



IBM Software Group

## Using Backup, Recovery and Media Services with Lotus® Domino® on i5/OS®



 business on demand.

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This education series consists of three modules that cover backup and recovery strategies for a Lotus® Domino® implementation on i5/OS®. This third module focuses on using Backup, Recovery and Media Services (BRMS) with Domino.

## What BRMS brings to Domino on iSeries®

### ■ Backup, Recovery and Media Services

#### ▶ Media management

- Maintains management of saved data
- Robust data recovery
- Management of tape library or save files

#### ▶ Ability to eliminate downtime for backup purposes

- True online backup (no sync points)
- Backup to tape libraries or devices, savefiles, and Tivoli® Storage Manager server
- Domino databases and templates only

### ■ True incremental backups

- Point in time recovery
- Domino databases and templates only

Backup, Recovery and Media Services (BRMS) brings several new functions to Domino backup and recovery. Specifically, media management, online backups and incremental backup with point in time recovery.

## BRMS requirements

- Backup, Recovery and Media Services (5722BR1)
- Domino databases and templates only when using online full or incremental saves
- <http://www.ibm.com/systems/i/support/brms/domino.html>

To use BRMS you must purchase and install the product. The product code is 5722BR1. Be aware that Domino online backups save only Domino databases and templates. If you want to save all files in the Domino directory, you still need to end the Domino server before the backup. For more information on BRMS and Domino, refer to the listed URL.

## BRMS terminology

Media	Tape cartridge which will hold saved data
Media identifier	Name given to a physical piece of media
Media class	Logical grouping of media (for example, QIC5010 for internal tape drives)
Control group	Grouping of items to backup and how to back them up (for example, libraries and stream files)
Policies	Set of commonly used defaults. Types are device, media and backup.

Here are some basic terms which will be used in the remaining slides.

## Domino control groups

- Created during BRMS initialization - INZBRM \*DATA
- Created or rebuilt during BRMS maintenance to handle daily changes to Domino servers
- Refer to <http://www.ibm.com/systems/i/support/brms/dominitbrm.html>

Name	Object type	Description
QLTSSVR	Control group	Backs up all Domino and QuickPlace servers
QLTSDOMnn	Control group	Backs up up databases for Domino server nn, where nn is 01-99. The description gives the actual server name.
QLTSQPLnn	Control group	Backs up databases for QuickPlace server nn, where nn is 01-99. The description gives the actual server name.
QLTSSVR	Media policy	Media policy specifying the media class and expiration to be used for Lotus server backups

Originally control groups were named QDOMINO and QDOMINOnn and the exclusion list was QDOMEXCL. If you still see these control groups, run INZBRM \*DATA to create the new control groups on your system.

Here is a list of all Domino control groups that are created for you by default. To perform an online backup of all Domino servers configured on this system or lpar, use the QLTSSVR control group. You should also have a unique control group for every server configured on the system. If you do not see this, you need to force BRMS to update this information. You can do this with the I-N-Z-B-R-M star DATA command.

## Domino backup lists

- Created during BRMS initialization - INZBRM \*DATA
- Created or rebuilt during BRMS maintenance to handle daily changes to Domino servers
- Refer <http://www.ibm.com/systems/i/support/brms/dominitbrm.html>

Entry Name	User-Modifiable List	Description
*LNKOMTONL or QLTSEXCL	QLNKOMTONL	All files in the IFS except Lotus server databases because they are backed up in the on-line backup
*LNKOMTLTS or QIFSXCLLTS	QLNKOMTLTS	This link list excludes all Lotus server data directories from the backup.
*LTSOMTONL or QLTSXLCONL	QLTSOMTONL	This link list includes all Lotus server data directories and excludes the online backup Lotus server databases.
*LINK	QLNKOMT	In V5R3 with SI13463 applied, you can specify any directories or links to be excluded from a *LINK backup by adding them to the QLNKOMT user-modifiable list.

Here is a list of the backup lists that are created for you by default. Again, if you do not see the correct lists, you must force BRMS to update this information. You can do this with the I-N-Z-B-R-M star DATA command.

## Domino control group entry

- BRMS > Option 2(Backup) > Option 1(Backup planning) > Option 2 (Work with Backup Control Groups)
  - ▶ Or WRKCTLGBRM

```

Work with Backup Control Groups                                RCHASSQ1
Position to . . . . . _____ Starting characters
Type options, press Enter
1=Create      2=Edit entries  3=Copy      4=Delete    5=Display
6=Add to schedule  8=Change attributes  9=Subsystems to process ...

Control      Full      Incr      Weekly
Opt  Group    Media    Media    Activity
-----
--- QLTSDOM06  QLTSSVR  QLTSSVR  *BKUPCY  TRAIN2
--- QLTSDOM07  QLTSSVR  QLTSSVR  *BKUPCY  TRAIN3
--- QLTSDOM08  QLTSSVR  QLTSSVR  *BKUPCY  TRAIN4
--- QLTSDOM09  QLTSSVR  QLTSSVR  *BKUPCY  RCHASSC1653
--- QLTSDOM10  QLTSSVR  QLTSSVR  *BKUPCY  IMSERVER
--- QLTSDOM11  SAVF     SAVF     *BKUPCY  MAILXX
--- QLTSDOM12  QLTSSVR  QLTSSVR  *BKUPCY  COMMONIM
--- QLTSDOM13  QLTSSVR  QLTSSVR  *BKUPCY  DOMINO655
--- QLTSSVR    QLTSSVR  QLTSSVR  *BKUPCY  Online backup of all Lotus ser
More...

F3=Exit      F5=Refresh  F7=Work with BRM scheduled jobs
F9=Change backup policy  F23=More options  F24=More keys

```

Here is an example of control groups from a sample system. You can view this information with the W-R-K-C-T-L-G-B-R-M command.

## Editing a control group

- Option 2 to edit a control group, press F11 to view the exit commands

```

Edit Backup Control Group Entries                                RCHASSQ1
Group . . . . . : QLTSDOM11
Default activity . . . . . : *BKUPCY
Text . . . . . : MAILXX
-----
Type information, press Enter.

Seq      Backup      Exit command
Items
- 10 *EXIT
  20 *EXIT      QNOTES/SAVDOMBRM SERVER('MAILXX') CTLGRP(QLTSDOM11
  30 *EXIT

```

Bottom

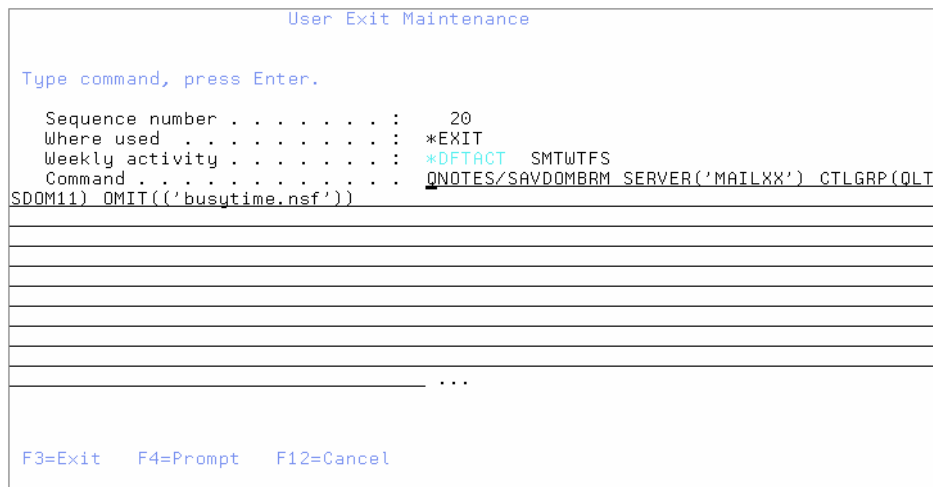
F3=Exit   F5=Refresh   F10=Change item   F11=Display main   F12=Cancel

From the “Work with Backup Control Groups” screen you can select option 2 to edit the control group. Here is an example control group for one server. Notice that the line above and below the S-A-V-D-O-M-B-R-M (save dom brm) SAVE command is star EXIT. This is required for a Domino online save.



## Domino control group entry

- Display Exits and then press F10 to edit the command
  - ▶ Can omit certain databases and directories under Domino



```
User Exit Maintenance

Type command, press Enter.

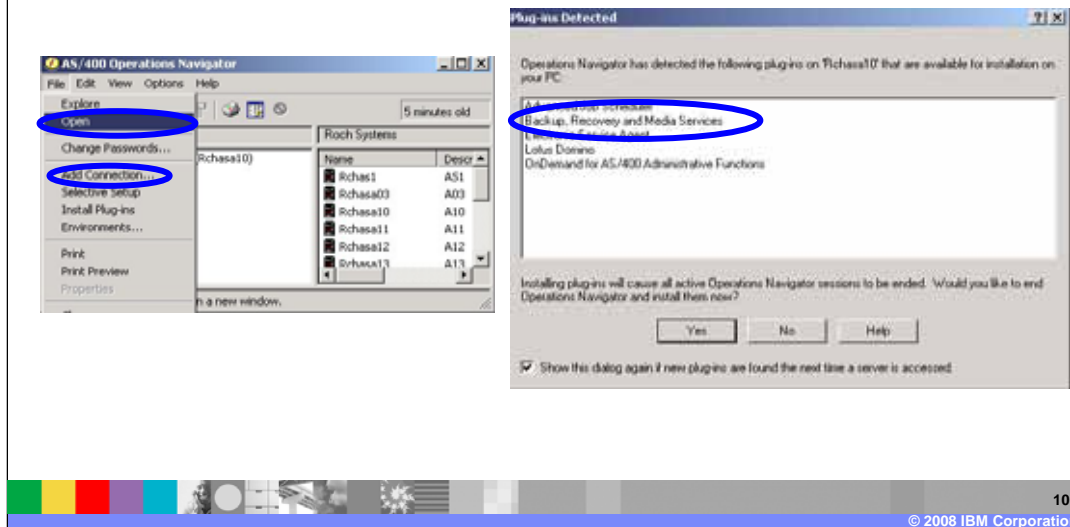
Sequence number . . . . . : 20
Where used . . . . . : *EXIT
Weekly activity . . . . . : *DFACT SMTWTF5
Command . . . . . : QNOTES/SAVDOMBRM SERVER('MAILXX') CTLGRP(QLT
SDQM11) OMIT(('busytime.nsf'))

F3=Exit F4=Prompt F12=Cancel
```

To view the save dom brm command in its entirety, place your cursor on the command and press F10. Note that this example omits the busytime.nsf database. This is for demonstration purposes only. You can omit any database or template you want or leave the default settings which are to save all .nsf, .ntf and .box files. If you do want to omit a file, you must specify the file path relative to the server's data directory. Also, the omit parameter is case sensitive.

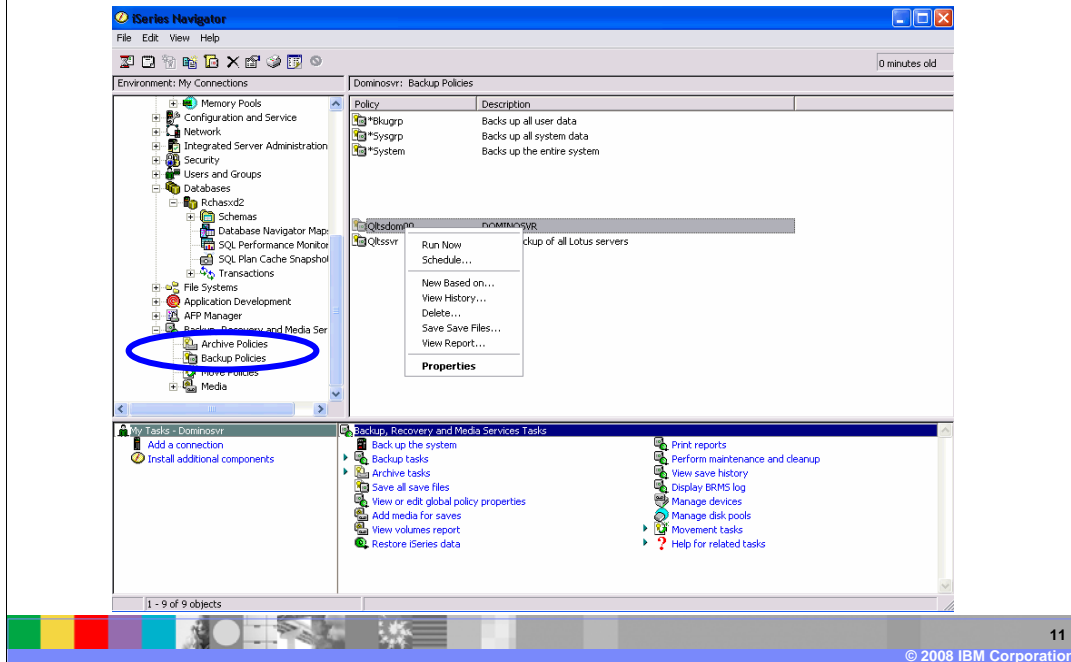
## Installing BRMS plug-ins

- Automatic plug-in detection
  - ▶ Invoked upon open on a connection to iSeries system



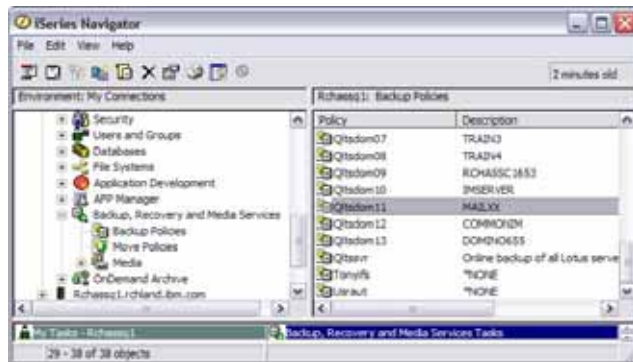
If you prefer to use iSeries Navigator, you can perform the same functions very easily. However, you must have the BRMS plug-in installed. Once you create a connection to a system, iSeries Navigator will prompt you to install any available plug-ins. If you already have your connection to the system configured, there is the link at the bottom of every iSeries Navigator screen which you can select to install plug-ins.

## Backup policies in iSeries Navigator



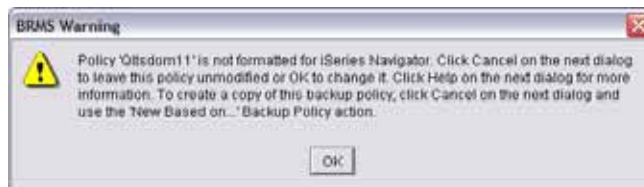
In iSeries Navigator the terminology has slightly changed. Control groups are referred to as backup policies. If you right click on a policy, you can edit its properties, schedule or perform other functions.

## Domino control group entry: iSeries Navigator view



- In iSeries Navigator, choose Backup, Recovery and Media Services > Backup Policies

Once the control group is formatted for iSeries Navigator, you must always use iSeries Navigator to view/modify the control group

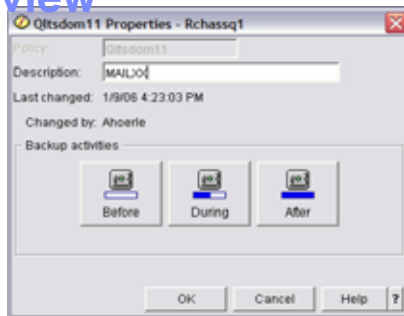


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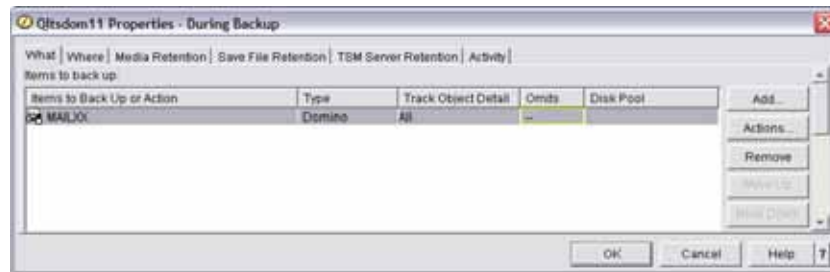
If you double-click on the backup policy, you can see the details for that control group or backup policy. The first time you view the control group or backup policy from iSeries Navigator a warning box will display. Click OK to continue to work in the backup policy. If you do click OK to format the control group for iSeries Navigator, then you must use iSeries Navigator to view or modify the control group in the future.

## Domino control group entry: iSeries Navigator view



You can select to shut down subsystems or run a program before or after the backup.

You can add or remove entries from the backup.



Here is an example of the initial backup policy window. Click the “During” button to see the same information that you see on the “green screen”.

## Automated Domino backup

- Job Scheduler: WRKJOBSCDE, F6 to Add
  - ▶ Also an option within BRMS > Option 6 from WRKCTLGBRM

```

Add Job Schedule Entry (ADDJOBSCDE)

Type choices, press Enter.

Job name . . . . . > QBRMBKUP      Name, *JOBID
Command to run . . . . . > STRBKUBRM CTLGRP(QLTSDOM11) SBMJQB(*NO)

-----

Frequency . . . . . > *ONCE      *ONCE, *WEEKLY, *MONTHLY
Schedule date . . . . . > *CURRENT  Date, *CURRENT, *MONTHSTR...
Schedule day . . . . . > *NONE     *NONE, *ALL, *MON, *TUE...
+ for more values
Schedule time . . . . . > '23:01'  Time, *CURRENT
Save . . . . . > *yes      *NO, *YES

-----

F3=Exit  F4=Prompt  F5=Refresh  F10=Additional parameters  F12=Cancel
F13=How to use this display  F24=More keys
More...

```

This image of the “green screen” shows how you can schedule a backup job. Note that BRMS will use the advanced job scheduler if it is on your system. In which case, this screen will appear slightly different.

## Viewing scheduled backups

- WRKCTLGBRM > F7 to view all scheduled jobs

Work with BRM Job Schedule Entries RCHASSQ1

Type options, press Enter.  
2=Change 3=Hold 4=Remove 5=Work with 6=Release

Opt	Job	Status	-----Schedule-----		Frequency	Recovery Action	Next Submit Date
			Date	Time			
-	QBRMBKUP	SCD	2/27/06	23:01:00	*ONCE	*SBMRLS	2/27/06

Bottom

F3=Exit F5=Refresh F6=Add F12=Cancel

To view all scheduled BRMS jobs, enter the work with control groups command and press F7. A screen similar to this one will display.

## How BRMS full backups work

1. BRMS places a stop (or marker) in databases to track changes while the save is active
2. BRMS saves databases in groups
3. BRMS gathers changes and writes them to a temporary file
4. BRMS saves database changes

Note: BRMS can save to a savefile, Tivoli Storage Manager server or a tape device

This slide shows how BRMS works. The first thing BRMS will do is put a stop in the database. This way the backup can track all changes that occurred to the database during the save. It will then read the Domino database in a similar manner as any Domino task and write the file to the backup device. After you save the file, all changes are written to the backup device. Keep in mind that the more changes that occur to a database the longer this step will take. It is best to schedule your on-line backup to occur during the slowest time of the day.



## BRMS performance with Domino

- Domino databases are backed up in groups
- Default is 50 (range is 1 to 120)
- Higher number means:
  - ▶ Faster backup. More packaged together means less overhead
  - ▶ Longer restore of a single database
  - ▶ Larger processor impact on system. Pumping more data into groups
- Notes.ini setting:
  - ▶ Domino: SAVDOMBRM\_FILES\_IN\_GROUP=n
  - ▶ Lotus QuickPlace® or Lotus Quickr™: SAVLQPBRM\_FILES\_IN\_GROUP=n

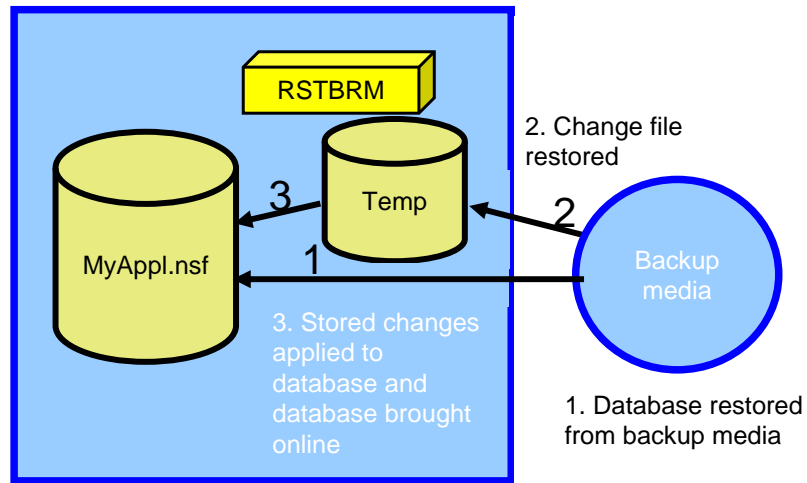
```

Edit File: /mailxx/notes/data/NOTES.INI
Record : 80 of 86 by 10 Col
Control :
-----
CHD .....1.....2.....3.....4.....5.....
EIAdminServer=mailxx/common
EITranslation=2
DominoControllerCurrentLog=dentr1r200602190000.log
CRASH_MAIL.IN_DB=CN=Lotus_Notes/O=Domino Fault Reports
SAVDOMBRM_FILES_IN_GROUP=50
*****End of Data*****

```

There are performance considerations for the BRMS online backup. By default, saved files process in groups of 50 databases. However, you can process anywhere from 1 to 120 databases. In general, as you increase the number of databases in the group, the backup will run faster. A restore of an individual database will take longer. The backup job will consume additional processor resources as the number of databases in the group increases. You can modify the group size using the save dom brm underscore files underscore in underscore group ini parameter. However, if you are running Lotus QuickPlace or Lotus Quickr on the server, you should use the S-A-V-L-Q-P-B-R-M underscore files underscore in underscore group ini parameter.

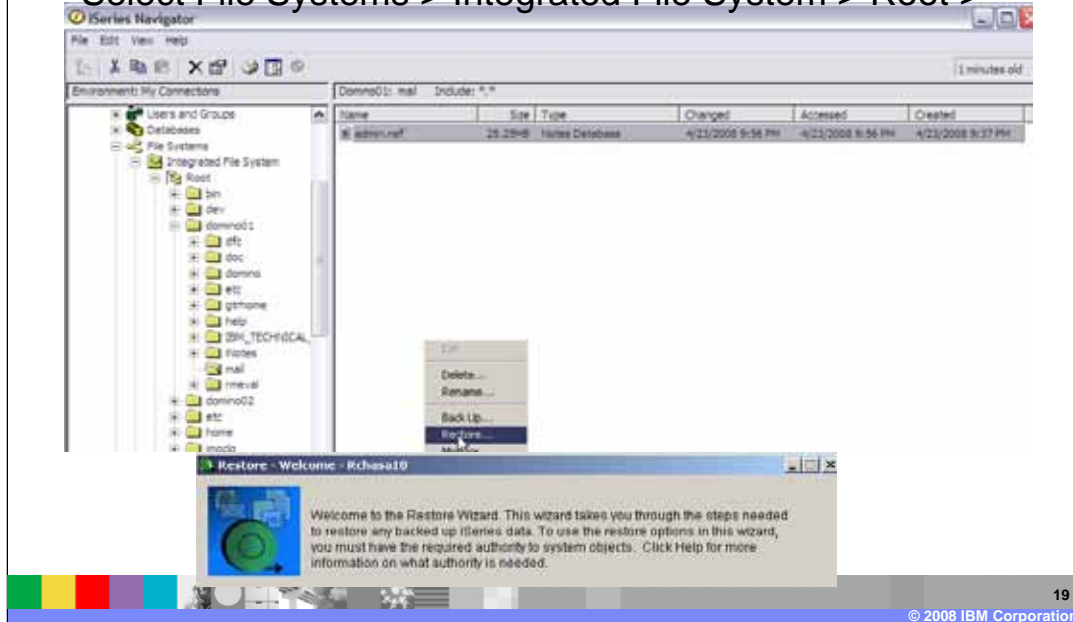
## How BRMS restore works



A restore from a Domino online save is the reverse of the save. The first thing that happens is that the database is restored from the backup media. The temporary file containing the database changes are also restored. The database changes are then applied to the database. Finally, the database is marked "on-line" and is accessible by the server and client.

## BRMS Restore Wizard within iSeries Navigator

- Select File Systems > Integrated File System > Root >

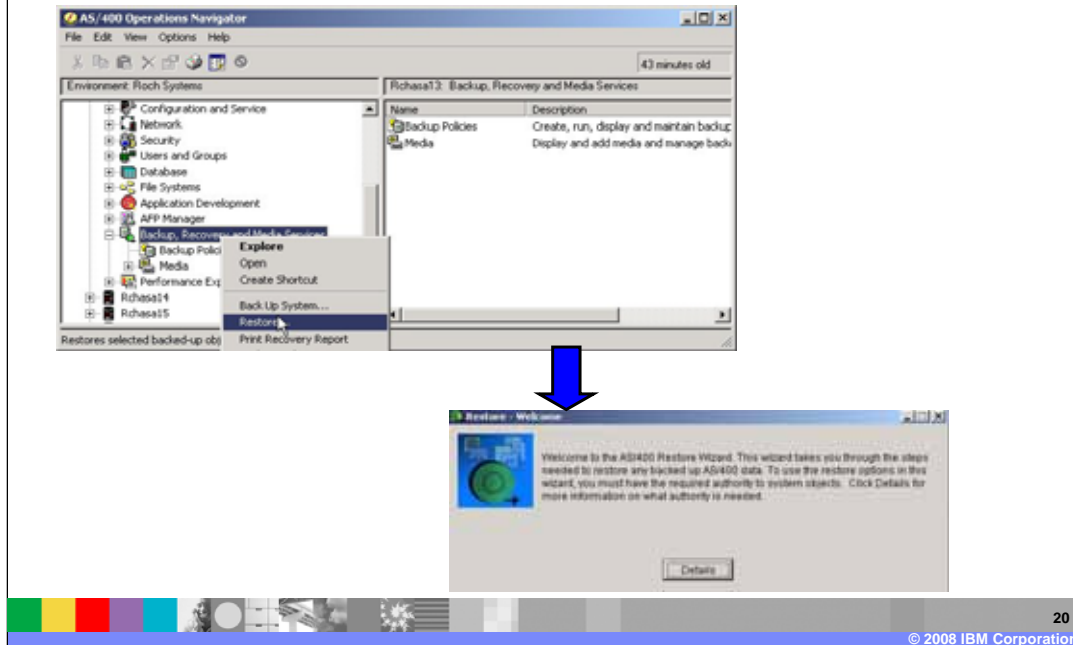


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The Restore Wizard in iSeries Navigator is very easy to use. To restore an entire directory, create an empty directory, right-click on it and then click “Restore”. To restore an individual file, right-click on the directory containing the file you want to restore and the restore wizard will appear. Here is an example of the initial restore wizard screen. This presentation does not show the rest of the wizard.

## BRMS Restore Wizard (continued)



This slide shows an alternate way to launch the BRMS restore wizard.

## Recovering databases through BRMS commands

- WRKLNKBRM - shows directories and you can drill down to your file
  - WRKMEDIBRM - shows all the backup history
- ▶ IFS structure under \*LINKs

```
Work with Link Information                                RCHASSQ1
                                                         02/27/06 17:10:57
Type options, press Enter.
 4=Remove      9=Work with directory information

Opt   Directory
-     /mailxx/notes/data
-     /mailxx/notes/data/mail

Command                                               Bottom
====>
F3=Exit  F4=Prompt  F5=Refresh  F9=Retrieve  F12=Cancel  F17=Position to
F22=Display entire field
```

If you prefer the command line interface over iSeries Navigator, the restore is just as easy. Drill down to the file you want to restore using either the “Work Link BRM” or “Work Medi BRM” commands. The example shown is from the “Work Link BRM” command.

## Recovering databases through BRMS commands (continued)

- Specify the date needed and choose Option 9 (Work With Objects)
  - Option 7 to restore

```
Work with Objects                                02/27/06  RCHASS01 17:11:39
Directory . . . . : /mailxx/notes/data/mail
Saved date/time . : 02/27/06 17:07:49

Type options, press Enter.
 4=Remove 5=Display 7=Restore

Opt  Object                               Volume      Size
 7  cadmin.nsf                             *SAVF      17825792
    muserxx.nsf                            *SAVF      17825792

Command                                         Bottom
===>
F3=Exit  F4=Prompt  F5=Refresh  F9=Retrieve  F12=Cancel  F17=Position to
F22=Display entire field
```

Once you locate the database you want to restore, you can take option 7 next to the file to complete the restore.

## Using RSTBRM to restore a single file

- If you do not want to select the file through the menus, you can use the **RSTBRM** command

```

Restore Object using BRM (RSTBRM)

Type choices, press Enter.
Device . . . . . > *MEDCLS      Name, *MEDCLS
Objects:
Name . . . . . > '/mailxx/notes/data/mail/muserxx.nsf'
-----
Include or omit . . . . . *INCLUDE  *INCLUDE, *OMIT
New object name . . . . . *SAME
-----
+ for more values -
Directory subtree . . . . . *ALL      *ALL, *DIR, *NONE, *OBJ
Save level . . . . . *CURRENT  1-99, *CURRENT
End of tape option . . . . . *REWIND  *REWIND, *LEAVE, *UNLOAD
Option . . . . . *ALL      *ALL, *NEW, *OLD
Allow object differences . . . . . *NONE    *NONE, *ALL, *AUTL, *OWNER...
-----
Object ID . . . . . *SAVED      *SAVED, *SYS
From system . . . . . *LCL
-----
F3=Exit  F4=Prompt  F5=Refresh  F12=Cancel  F13=How to use this display
F24=More keys
Bottom

```

Finally, another option for restoring the file is the R-S-T-B-R-M command. The syntax for this command is nearly identical to the R-S-T command.

## Restoring a Domino server

- To recover the entire system use BRMS to print your complete disaster recovery plan.
  - ▶ Use this document when restoring the system
- To recover only a Domino server
  - ▶ Install Domino software
  - ▶ Configure the Domino server using CFGDOMSVR or iSeries Navigator
  - ▶ Restore the Domino databases
  - ▶ STRRCYBRM <Control Group Name>
- To recover the IFS from a BRMS-linked list (if using BRMS when the Domino server is down)
  - ▶ STRRCYBRM OPTION(\*LNKLIST) ACTION(\*RESTORE) LIST(<ListName>)

Should you ever need to restore the entire Domino server, consider these three options. Option 1. If you need to restore the entire system including Domino, you should be using the complete disaster recovery plan from BRMS. For details, refer to the BRMS documentation.

Option 2. If you only need to recover the Domino server, perform these steps. First, verify that the Domino software is still installed. Second, configure a Domino server using iSeries Navigator or the Config dom server command. This server should have the same name, data directory path and subsystem name as the original server. You can then remove all of the files other than the notes.ini from the new server you just configured. You will then recover the Domino server using the Start Recovery BRM command.

Option 3. The last option is used if you are recovering the server from a BRMS save that did not use Save Dom BRM. You can do this when you perform a weekly or monthly entire system save. This may also be the case if you end the Domino server to perform a daily IFS backup. In this case, you should restore the list used to save the Domino server as demonstrated with the last bullet on this slide.



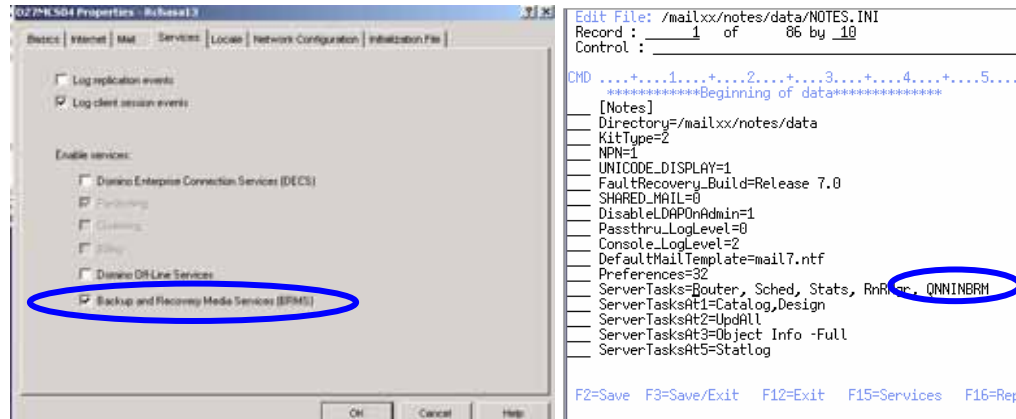
## Incremental online backup

- Backup of Domino Transaction Logs
- Requires use of Archival Transaction Logging
- Supports point-in-time recovery
- Requires QNNINBRM task
  - ▶ Do not run this task or archival transaction logging without actually implementing incremental backups. Otherwise, it can fill your DASD!

The last save method is the incremental online backup done from BRMS. To complete an online backup you must have archival transaction logging configured as the save is backing up the Domino transaction logs. The incremental save supports point-in-time recovery. Finally, running the Q-N-N-I-N-BRM task is required. A word of warning at this point, do not configure archival transaction logging and the Q-N-N-I-N-BRM task without actually implementing a incremental save otherwise the transaction logs will never get cleaned up. This can eventually fill up your available disk space. Finally you must perform a full Domino online save before you can run an incremental save.

## Autostart the QNNINBRM task

- A CHGDOMSVR command adds the QNNINBRM task to the Domino server tasks line in the notes.ini
  - ▶ CHGDOMSVR SERVER(DominoServerXX) ADLSRV(\*BRMS)
  - ▶ iSeries Navigator: Network > Servers > Domino > Properties > Services



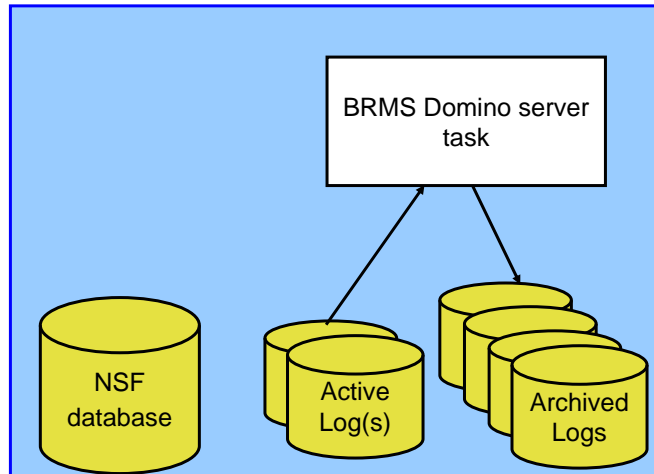
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As mentioned in the previous slide, the Q-N-N-I-N-BRM task is required for incremental backups. You can enable this task to autostart by using the CHGDOMSVR command, editing the notes.ini directly or selecting the option from iSeries Navigator as seen in the examples on this slide.

## How incremental backup works

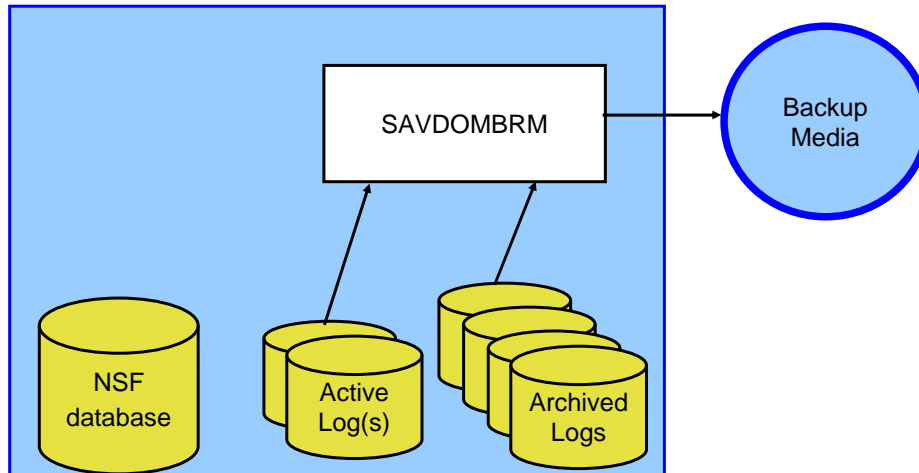
- BRMS Domino server task archives (copies) log extent (.txn) files to a subdirectory as they become full.



The next two slides briefly discuss the architecture of the BRMS incremental backup. First, the BRMS domino server task – the Q-N-N-I-N-BRM task – copies the transaction log extent, dot TXN files, to a subdirectory as they become full.

## How incremental backup works (continued)

- When a backup runs, archived log extents are copied, then deleted, followed by extents in log directory including the active log.



The next step occurs when the incremental backup runs. The backup will copy all of the archived log extents and then delete them from the server's data directory. It will then save the active transaction log.

## Domino transaction logging

- First available in Domino version 5
- Uses IBM's Algorithm for Recovery and Isolation Exploiting Semantics (ARIES) same as DB2®, MQSeries®
- Sequential record of every operation that occurs to data
- Set up a Domino administrator (in the server document)
- Speeds server recovery and restart after a crash (no need to run FIXUP)
- Slight overhead when running transaction logging (up to 10%)
- See Technote 7003543
  - ▶ Search at <http://www.ibm.com/software/lotus/support/>

Here are some facts regarding transaction logging. Transaction logging first became available in Domino version 5 and uses the same IBM ARIES algorithm as DB2 and MQSeries. Transaction logging keeps a sequential record of every data change. It is configured by the Domino administrator and has the added benefit of speeding up restart and recovery time after a crash. There is a slight overhead in running transactional logging, up to 10 percent processor increase. For additional information on transaction logging, refer to technote 7003543 at the provided link.

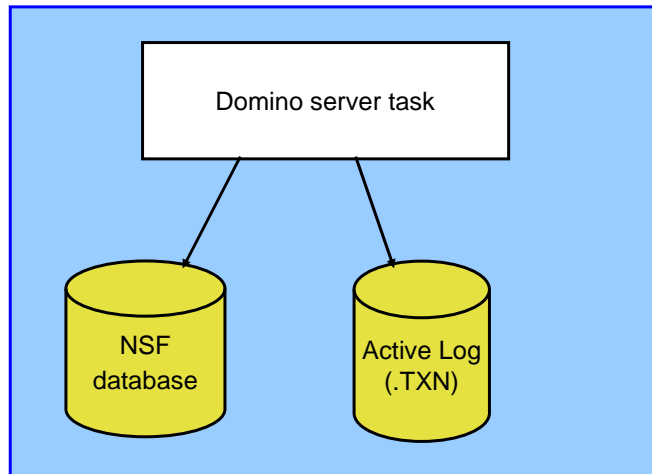
## Transaction logging and database instance ID

- Each database being logged is assigned a database instance ID (DBIID)
- Used to match transactions to databases
- DBIID is used during the recovery process to locate database
- DBIID changes when
  - ▶ you enable or re-enable transaction logging on a database
  - ▶ database is moved to another server then back
  - ▶ is COMPACTed with any options
  - ▶ Fixup is forced to run (-J option)
- If DBIID changes AND incremental backup runs, a new full backup of the database is needed and will automatically be performed!

It is important to understand how the Database instance ID (DBIID) works with transaction logging and its relationship to the incremental backups. When transaction logging is enabled on the Domino server all databases are automatically assigned a DBIID. It is used to match transactions to the database. When the DBIID changes past transactions will no longer be associated with the database. Thus, a new full backup must be completed on those databases. Therefore, it is important to minimize DBIID changes to effectively use incremental backups and point-in-time recovery. Some of the most common reasons are transaction logging being enabled or re-enabled on a database or the database being moved to the server. Running compact with any option other than the default lowercase b or running fixup with the minus j option will also modify the DBIID.

## How transaction logging works

- When a database change occurs, it is written to the log immediately.
- Writes to the NSF are done periodically when processor time is available.
- If a crash occurs, the changes in the log are applied or rolled back.



This slide demonstrates the architecture of transaction logging. You can see that database changes are written to both the active transaction log and the .nsf database. The writes to the transaction logs are immediate, but the actual database changes are performed periodically as processor resources become available. If a crash were to occur, the changes in the transaction log are applied or rolled back.

## Configuring transaction logging

- Enabled through the Server document
  - ▶ Administrator client > Configuration > All Server Documents view



Here is an example of the Transaction Logging tab in the Server document. Here you can see that transaction logging is enabled for archived or archival style logging. Be aware that when you modify these parameters a pop up window will appear stating that the transaction logs must be placed on a separate drive. This does not apply to servers running on i5/OS as the operating system takes care of this for you with its single level storage architecture.



## Changes to backup policy (control group) for incremental backups

Activity - Customize

For each save item, specify what type of save you want to occur on each day of the week.

Save items:

Items to Save or Action	Type	Sun...	Mond...	Tue...	Wed...	Thu...	Frid...	Sat...
DOMINOSVR	Domino	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Legend for save types:

No backup  Changes only  Full backup

Note: When the policy is run using these settings, the save or actions will only occur on the days that have an activity and match the days that are scheduled to run.

OK Cancel Help ?

To configure incremental backups, you will follow the same steps as the Domino online backup except for the activity level. Here is an example of how you can modify the backup policy in iSeries Navigator to run full backups on Sunday and incremental backups the rest of the week.

## Changes to the control group for incremental backups - WRKCTLGBRM, option 2

```

Change Backup Control Group Attributes

Group . . . . . : QLTSDOM06

Type information, press Enter.

Media policy for:
  Full backups . . . . . QLTSSVR      Name, F4 for list
  Incremental backups . . . . . QLTSSVR  Name, F4 for list
  Backup devices . . . . . *BKUPCY     Name, F4 for list
  _____
  _____

Parallel device resources:
  Minimum resources . . . . . *NONE      1-32, *NONE, *AVAIL
  Maximum resources . . . . . _____ 1-32, *AVAIL, *MIN
  Sign off interactive users . . . . . *NO      *YES, *NO, *BKUPCY
  Sign off limit . . . . . 0             0-999 minutes, *BKUPCY
  Default weekly activity . . . . . FIIIIII SMTWTFS(F/I), *BKUPCY
  Incremental type . . . . . *BKUPCY     *CONL, *INCR, *BKUPCY

F3=Exit  F4=Prompt  F12=Cancel

More...

```

Here is an example of the control group properties set to perform full backups on Sunday and incremental backups Monday through Saturday. You access the control group properties from the Work with Control groups command.

## Recovering incremental backups

- Recovery an individual database is the same as a full backup except an additional prompt for the date and time is provided.
- For additional recovery options and for detailed instructions, refer to

<http://www.ibm.com/systems/i/support/brms/domRecoveryIncremental.html>

Recovering a database from an incremental backup is similar to restoring a database from a full Domino online backup. The restore wizard will automatically ask you for a point in time for the restore. Follow the referenced link for additional details on incremental restores.

## Other incremental backup information

- If no prior full backup exists, incremental backup switches to full backup automatically
  
- Incremental types of \*CUML or \*INCR both result in incremental backups
  - ▶ There is no difference between these options for a Domino save.
  
- Media must be the same for full and incremental backups. Use the same media policy, if possible.
  
- Limit of 98 incremental backups between full backups. Perform a full backup once a week.

Here are some other general tips regarding incremental backups.

## BRMS considerations

- Domino servers must be shut down occasionally for full backups of code libraries and Domino configuration data
- A media policy retention type of VERSIONS is not supported
- Restoring a Domino database over a BRMS network is supported only if the Receive Media Info Attribute is set to \*LIB
- SAVDOMBRM and SAVLQPBRM are EXITS in their control groups. They **must** still have pre- and post-exit entries in order to work properly

It is important to remember that the Domino online backup available through BRMS saves only Domino databases and templates. You must still perform a backup with the server down to get all configuration data such as the notes.ini file and Domino software.

## General backup and recovery tips

- Consider recovery time and effort and backup when choosing a strategy
- Only let BRMS run the online Domino save commands: SAVDOMBRM or SAVLQPBRM.
- Never "copy" or FTP a live logged database. Use the Domino Administrator or Notes client functions instead.
- To place a new database on the server, FTP with different extension (for example, .FTP) and rename file so it "appears" instantly
- Consider disabling transaction logging on mail.box. See technote 1090763 at <http://www.ibm.com/software/lotus/support/>.
- Use BACKUP\_NO\_TIMEOUT=1 to prevent timeouts when saving a group of databases. Default time allowed for a group of databases is 15 minutes. If a timeout occurs during the save, the data saved cannot be recovered. See technote 1113347 at

<http://www.ibm.com/software/lotus/support/>.

Here are some general backup and recovery tips.

## Common mistakes

- Too short of a delay time when ending the server controlled before a backup. Ensure that NSDs are not generated during the backup time.
  - ❖ Rule of thumb: Start with two times the amount of time it typically takes for the server to end, and then increase as needed.
- Backing up the ini file or '/tmp' directory with the server active. This can cause the server to hang or become unresponsive
- Trying to submit the command SAVDOMBRM outside of a BRMS control group.
- Ending an active BRMS on-line Domino save (ENDJOB command)

Here are some common mistakes made when configuring backups. 1) Not providing a long enough delay for the server to end controlled. This can cause the server to crash or the backup to fail with object locks. A good rule of thumb is to monitor the server during shutdown to see how long is needed for the server to end. Once you have this number, multiply it by two and use that as your starting point for the delay time. 2) Trying to backup the tmp directory or notes.ini with the server active. The Domino server must be able to write to this file and directory.

3) Trying to run the sav dom brm command from an i5/OS command line. While you can enter the command, this is not supported and can cause the Domino server to crash or hang.

4) Trying to end the online BRMS backup with the end job command. When the backup is running it should be treated as any other Domino task. You should not end those tasks in this manner and you should not end your backup in this way. If there is a problem and a message must be answered, you should answer the message. If you do find yourself in a situation where you must end the backup, you can do so, but be aware it will most likely crash the Domino server.

## References

- Technotes: <http://www.ibm.com/software/lotus/support/>
- IBM Redbooks®:
  - ▶ Implementing IBM Lotus Domino 7 for i5/OS (SG24-7311-00)  
<http://www.redbooks.ibm.com/abstracts/sq247311.html?Open>
  - ▶ Backup, Recovery and Media Services for OS/400®: A Practical Approach (SG24-4840-01)  
<http://www.redbooks.ibm.com/abstracts/sq244840.html?Open>
- IBM System i Web site:
  - ▶ <http://www.ibm.com/systems/i/support/brms/index.html>
- iSeries Information Center
  - ▶ <http://publib.boulder.ibm.com/series/>

For additional information, follow the references listed on this slide.



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