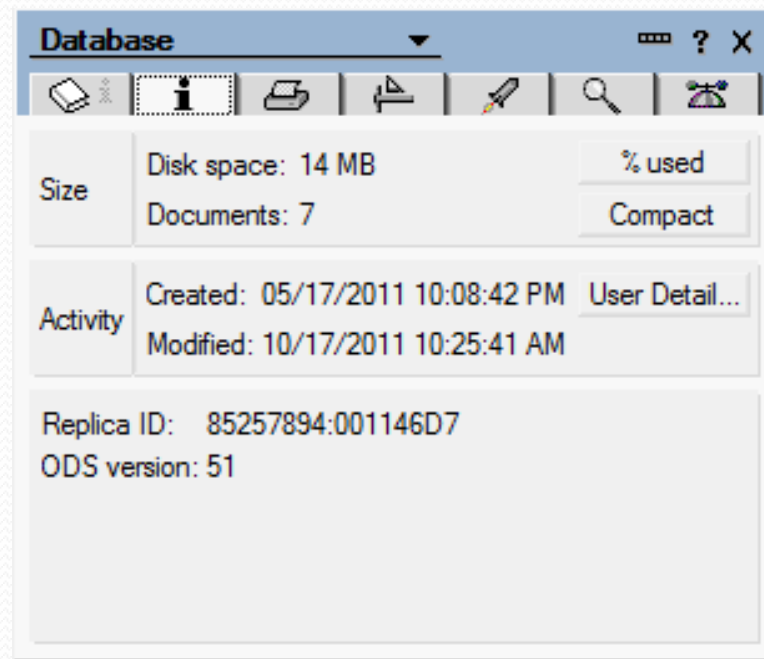
- OS Clustering
  - Clustering the server at the Operating System level
  - Only required when trying to cluster IMAP as each message has a unique message id

# Domino Replication and Clustering

- Domino Replication
  - Maintains identical copies of databases on two Domino server instances
  - May be on same or different server or platform
  - Automatic, scheduled
  - Provides warm standby
- Clustering
  - Real-time replication
  - Provides hot standby (load balancing and automatic failover for Notes clients)

# Replication

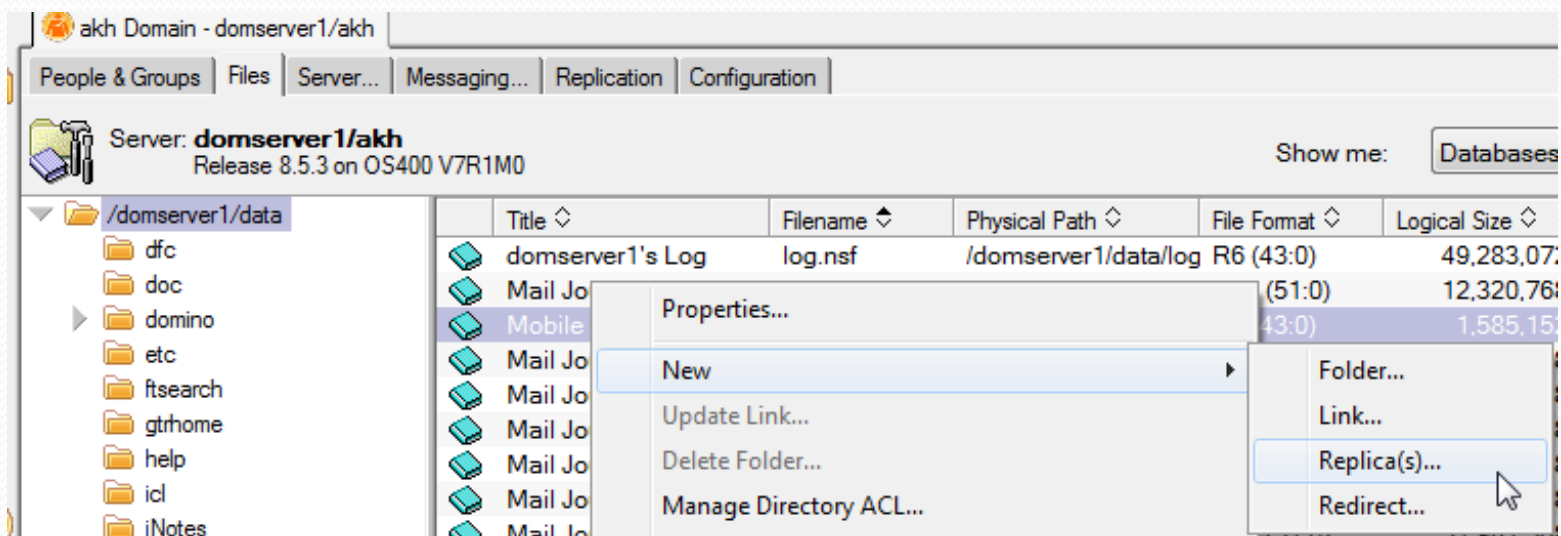
- Allows you to have multiple instances of an application on servers or clients where data is kept synchronized by the Domino server
- Databases are considered Replicas when the replica ID matches (file name does not matter)



**File → Application → Properties**

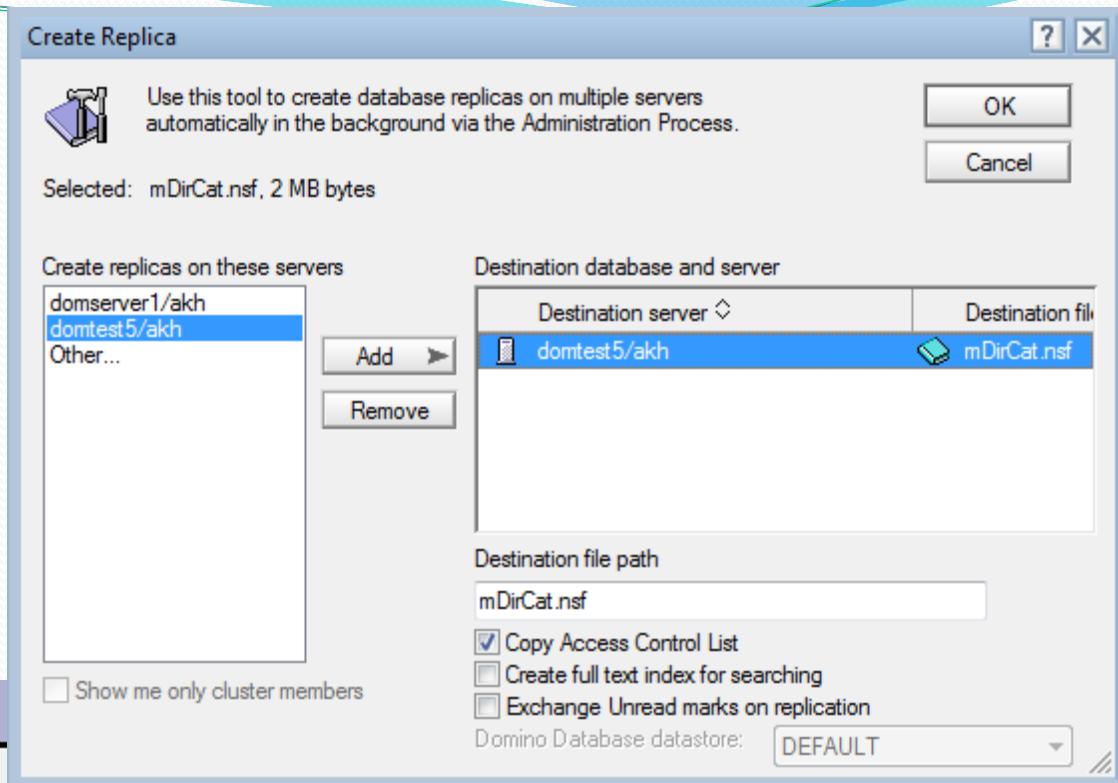
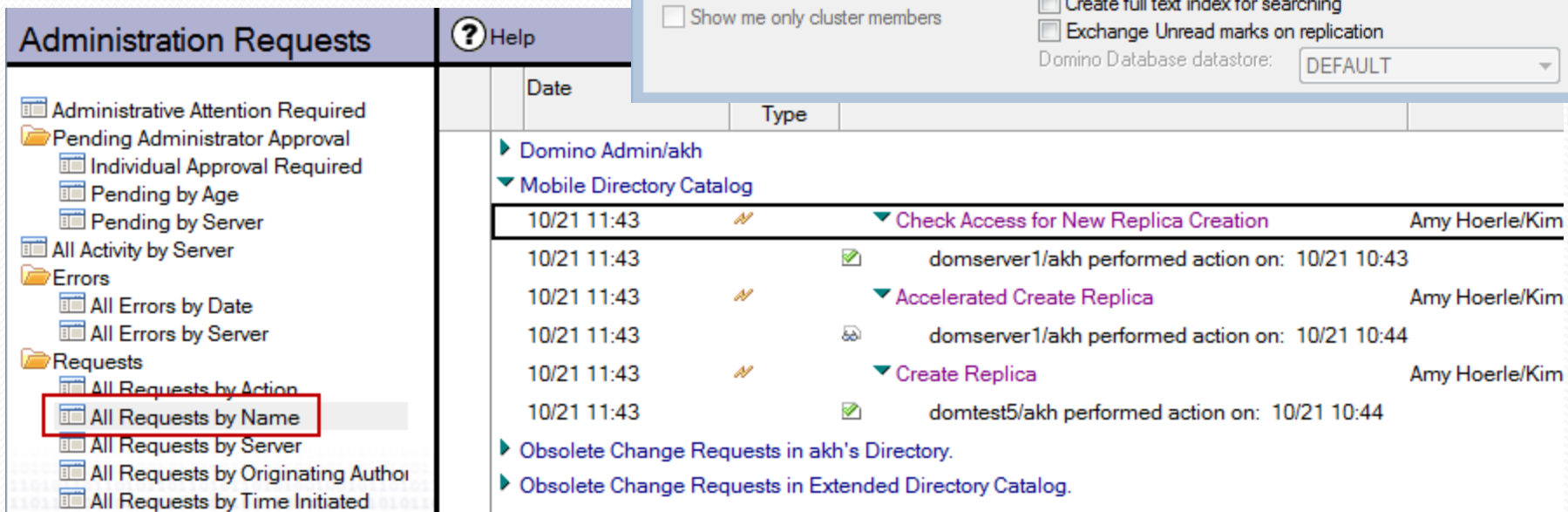
# Creating a New Replica

- Multiple Methods
  - Manually (File → Replication → New Replica)
  - Via the Administrator client



# New Replica

Creating a new replica via the Domino Administration Process (adminp)

Date	Type	Action	Author
10/21 11:43		Check Access for New Replica Creation	Amy Hoerle/Kim
10/21 11:43		domserver1/akh performed action on: 10/21 10:43	
10/21 11:43		Accelerated Create Replica	Amy Hoerle/Kim
10/21 11:43		domserver1/akh performed action on: 10/21 10:44	
10/21 11:43		Create Replica	Amy Hoerle/Kim
10/21 11:43		domtest5/akh performed action on: 10/21 10:44	

# Who can create replicas

- The *Create new replicas* field determines who can create a new replica database on the server

**Server document** →  
**Security tab**

Server Access	Who can -
Access server:	<input checked="" type="checkbox"/> users listed in all trusted directories and */Kim Greene Consulting LocalDomainServers
Not access server:	
Create databases & templates:	Domino Administrators Help Desk Employees LocalDomainServers
Create new replicas:	Domino Administrators LocalDomainServers
Create master templates:	DominoAdministrators
Allowed to use monitors:	*
Not allowed to use monitors:	
Trusted servers:	

# Replication Types

- **Push:** Send changes here to the remote server
- **Pull:** Receive changes from the remote server
- **Rep:** Performs a pull followed by a push to send and receive changes to and from the remote server

***Rep Remote\_Server App.nsf***

- The ACL still rules! If the server does not have authority to read the updates or write to the database the replication will not work as expected.

# Logging

- Log.nsf

Name: domserver1/akh  
 Time: 10/18 10:06 AM ADT - 10/18 10:06 AM ADT  
 Remote Server: domtest5/akh  
 Initiated By: domserver1/akh  
 Elapsed Time: 0.7 minutes

**Server Log** ▾

⊕ Expand All
⊞ Collapse All

🔍 Search in View 'Replication Events'

Search for  Search

With	Date	Starting Time	Ending Time	Minutes	Av
		10:02 AM ADT	10:02 AM ADT	0.0	
		10:06 AM ADT	10:06 AM ADT	0.7	

- Miscellaneous Events
- Mail Routing Events
- Replication Events
- Security Events
- Newsgroups Events

**Events:**

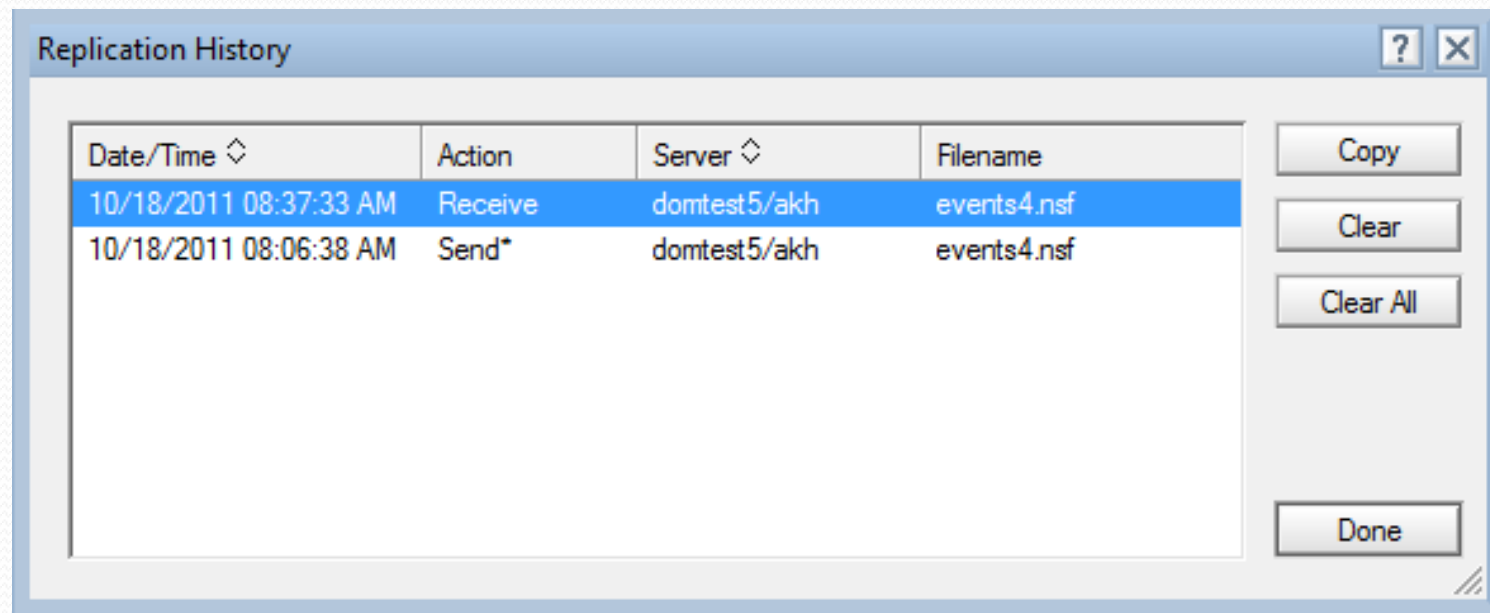
Access control is set in catalog.nsf to not allow replication from domtest5/akh catalog.nsf  
 Access control is set in domtest5/akh catalog.nsf to not allow replication from catalog.nsf

Databases replicated:	Access:	Added:	Deleted:	Updated:	KB Rec'd:	KB Sent:
domserver1 names.nsf	Manager	1	24	442	10,832.41	5.75
From: domtest5 names.nsf (PULL)						
domtest5 names.nsf	Manager	4	0	3	8.22	60.98
From: domserver1 names.nsf (PUSH)						
domserver1 events4.nsf	Manager	1	0	0	592.96	0.47
From: domtest5 events4.nsf (PULL)						
domtest5 events4.nsf	Manager	251	0	473	250.99	7,785.53
From: domserver1 events4.nsf (PUSH)						
domserver1 events4.nsf	Manager	32	3	111	16.66	1,621.22
From: domtest5 events4.nsf (PUSH)						
domtest5 admin4.nsf						
From: domserver1 admin4.nsf (PUSH)						



# The Replication History

- Access the Replication history from the menu (**File** → **Replication** → **History...**)



- Does not show client replications!
- Hundred servers or more in your domain? See <http://www-01.ibm.com/support/docview.wss?uid=swg21270104>

- Amy Hoerle
  - ACL
  - Designs
  - Documents
  - Profile Documents
  - Deletion Stubs (184)
    - Document (0/171)
      - 10/23/2011 07:23:50 F
      - 10/22/2011 08:15:25 A
      - 10/22/2011 08:15:25 A
      - 10/21/2011 03:08:57 F
      - 10/21/2011 12:02:05 F
      - 10/21/2011 09:58:31 A
      - 10/21/2011 08:56:03 A
      - 10/20/2011 09:33:41 F
      - 10/20/2011 08:49:23 A
      - 10/20/2011 08:49:23 A
      - 10/20/2011 08:49:23 A
      - 10/19/2011 07:34:40 A
      - 10/18/2011 08:17:51 A
      - 10/18/2011 08:17:51 A
      - 10/17/2011 07:33:35 A
      - 10/16/2011 08:25:50 A
      - 10/16/2011 08:25:50 A
      - 10/15/2011 05:21:52 F
      - 10/15/2011 11:20:11 A
      - 10/14/2011 02:13:58 F
      - 10/14/2011 08:04:39 A
      - 10/13/2011 10:55:12 A

### Deletion Stubs

This category shows all the Deletion stubs of the database categorized by their Class.

#### What is a Deletion Stub...

Deletion stubs are the 'remains' of documents that were deleted from the database. They are used by replications to update all other databases on the network. The stub is a way for Lotus Notes to 'remember' that a document was deleted from the database.

Since very little information exists after deletion, the Deletion stubs are categorized by their Class, which explains that a Page will be considered like a Form since they share the same Class. Consult Notes Help to learn more about classes.

#### Deleting Deletion Stub...

In scanEZ, use right-click on a deletion stub or a collection and choose 'Delete' to erase them.

Deleting Deletion stubs may have a serious effect on a database... If a document is deleted and you delete his deletion stub too, then the document will be retrieved if it exists on another database during a replication process.

#### What to Search?

- All Deleted Notes
- Only Deleted Documents
- Only Deleted Designs

#### Retrieval Options

- Regular Search (default)
- Regular Search plus Count
- Full Scan

# Understanding Deletion Stubs

Ytria scanEZ v10.0.0 - Kim Greene Consulting on

Database Document Field Search My Selection Folder CheckBox Selection Tools Help



Kim Greene Consulting

- ACL
- Designs
- Documents
- Profile Documents
- Deletion Stubs (107)
  - Agent (0/1)
  - Document (0/35)
    - 09/22/2011 10:55:08 PM
    - 08/25/2011 10:19:04 PM
    - 08/25/2011 10:19:04 PM
    - 08/25/2011 10:19:04 PM
    - 08/25/2011 10:19:04 PM
    - 08/25/2011 10:19:04 PM
    - 08/25/2011 10:19:04 PM
    - 08/25/2011 10:19:04 PM
    - 08/25/2011 10:19:04 PM
    - 08/25/2011 10:19:04 PM
    - 08/25/2011 10:19:04 PM
    - 08/25/2011 10:19:04 PM
    - 08/25/2011 10:19:04 PM
    - 08/25/2011 10:19:04 PM
    - 08/25/2011 10:19:04 PM

## Deletion Stub

UNID 7983BBE6F6F5346B862578E80011297D

Deletion Time (In this file): 08/26/2011 11:00:31 PM

Creation Time (Initially): 08/09/2011 10:07:27 PM

Deletion Time (Official): 08/25/2011 10:19:04 PM

Modification Sequence Nb: 4

Deletion stub lifetime setting (days): 90

Available for deletion on: 11/23/2011 11:00:31 PM

Remaining life of deletion stub (days): 33

**UNID** = Universal document ID = Same for all replicas

**Note ID** = Uniquely identifies a document within a database and may or not be the same across replicas.

# Soft Deletes

Amy Hoerle

- ACL
- Designs
- Documents (0/2,552)
  - (untitled) (0/7)
  - Appointment (0/162)
  - Memo (0/1,566)
  - NonDelivery Report (0/1)
  - Notice (0/27)
  - OutOfOfficeProfile (0/1)
  - Person (0/9)
  - Reply (0/769)
  - Task (0/6)
  - (ReplyNotice) (0/4)
- Profile Documents
- Deletion Stubs (179)
  - Document (0/164)
  - Form (0/9)
  - Soft Deletion (0/6)
    - 10/20/2011 08:06:05 AM
    - 10/20/2011 08:05:36 AM
    - 10/19/2011 02:39:22 PM
    - 10/19/2011 11:40:20 AM
    - 10/19/2011 09:29:24 AM
    - 10/19/2011 08:45:16 AM

Drag a column header here to group by that content.

xY	Name	^ xY	N. xY	S. xY	D. xY	I.. xY	Value	xY
ab	\$Abstract		1	2	0	39	Email not displaying correctly? [1]View it i...	
	\$Created		1	2	0	29	10/19/2011 09:00:18 AM	
	\$INetOrig		1	2	0	28	[UNID] 16109EE970B6EBE15BD5DEBF08D...	
ab	\$Mailer		1	2	0	13	MailChimp Mailer - **CID038c67071f171a6...	
ab	\$MessageID		1	2	0	12	<bbeb4d95e79fe34cbcbba347f171a614d...	
ab	\$MIMETrack		3	2	0	27	Itemize by SMTP Server on Mail/SGA(Rele...	
	\$Orig		1	2	0	33	[UNID] E54F173DDE4EFC248525792F004...	
1.2	\$PaperColor		1	2	0	41	1	
	\$Revisions		1	2	0	35		
	\$TUA		1	2	0	40	[UNID] 16109EE970B6EBE15BD5DEBF08D...	
	\$UpdatedBy		1	2	0	32	CN=Mail/O=SGA	
	Body		1	2	0	42	[rich text cannot be viewed in list] CRC: 2...	
ab	Categories		1	2	0	34		
	DeliveredDate		1	2	0	38	10/20/2011 08:05:32 AM	
ab	DKIM_Signature		1	2	0	4	v=1; a=rsa-sha1; c=relaxed/relaxed; s=k1...	
ab	DomainKey_Sig...		1	2	0	5	a=rsa-sha1; c=noaws; q=dns; s=k1; d=ma...	
ab	Form		1	2	0	31	Memo	
ab	From		1	2	0	20	"Townsend Security" <newsletter=towns...	
ab	List-Unsubscribe		1	2	0	19	<mailto:unsubscribe-bbeb4d95e79fe34cb...	

# Recovering Accidental Deletions

- Be careful when restoring!
  - If a replica with deletion stubs still exists the documents will be removed again
  - If you can't be certain that a replica exists which can overwrite the recovered database, change the replica ID
    - File → Application → New Copy
    - 3<sup>rd</sup> Party Products (ANTRID)
    - New replicas must be distributed
- Beware if a system database, such as NAMES.NSF is involved

# Replication Save Conflicts

- A conflict occurs when the same document is
  - Modified by 2 different users on the same server
  - Modified on 2 different servers between replication cycles
- Administrator or manager of application must take action to resolve
  - Update the Original document
  - Delete the conflict document

# Application Designer in Control

- The Application Designer is in control with replication save conflicts
- Form property determines what will happen when a conflict occurs
  - **Create Conflicts** – doesn't matter what changed, create the conflict document
  - **Merge Conflicts** – if changes are not in the same field combine the changes into the single document
  - **Merge/No Conflicts** – merge the changes and if the same field was changed in both documents, Domino picks a winner
  - **Do Not Create Conflicts** – Domino will pick one of the documents as the current document and the other changes will be lost

# Example Replication Save Conflict

Conflicts Solver

Conflict Documents list : 2. Memo  Show only fields with different values between documents

Name		22346 - Parent	22366 - Conflict
UNID		5C2989EDFC12474B97D2374632BEEEE2	5C2989EDFC12474B86257930004CB7C7
Modified By		Amy Hoerle/Kim Greene Consulting	Amy Hoerle/Kim Greene Consulting
Created Initially		04/03/**** 07:55:37 AM	10/21/2011 08:57:57 AM
Modified Initially		10/21/2011 08:58:08 AM	10/21/2011 08:57:57 AM
Subject		<input type="checkbox"/> Domino400 Digest, Vol 9, Issue 87 - Original	<input type="checkbox"/> Domino400 Digest, Vol 9, Issue 87 - New one
useApplet	<input type="checkbox"/>	<input checked="" type="checkbox"/> True	<input type="checkbox"/> True
wBody		<input type="checkbox"/> [rich text cannot be viewed in list] CRC: 4D33CD59	<input type="checkbox"/> [rich text cannot be viewed in list] CRC: B0098216
X_BeenThere	<input type="checkbox"/>	<input checked="" type="checkbox"/> domino400@midrange.com	<input type="checkbox"/> domino400@midrange.com
X_DKIM	<input type="checkbox"/>	<input checked="" type="checkbox"/> Sendmail DKIM Filter v2.8.3 mail1.midrange.com p9KH	<input type="checkbox"/> Sendmail DKIM Filter v2.8.3 mail1.midrange.com p9KH
X_DomainKeys	<input type="checkbox"/>	<input checked="" type="checkbox"/> Sendmail DomainKeys Filter v1.0.0 mail1.midrange.com	<input type="checkbox"/> Sendmail DomainKeys Filter v1.0.0 mail1.midrange.com
X-Mailman_Versi...	<input type="checkbox"/>	<input checked="" type="checkbox"/> 2.1.9	

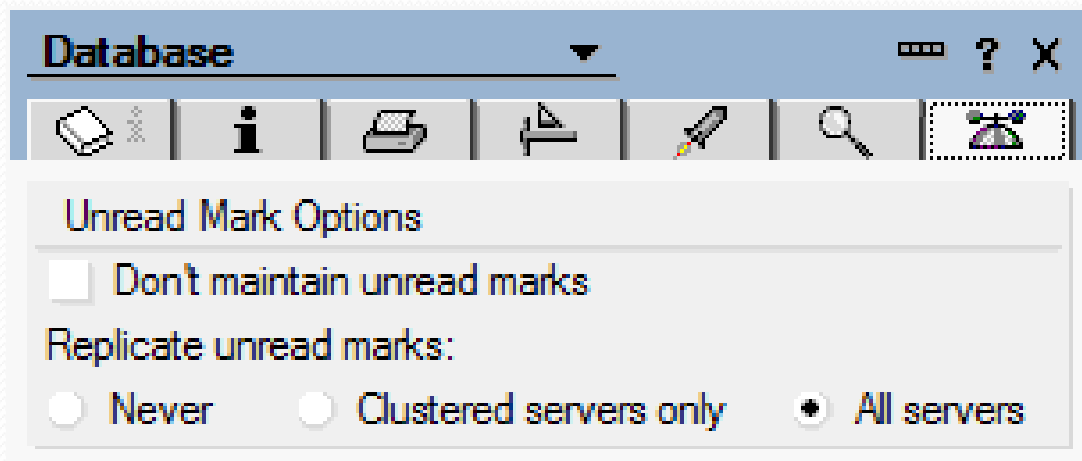
Compare Field: Subject

22346 - Parent	22366 - Conflict
Domino400 Digest, Vol 9, Issue 87 - Original	Domino400 Digest, Vol 9, Issue 87 - New one



# Understanding Unread Marks

- How does Domino know what you read?
  - Tracked by person
  - Many changes on functionality over the past few years
  - Optionally replicate unread marks
  - Review Database properties

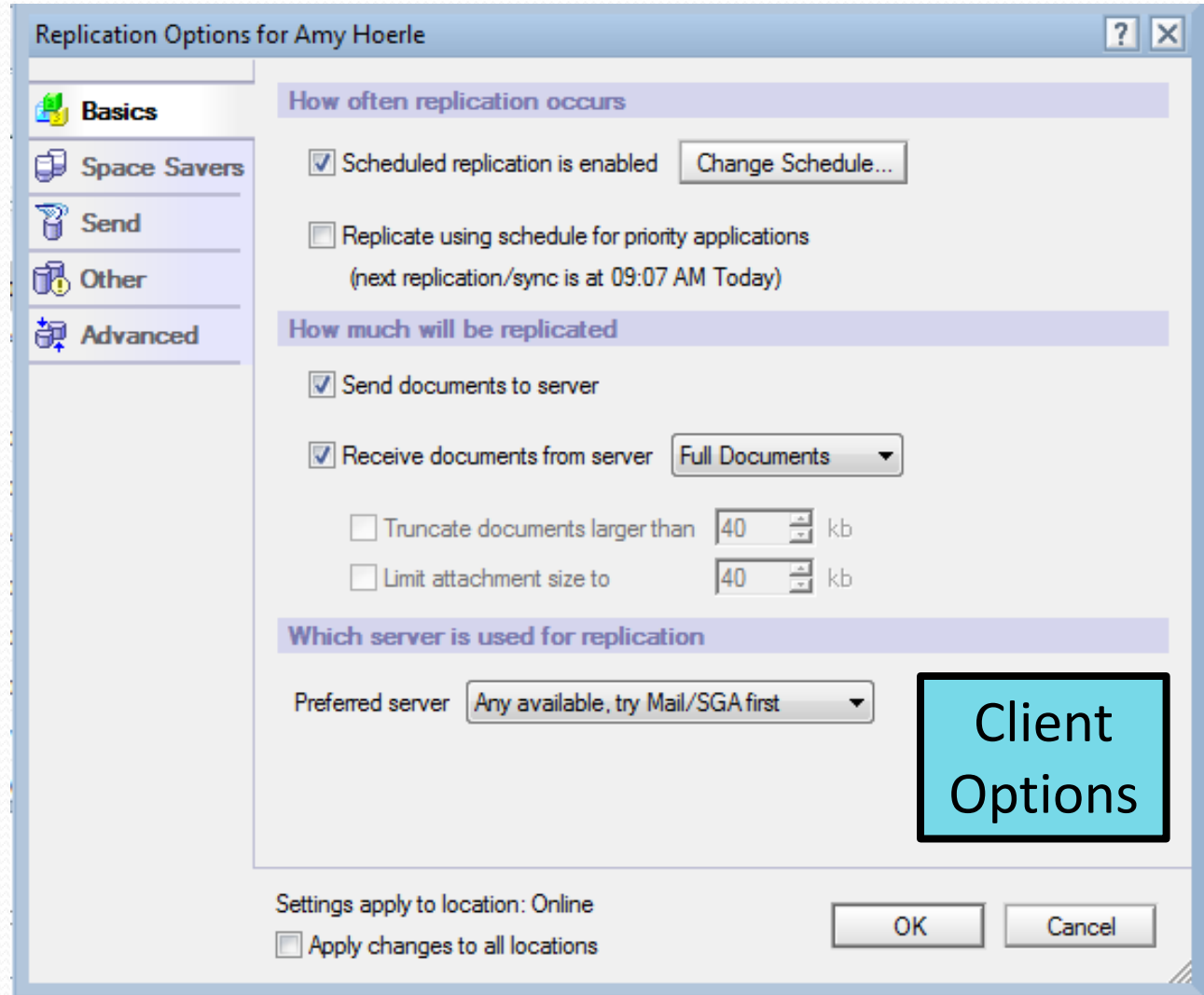


# Looking at the Replication Options

Application  
Properties →  
Replication  
Settings button

OR

File → Replication  
→ Options for this  
Application...

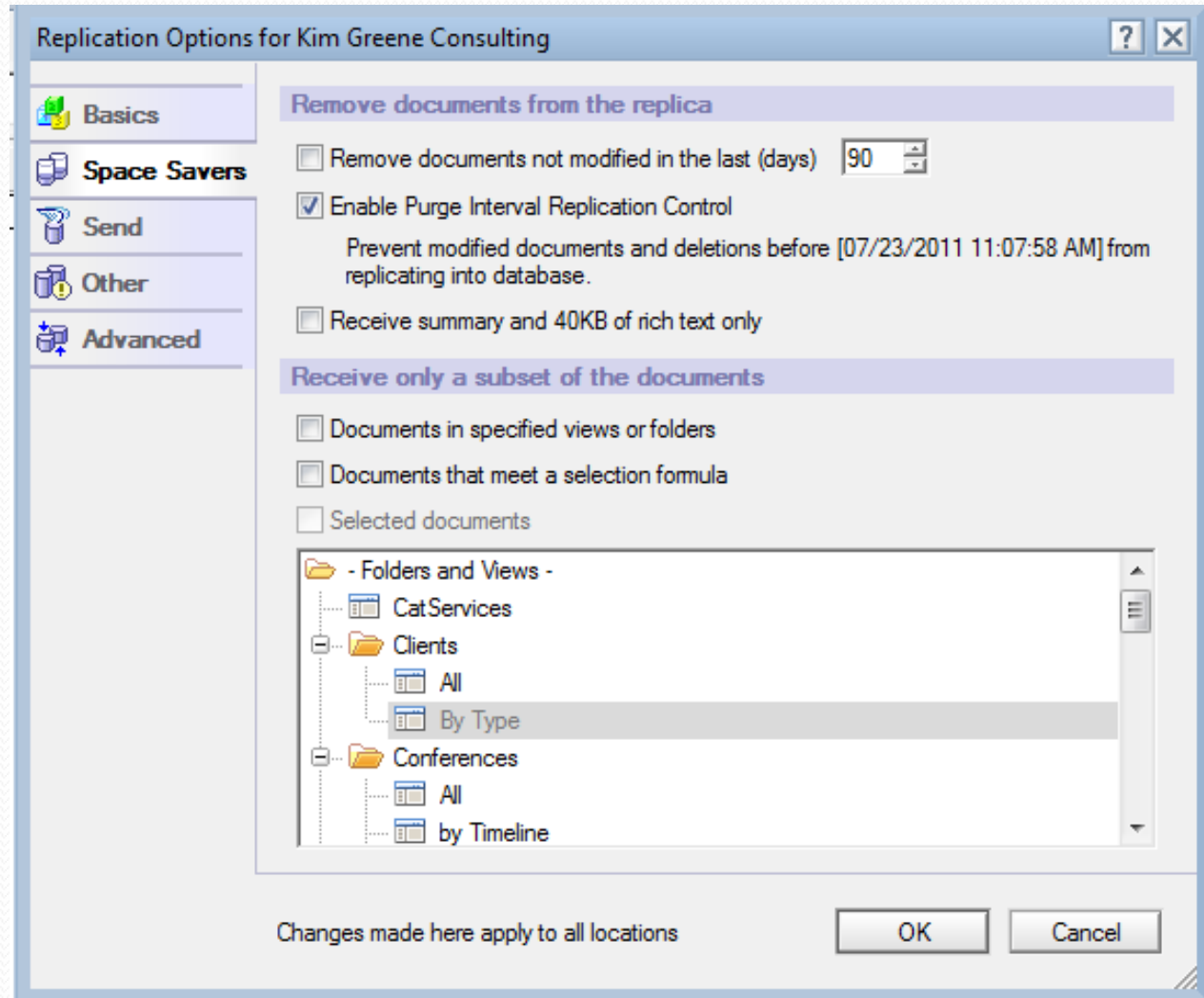


# Looking at the Replication Options

Use the **Space Savers** options to limit the data in the application

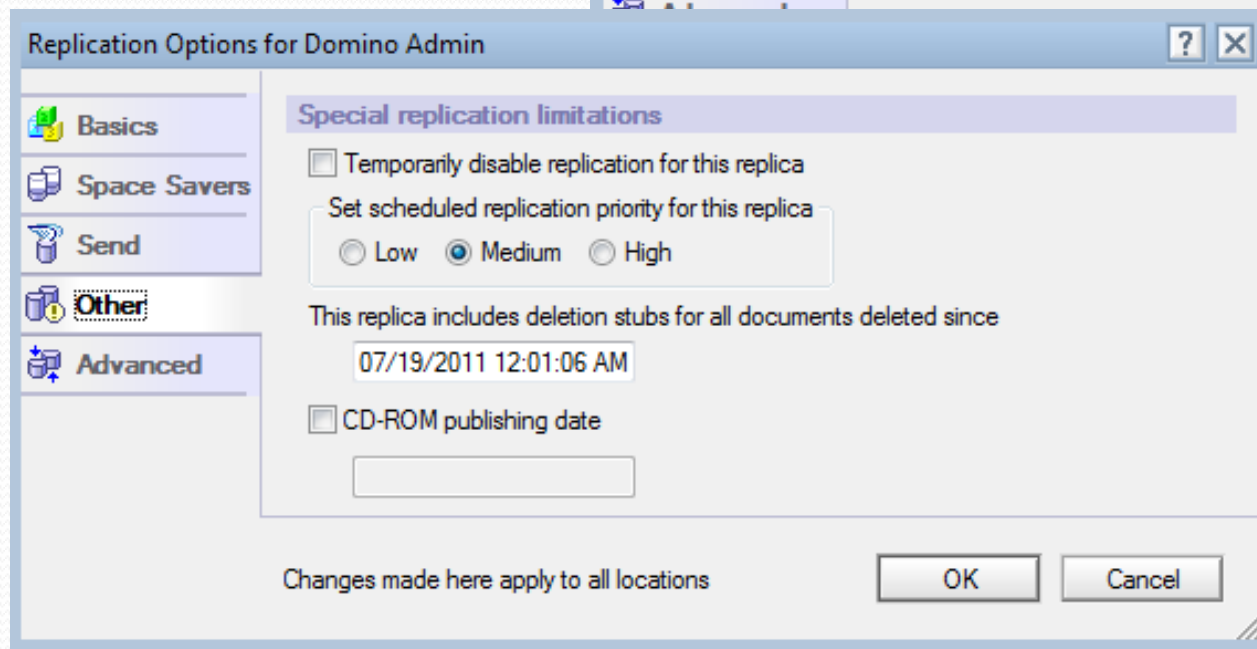
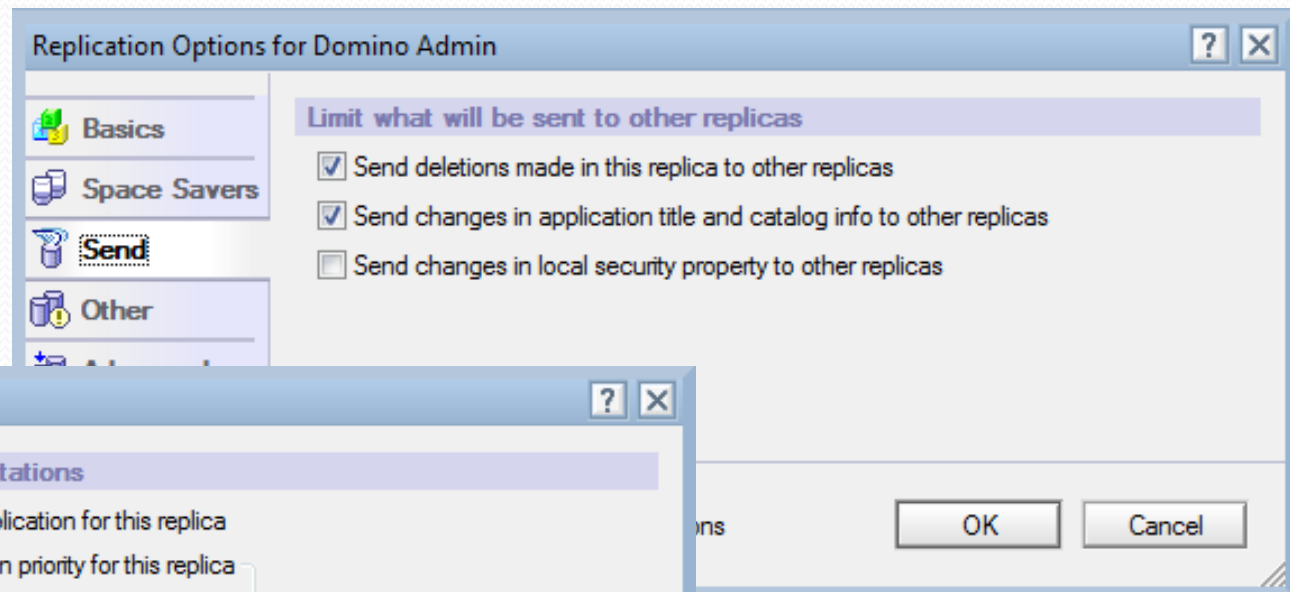
Use the **Remove documents not modified in the last (days)** option on any application.

- It does not need to replicate!
- Use this to keep your log files small!



# Looking at the Replication Options

Do you want to send deletions, application title or security?

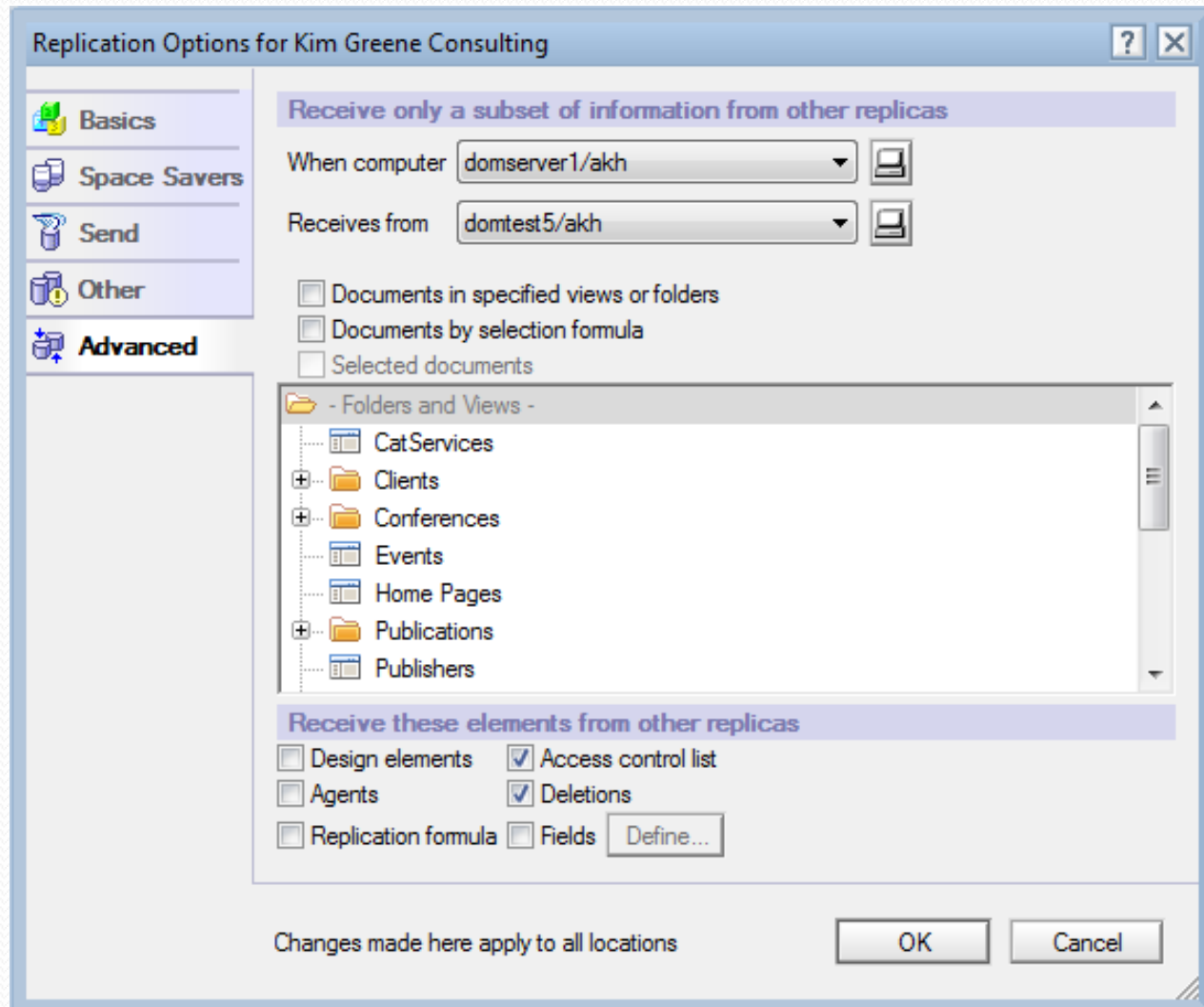


Need to temporarily disable replication?

# Looking at the Replication Options

A simple way to prevent Database design or deletions from being replicated.

Can define for All servers or limit changes from a specific server.



# Limiting what replicates

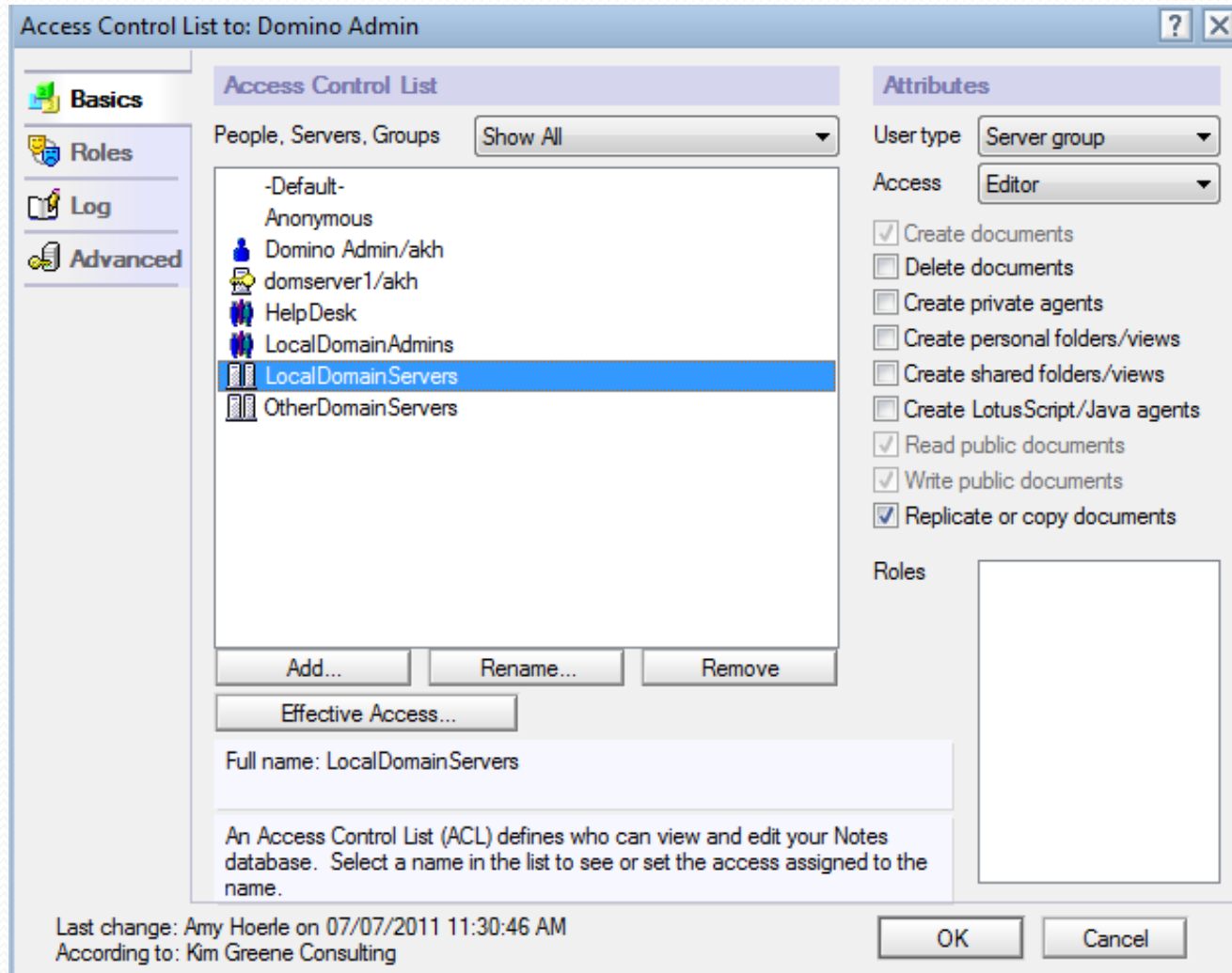
Use the ACL to control what data the server can update

**For example:**

Mail server = Manager

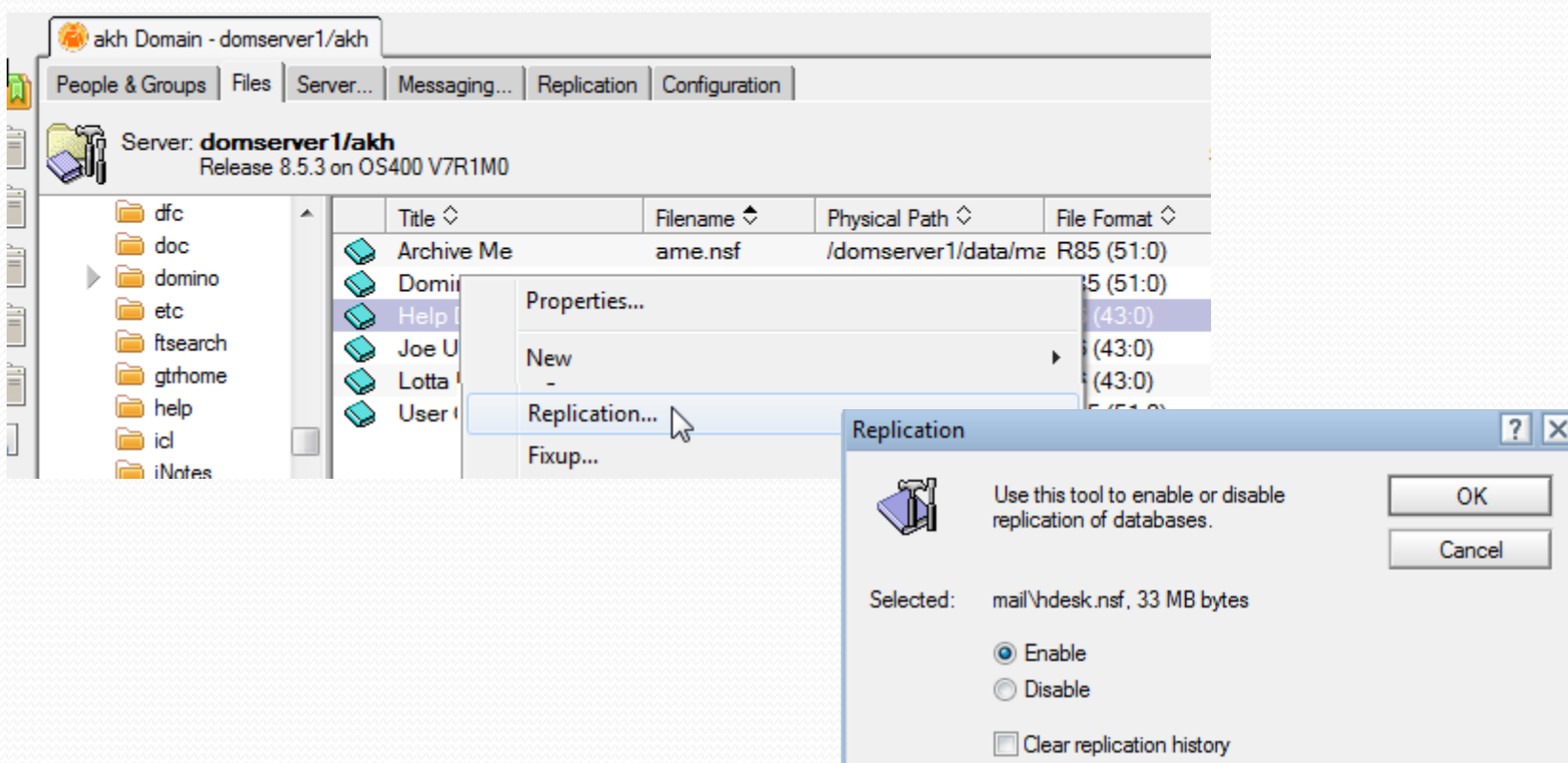
LocalDomainServers = Editor

OtherDomainServers = Reader



# Disabling Replication

Replication can be disabled for an application at any time



# Clustering



# What is Domino Clustering

- A Domino cluster is a collection of 2 to 6 Domino servers which provides high availability and workload balancing.
- How Does it work?
  - 2 or more servers are selected to be in a Cluster (up to 6 servers)
  - Each server contains replicas of the applications which are to be clustered
  - If user attempts to access a clustered application and it is not available, Notes opens a replica of the database on a different cluster server
  - Domino continuously synchronizes databases

# Domino Clustering Requirements

- Connection to a high speed network
- All servers in a cluster must share a common Domino Directory
- A server can be a member of only One cluster at a time
- Adequate Disk for replica databases
- Adequate CPU resources to handle additional replication requirements
- Be aware - Domino Clustering is not hardware clustering, it is application clustering

# Clustering Tasks

- CLREPL = Cluster Replication
  - As the name implies, performs cluster replication
- CLDBDIR = Cluster Database Directory
  - Responsible for maintaining clbdir.nsf application
  - Will create application if it does not exist
- New in 8.5.x versions
  - Clustering tasks automatically start
  - Do not need to specify tasks in ServerTasks

# Types of Clustering

- Failover
  - Server in Domino cluster provides services while primary server is unavailable
  - Provides HA solution for Lotus Domino servers
- Workload balancing
  - Spreads workload among servers
  - Limits how busy a specific server will become
  - Provides more consistent performance for end users

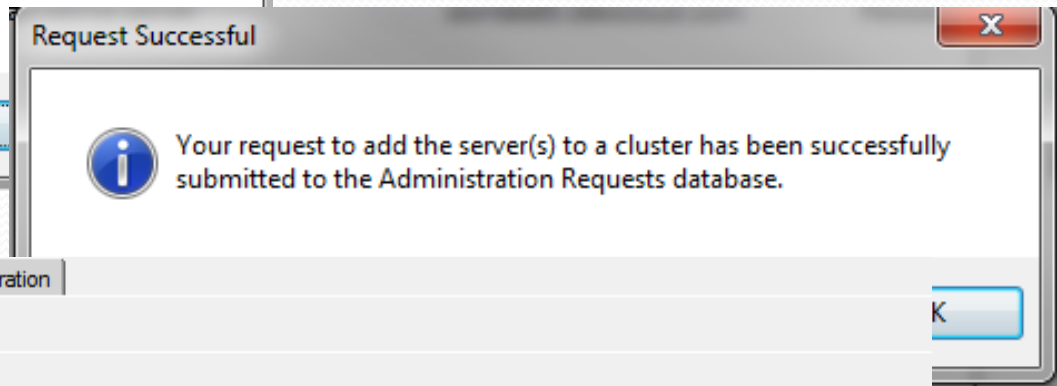
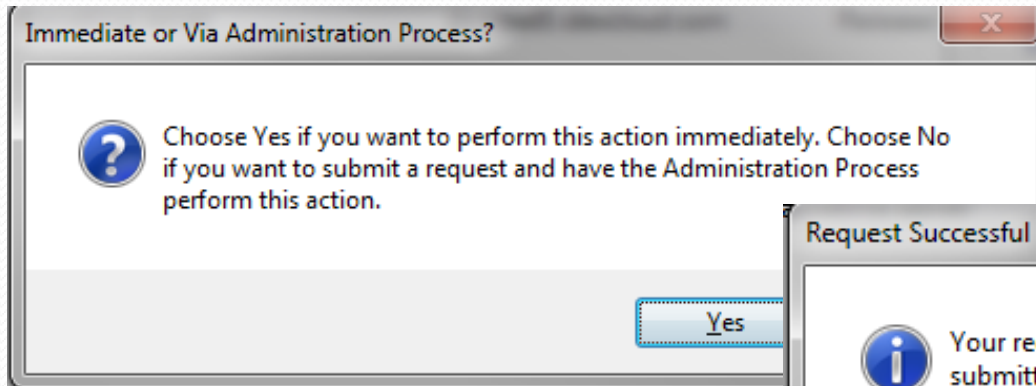
# Configuring Domino Clustering

The screenshot displays the Domino Administration Console interface. The main window shows the configuration for a server named 'domserver1/akh' (Release 8.5.3 on OS400 V7R1M0). The left sidebar lists various server-related categories, including 'Server', 'Messaging', and 'Replication'. The 'Server' category is expanded, showing a list of server documents under the domain 'akh'. The table below shows the following entries:

Domain	Server Name	Title
akh	domserver1/akh	Administration server for akh domain
	domserver2/akh	
	domtest5/akh	Sametime server

Overlaid on the main window are two dialog boxes. The first, titled 'Cluster Name', prompts the user to choose a cluster to add the server(s) to, with a dropdown menu currently set to '\*Create New Cluster'. The second dialog, titled 'New Cluster Name', asks for the name of the new cluster, with the text 'Mail Cluster' entered in the input field.

# Configuring Domino Clustering



People & Groups | Files | Server... | Messaging... | Replication | Configuration

Status | Analysis | Monitoring | Statistics | Performance

Server: **domserver1/akh**  
Release 8.5.3 on OS400 V7R1M0

- domserver1's Log
- Domino Web Server Log (8.5)
- Catalog (8)
- Monitoring Results
- Administration Requests
  - Administrative Attention Req.
  - All Activity by Server
  - All Errors by Date
  - All Errors by Server
  - All Requests by Action
  - All Requests by Name
  - All Requests by Originating A
  - All Requests by Server

Help				
	Date	Sched. Type	Action	Requester
▼ domserver1/akh				
	10/24 11:23	✎	▼ Add Server to Cluster	Amy Hoerle/t
	10/24 11:23	✓	domserver1/akh performed action on: 10/24 10:23	
▼ domtest5/akh				
	10/24 11:23	✎	▼ Add Server to Cluster	Amy Hoerle/t
	10/24 11:23	✓	domserver1/akh performed action on: 10/24 10:23	
▶ Mobile Directory Catalog				

# What just happened?

Adding server to cluster Mail Cluster

Cluster Database Directory started

Directory Assistance is updating server info in internal tables (Server records in primary directory have changed)

RnRMgr: Error switching busy time database from busytime.nsf to clubusy.nsf: RnRMgr: Error switching cluster busy time database, Rooms and Resources Manager shutdown complete

Recovery Manager: Assigning new DBIID for /domserver1/data/clbdir.nsf (need new backup for media recovery).

Created database Cluster Database Directory: clbdir.nsf

Finished initialization of Cluster Database Directory

Replicating Cluster Database Directory with domtest5/akh

Starting replication with server domtest5/akh

Unable to update Cluster Database Directory: None of the selected databases has a replica on the server

Cluster Replicator started, Cluster Replicator is set to Ignore Database Quotas

Pulling clbdir.nsf from domtest5/akh clbdir.nsf

Replicator added 170 document(s) to clbdir.nsf from domtest5/akh clbdir.nsf

Replicator updated 2 document(s) in clbdir.nsf from domtest5/akh clbdir.nsf

load rnmgr

Rooms and Resources Manager started

RnRMgr: Informational: Schedule Manager is responsible for the busytime database on this server.

# Cluster Database Directory

- Cldbdir.nsf

Cluster Directory		Tools	Help			
			File Name	Server	Replica ID	Cluster Replication ^
<ul style="list-style-type: none"> <li>Databases by Pathname</li> <li>Databases by Replica ID</li> <li>Databases by Server</li> <li>Databases by File Name</li> </ul>	★		mailjrn.nsf	domtest5	84257933:00109572	Enabled
	★		mailjrn.nsf	domserver1	05257811:005B8AFD	Enabled
	★		mailjrn.nsf	domtest5	852568CC:0071B046	Enabled
	★		mail.box	domserver1	84257894:003F773A	Enabled
	★		mail.box	domtest5	842578B9:000CE9C8	Enabled
	★		mail\ame.nsf	domserver1	842578B2:00576CA0	Enabled
	★		mail\dadmin.nsf	domserver1	85257894:001146D7	Enabled
	★		mail\hdesk.nsf	domserver1	842578B0:00653F5C	Enabled
	★		mail\juser.nsf	domserver1	842578B2:00576C8C	Enabled
	★		mail\mail.nsf	domserver1	842578B2:005783AD	Enabled
	★		mail\uone.nsf	domserver1	842578A3:004DB7DE	Enabled

- Only ddm.nsf is disabled “out of the box”
- Does this mean you are done?



# Managing a Cluster Database Directory

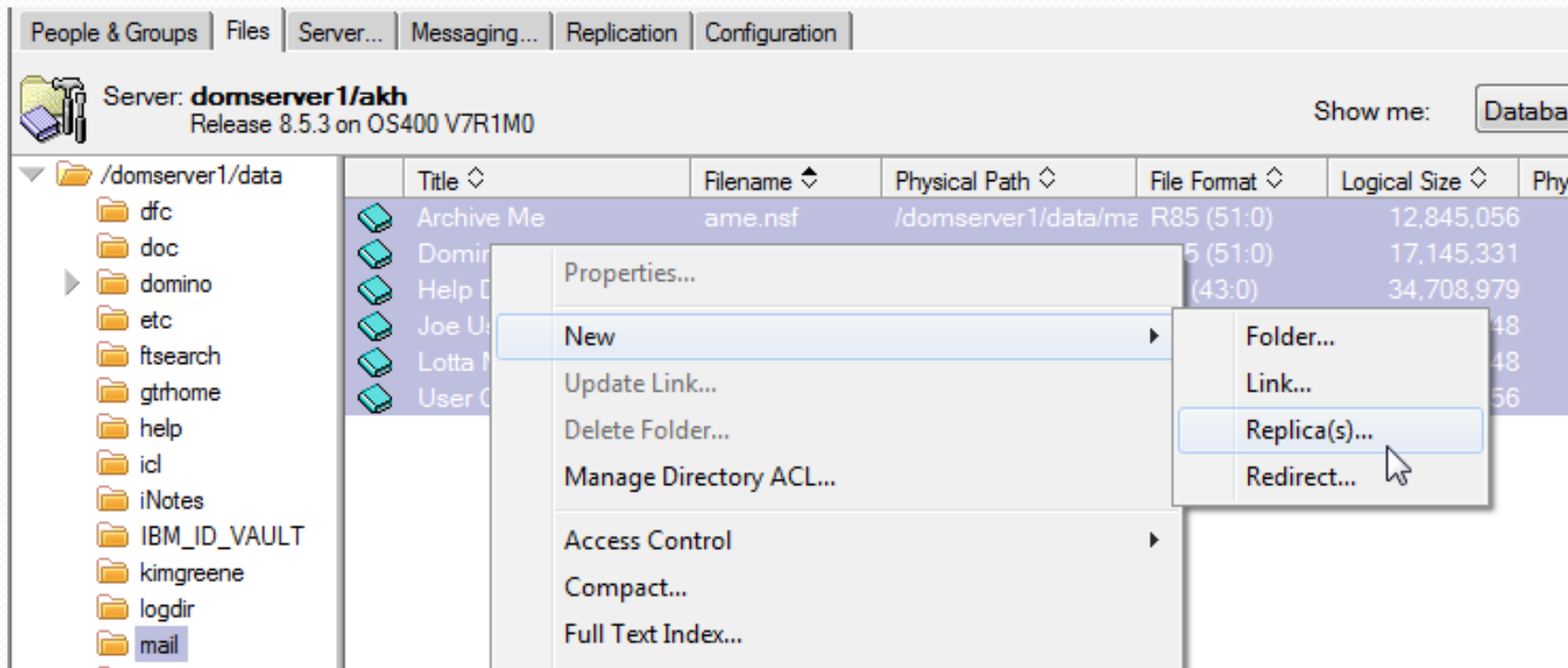
- Ensure all servers in the cluster are included in the directory!

The screenshot shows a software interface with a window titled "Cluster Directory (6) - Databases by Pathna...". The interface has a menu bar with "Tools" and "Help". On the left, there is a sidebar with four options: "Databases by Pathname", "Databases by Replica ID", "Databases by Server", and "Databases by File Name". The main area displays a table of databases with a context menu open over it. The context menu has two options: "Enable Cluster Replication on Selected Databases" and "Disable Cluster Replication on Selected Databases". The table contains the following data:

Replication Status	Database Name	Server Name
★	AgentRunner.nsf	domtest5
★	alog4.ntf	domserver1
★	alog4.ntf	domtest5
★ ✓	amy.nsf	domserver1


# Creating Replicas

- Create replicas of any applications that need to be clustered



# Creating Replicas

**Create Replica** [?] [X]

 Use this tool to create database replicas on multiple servers automatically in the background via the Administration Process.

OK  
Cancel

Selected: 6 Databases, 132 MB bytes











Create replicas on these servers

- domserver1/akh
- domtest5/akh
- Other...

Add [➤]  
Remove

Show me only cluster members for cluster: Mail Cluster

Destination database and server

Destination server	Destination file
 domserver1/akh	 mail\dadr
 domserver1/akh	 mail\hdesl
 domserver1/akh	 mail\user.
 domserver1/akh	 mail\mail.
 domserver1/akh	 mail\uone

Destination file path


mail\

Copy Access Control List  
 Create full text index for searching  
 Exchange Unread marks on replication


Domino Database datastore: DEFAULT

# Oops, I did it again!

## ADMINISTRATION PROCESS - Log

Action:	Accelerated Create Replica
Link to request:	
Name(s) acted upon:	Joe User
Action requested by:	Amy Hoerle/Kim Greene Consulting
Server responding to request:	domserver1/akh
Destination server:	domtest5/akh
Start time:	09:47:30 AM Today
End time:	09:47:30 AM Today
Databases processed:	None
Errors:	Title: Path: domtest5/akh!!mail\user.nsf; Error: File already exists
Perform request again?:	<input type="checkbox"/> Yes

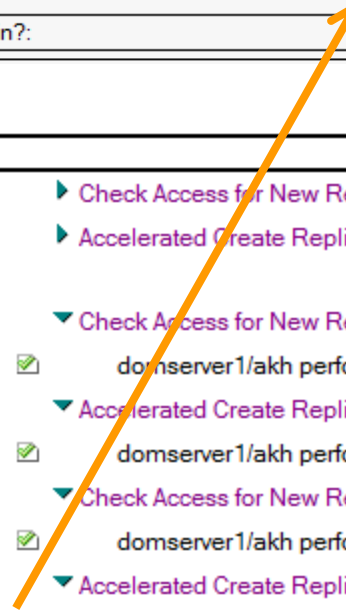
- Server: **domserver1/akh**  
Release 8.5.3 on OS400 V7R1M0
- ▶ domserver1's Log
  - ▶ Domino Web Server Log (8.5)
  - ▶ Catalog (8)
  - ▶ Monitoring Results
  - ▶ Administration Requests
    - ▶ Administrative Attention Req.
    - ▶ All Activity by Server
    - ▶ All Errors by Date
    - ▶ All Errors by Server
    - ▶ All Requests by Action
    - ▶ All Requests by Name
    - ▶ All Requests by Originating A
    - ▶ All Requests by Server
    - ▶ All Requests by Time Initiated
    - ▶ CA Modification Requests
    - ▶ CA Recovery Updates
    - ▶ Certificate Requests
    - ▶ Certify New Key Requests
    - ▶ Cross Domain Configuration
    - ▶ Cross Domain Delivery Failure
    - ▶ Enrollment Requests
    - ▶ Individual Approval Required
    - ▶ Name Move Requests
    - ▶ Pending Administrator Approv

 Help

- ▶ Archive M
- ▶ Domino /
- ▶ domserver1/akh
- ▶ domtest5/akh

▼ Help Desk

10/24 12:47		▶ Check Access for New Replica Creation	Amy Hoerle/Kim Gre
10/24 12:47		▶ Accelerated Create Replica	Amy Hoerle/Kim Gre
▼ Joe User			
10/24 12:23		▼ Check Access for New Replica Creation	Amy Hoerle/Kim Gre
10/24 12:23		domserver1/akh performed action on: 10/24 11:23	
10/24 12:23		▼ Accelerated Create Replica	Amy Hoerle/Kim Gre
10/24 12:23		domserver1/akh performed action on: 10/24 11:24	
10/24 12:47		▼ Check Access for New Replica Creation	Amy Hoerle/Kim Gre
10/24 12:47		domserver1/akh performed action on: 10/24 11:47	
10/24 12:47		▼ Accelerated Create Replica	Amy Hoerle/Kim Gre
10/24 12:47		domserver1/akh performed action on: 10/24 11:47	



# Automatically Create Replicas

Use a registration policy!

**Roaming Options**

Roaming User (before Notes 8.5)

Use mail server for roaming server

Choose a sub-folder format:

FI LastName

FI MI LastName

LastName FirstName

LastName FirstName MI

Create roaming replicas on:

All roaming server cluster mates

Create roaming files now

Create roaming files in background

Do not clean-up

**Registration Settings : Default Registration Settings**

Basics | **Mail** | ID/Certifier | Miscellaneous | Comments | Administration

**Mail User Registration Options** How to apply this

Choose the mail system:

Lotus Notes  Don't set value

POP

IMAP

Choose the mail server:

domserver2/akh  Don't set value

Mail Template: mail85.ntf  Don't set value

Create mail file now  Don't set value

Create mail file in background  Don't set value

**Internet Address Options** How to apply this

Internet Domain: domtest.idevcloud.com  Don't set value

Choose an internet address format:

FirstName LastName  Don't set value

FirstName MI LastName

FI LastName

FI MI LastName

Choose an internet address separator:

Underscore  Don't set value

Dot

Equal

Percent







**Advanced Mail Options** How to apply this

Create mail replica's on:

All mail server cluster mates  Don't set value

# Replication Stub

- When creating replicas you may see a “replication stub”
- Empty “shell” with properties
- Database will be populated the first time it is replicated

	Title ◊	Filename ◊
	Help Desk	hdesk.nsf
	Joe User	juser.nsf
	Archive Me	ame.nsf
	Lotta Mail	lmail.nsf
	* 85257894:001146D7	dadmin.nsf
	User One	uone.nsf

# Full Text Indexes

domserver1/akh - Ytria databaseEZ v10.0.0 - domserver1/akh

Server Edit Panels Search Options Tools Help

Databases 198 databases currently listed in the grid.

Drag a column header here to group by that content.

<input checked="" type="checkbox"/>	Database Title	<input checked="" type="checkbox"/> Database Path	<input checked="" type="checkbox"/> Database Filename	<input checked="" type="checkbox"/> Database is full text indexed
<input checked="" type="checkbox"/>	Domino Web Access Help	\iNotes\	iNotes\help85_iwa_en.nsf	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	Domino Admin	\mail\	mail\dadmin.nsf	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	Help Desk	\mail\	mail\hdesk.nsf	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	Joe User	\mail\	mail\juser.nsf	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	Archive Me	\mail\	mail\ame.nsf	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	Lotta Mail	\mail\	mail\lmail.nsf	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	User One	\mail\	mail\uone.nsf	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	Kim Greene Consulting	\kimgreene\	kimgreene\kgreene.nsf	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	XPages Contacts (Start)	\	XPagesContacts.nsf	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	Mobile Directory Catalog	\	mDirCat.nsf	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	MXPD - Chapter 13	\MasteringXPages\	MasteringXPages\chapt...	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	Chapter3	\MasteringXPages\	MasteringXPages\chapt...	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	MXPD: Chapter 7	\MasteringXPages\	MasteringXPages\chapt...	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	MXPD: Chapter 8	\MasteringXPages\	MasteringXPages\chapt...	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	MXPD: Chapter 9	\MasteringXPages\	MasteringXPages\chapt...	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	MXPD: Chapter 9A	\MasteringXPages\	MasteringXPages\chapt...	<input checked="" type="checkbox"/>

# Quotas

- Cluster replication will ignore database quotas
- Quotas are unique to the server
  - Will only get set on cluster when replica is first created
  - Changes do not replicate
- Therefore, you must set the quota on the cluster server to match the primary.



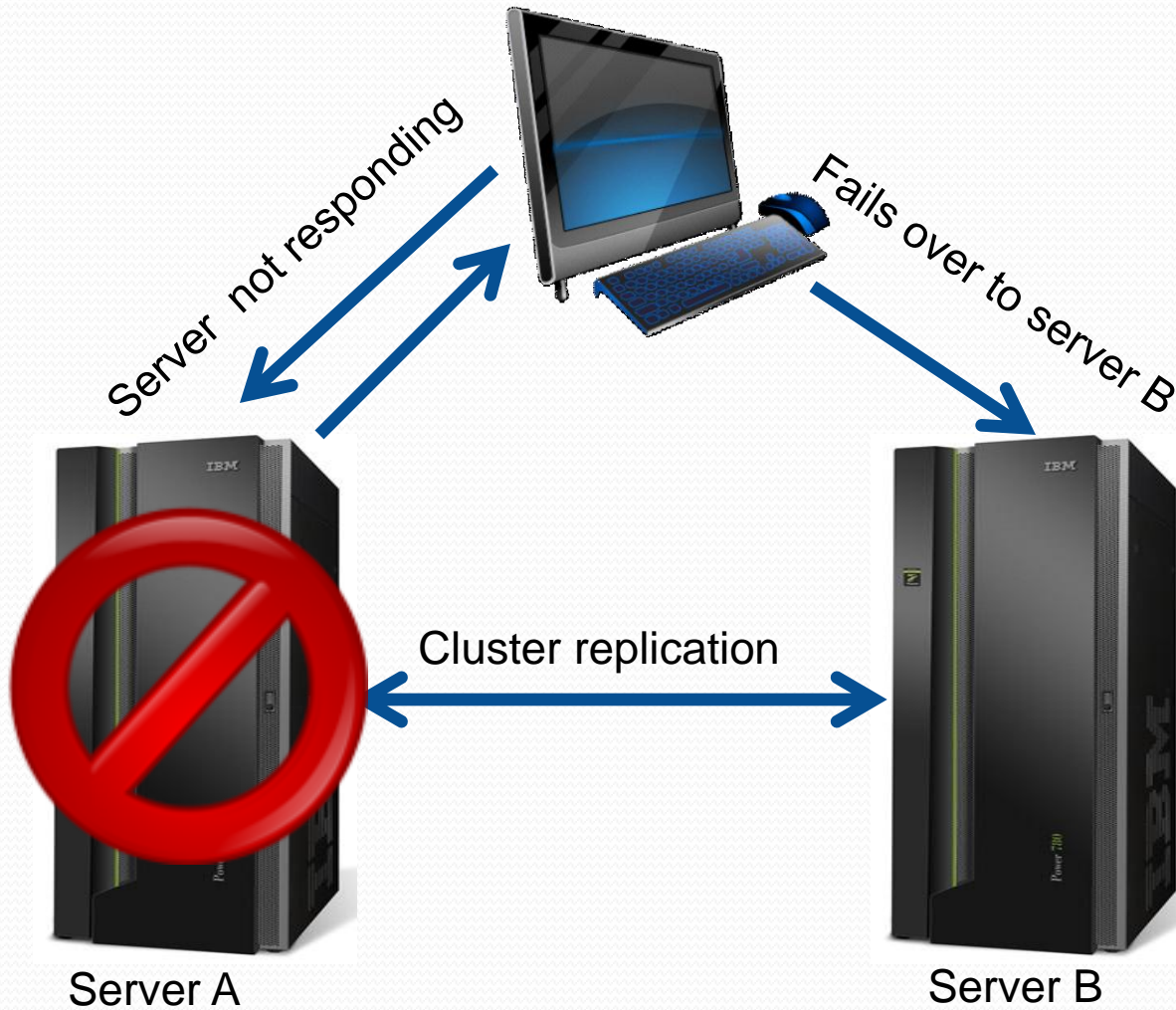
# Understanding Cluster Replication

- In memory replication - as changes occur they are queued and sent to the cluster server
- The cluster server then applies the changes to the database
- Can be disabled during upgrades with *DISABLE\_CLUSTER\_REPLICATOR=1*

# Streaming cluster replication

- First introduced in Domino 8.0 and had a few issues
  - Was disabled by default in 8.0.2
  - Disable with *DEBUG\_SCR\_DISABLED=1* at 8.0.x
  - Now works fine and is recommended for all 8.5.x servers
- In memory means, if the server goes down....
  - Changes are lost
  - Traditional replication needed to synchronize the databases
  - Thus, always leave replication scheduled between the servers after enabling clustering

# How Failover Works



# How Failover Works

- Notes client attempts to open database on Server A
- Notes client realizes Server A is not responding
- Notes client looks in its cluster cache (cluster.ncf), finds name of other servers in cluster
- Notes client accesses next server listed in cluster cache

# How Failover Works

- Cluster Manager looks in Cluster Database Directory, finds servers in cluster with replica of desired database
- Cluster Manager looks in server cluster cache, determines availability of servers containing a replica
  - Builds list of servers in cluster containing a replica
  - Sorts list in order of availability
  - Sends list to Notes client
- Notes client opens replica on first server in list
  - If that server is no longer available, opens replica on next server in list

# Actions that may trigger a failover

- Creating a new mail, calendar or To Do
- Opening a document in an application
- Opening a folder or view
- Replying or forwarding a document or mail message
- Deleting a document
- Sending a message
- Opening an application using a “bookmark”
  
- Starting with the 8.5.2 client – Notes will automatically switch back to the Primary server when it becomes available

# When Failover does not occur

- Attempting to open the server directly (CTRL + O)
- Opening an application using a workspace icon
  - The workspace icon determines which replica will be opened
- During a server hang
  - If Port is active, but Domino server job is “hung”

# Server Availability Index (SAI)

- Percentage of total server capacity still available
- Determined by each server in a cluster
  - As response times increase, the SAI goes up
- Ranges from 0 to 100
  - 0 indicates a heavily loaded server
  - 100 indicates a lightly loaded server
- Example:
  - If SAI = 55, still have about 55% of the server capacity available



# SERVER\_AVAILABILITY\_THRESHOLD

- Key factor in balancing cluster workload
- Represents lowest acceptable value of availability you want the server to reach before it starts failing users over to a cluster mate
- Setting too high results in failover occurring unnecessarily
- Setting too low results in poor performance for users
- Ranges from 0 to 100
  - 0 indicates a fully available server; workload balancing is disabled
  - 100 indicates the server is busy; Cluster Manager redirects user requests to other cluster servers

# SERVER\_AVAILABILITY\_THRESHOLD

- Monitor statistics to set properly

- Sh cluster

Cluster information:

Cluster name: Domtest Cluster, Server name: domtest2/KGCI

Server cluster probe timeout: 1 minute(s)

Server cluster probe count: 15084

Server cluster default port: \*

Server cluster auxiliary ports:

Server availability threshold: 0

Server availability index: 100 (state: AVAILABLE)

Server availability default minimum transaction time: 3000

Cluster members (2):

Server: domtest1/KGCI, availability index: 100

Server: domtest2/KGCI, availability index: 100

# Desktop Policy

- Check your desktop policy...
- Have you enabled these settings?

Client Settings	How to apply this setting:
Auto-retrieve document setting: <input type="checkbox"/> Disable <input type="checkbox"/>	<input checked="" type="checkbox"/> Don't set value
Enable server to poll for new mail and trigger replication on notification of new mail: <input type="checkbox"/> Enable <input type="checkbox"/>	<input type="checkbox"/> Don't set value
Enable silent failover when a server goes down: <input type="checkbox"/> Enable <input type="checkbox"/>	<input type="checkbox"/> Don't set value
Enable upgrade of all local NSFs to latest ODS version: <input type="checkbox"/> Enable <input type="checkbox"/>	<input type="checkbox"/> Don't set value

**Desktop Settings Document → Mail tab**

# Mail Cluster Failover

Basics | Security | Client Upgrade | **Router/SMTP** | MIME | NOTES.INI Settings | Lotus iNotes | IMAP | SNMP | Activity Logging | I

Basics | Restrictions and Controls... | Message Disclaimers | Message Tracking | Message Recall | **Advanced...**

Journaling | Commands and Extensions | **Controls**

## Miscellaneous Controls

Logging level:  ▾

Out-of-Office type:

Select Keywords

Keywords

- Disabled
- Enabled for last hop only**
- Enabled for all transfers in this domain

OK

Cancel

## Advanced Transfer

Ignore message pri

## Additional Controls (Delivery and Transfer)

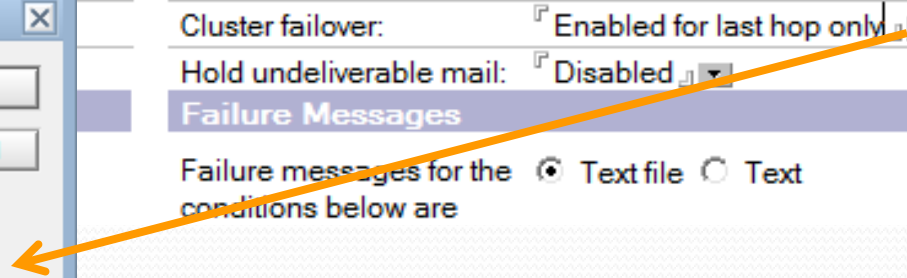
Restrict name lookups to primary directory only:  ▾

Cluster failover:  ▾

Hold undeliverable mail:  ▾

## Failure Messages

Failure messages for the conditions below are  Text file  Text



# Mail Cluster Failover

- What happens if primary server is down?
  - Server checks the cluster cache to find a cluster server
  - Message delivered to cluster server
  - Cluster server checks Primary server availability
  - If cluster not available and local replica is available, message is delivered
  - If cluster not available and local replica is not available message is delivered to alternate cluster member where replica is available or message is held in mail.box until the primary server is active.

# Avoid Routing Loops

- Routing cost still important
  - Especially important for larger clusters
  - Same cost? Alphabetical
- Do not set a high routing cost for a clustermate!

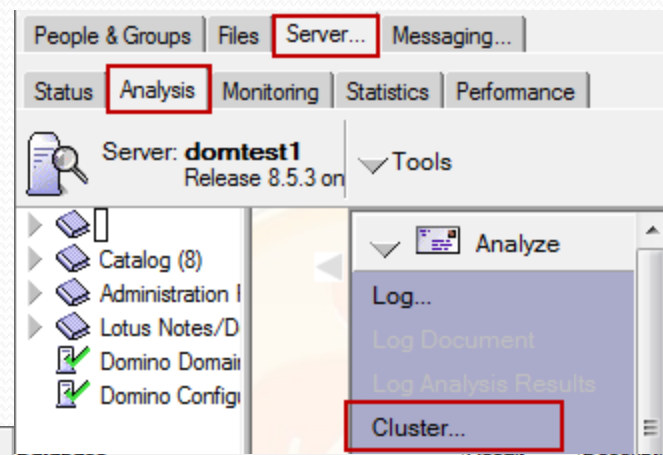
Server Connection: **domserver2/akh to domserver1**

Basics | **Replication/Routing** | Schedule | Comments | Administration

Replication		Routing	
Replication task:	Enabled	Routing task:	Mail Routing
Replicate databases of:	Low & Medium & High priority	Route at once if:	1 messages pending
Replication type:	Pull Push	<b>Routing cost:</b>	<b>1</b>
Files/Directory paths to replicate:	(all if none specified)	Router type:	Push Only

# Cluster Health

- Use the cluster analysis tool to evaluate the health of your cluster

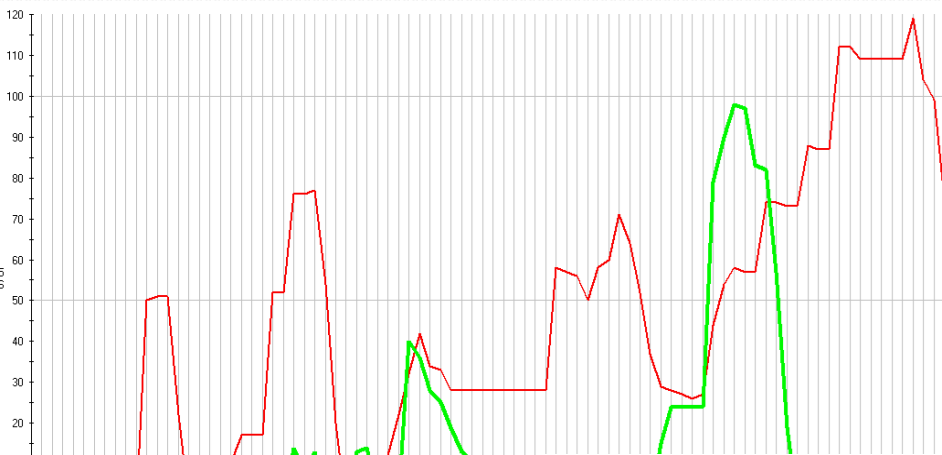


Cluster Analysis	Date	Time	Source Server			
<b>Consistent ACL</b>						
	10/19/2011	04:51:37 PM	domtest1/KGCI	CATALOG.NSF	Fail	ACL Levels do not ma
	10/19/2011	04:51:37 PM	domtest1/KGCI	CATALOG.NSF	Fail	ACL Flags do not ma
	10/19/2011	04:51:37 PM	domtest1/KGCI	CATALOG.NSF	Fail	ACL Levels do not ma
	10/19/2011	04:51:37 PM	domtest1/KGCI	CATALOG.NSF	Fail	ACL Flags do not ma
	10/19/2011	05:00:06 PM	domtest2/KGCI	CATALOG.NSF	Fail	ACL Levels do not ma
	10/19/2011	05:00:06 PM	domtest2/KGCI	CATALOG.NSF	Fail	ACL Flags do not ma
<b>Consistent Domain Membership</b>						
	10/19/2011	04:51:14 PM	domtest1/KGCI	NAMES.NSF	Pass	
<b>Number of Cluster Members</b>						
	10/19/2011	04:51:14 PM	domtest1/KGCI		Pass	This cluster contains
<b>Replicas Exist within Cluster</b>						
	10/19/2011	04:51:23 PM	domtest1/KGCI	ADDRESSBOOKDEMO2.NSF	Fail	No other replicas of t
	10/19/2011	04:51:24 PM	domtest1/KGCI	ADDRESSBOOKDEMO.NSF	Fail	No other replicas of t

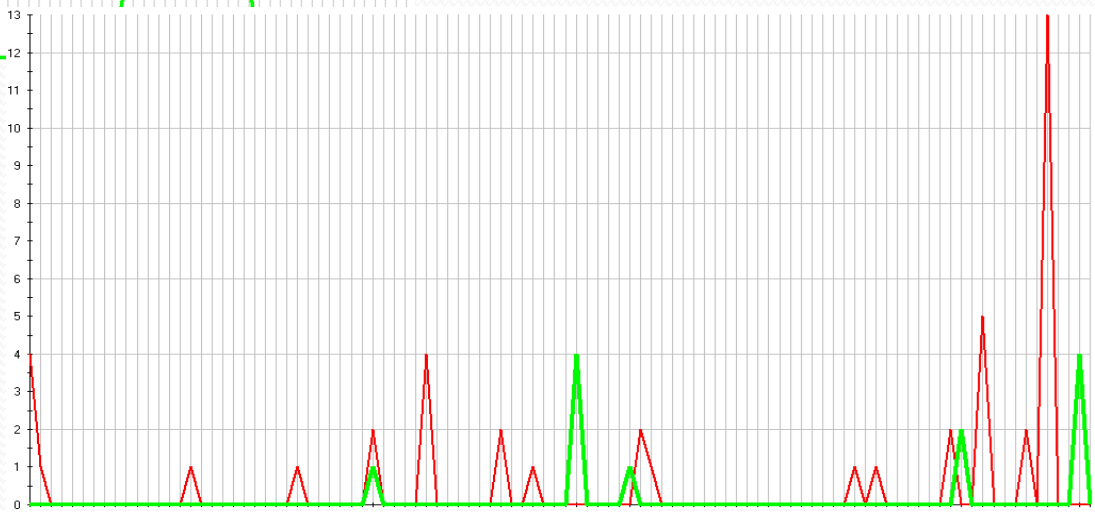
# Cluster/Replicator Queue Depth

Impact of increasing  
Cluster Replicators  
from 1 to 3

`CLUSTER_REPLICATORS=3`



**Replica.Cluster.  
WorkQueueDepth**





# Clustering Applications

- Clustering applications outside of mail?
  - Calendaring and scheduling clustering is built in
    - Configured for you when clustering is enabled (busytime.nsf becomes clubusy.nsf)
  - RNRMGR supports clustering
    - Be aware that only one other server in the cluster will be allowed to process requests
    - Be aware that if the home server (administration server in ACL) is down when RNRMGR starts it will not process any requests to protect cases where the database is out of date from the primary server

<http://www-10.lotus.com/ldd/dominowiki.nsf/dx/clustering-the-resource-reservation-database-in-ibm-lotus-domino>

# Clustering Applications

- Clustering applications outside of mail?
  - Custom applications
    - Fully supported by Domino
    - Be careful with scheduled agents
      - Agents triggered by new mail will automatically fail over
      - Scheduled agents may not run or may run too often
      - Multiple examples on the web regarding how critical agents can be clustered by querying primary server availability

# Clustering Applications

- Clustering applications outside of mail?
  - Lookups
    - @DBLookup, @DBCcolumn, @Picklist
  - Server Names
    - Are server names hardcoded within the application?
  - RDBMS Integration?
    - Where does remote data reside?
    - Will code still function if placed on another server, platform or system

# Clustering Applications

- Clustering applications outside of mail?
  - Readers fields can interfere with replication and agents
    - Agents may not run all documents
    - Documents can be removed from the server during replication
    - Always ensure that “LocalDomainServers” is included in all readers fields
- Encryption
  - Are you encrypting fields or documents in an application?

# Questions

