



IBM Lotus Domino for IBM iSeries Administration and Performance Best Practices

BP406

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FUTUREINSIGHT



Lotus. software

Introducing ourselves

- Kim Greene
 - Owner of Kim Greene Consulting, Inc.
 - Extensive iSeries background
 - System and application tuning, Migrations, Enterprise integration, Administration and Troubleshooting, Customized education and training
 - Technical writer for eServer Magazine and iSeries Experts Journal
 - Member of Penumbra Group
 - www.penumbra.org
- Chris Whisonant
 - Certified iSeries and Domino Systems Administration
 - End-to-End Messaging and Collaboration Systems Administration
 - Administration of 6 iSeries servers for large Telecommunications company in South Carolina
 - cwhisonant.blogspot.com

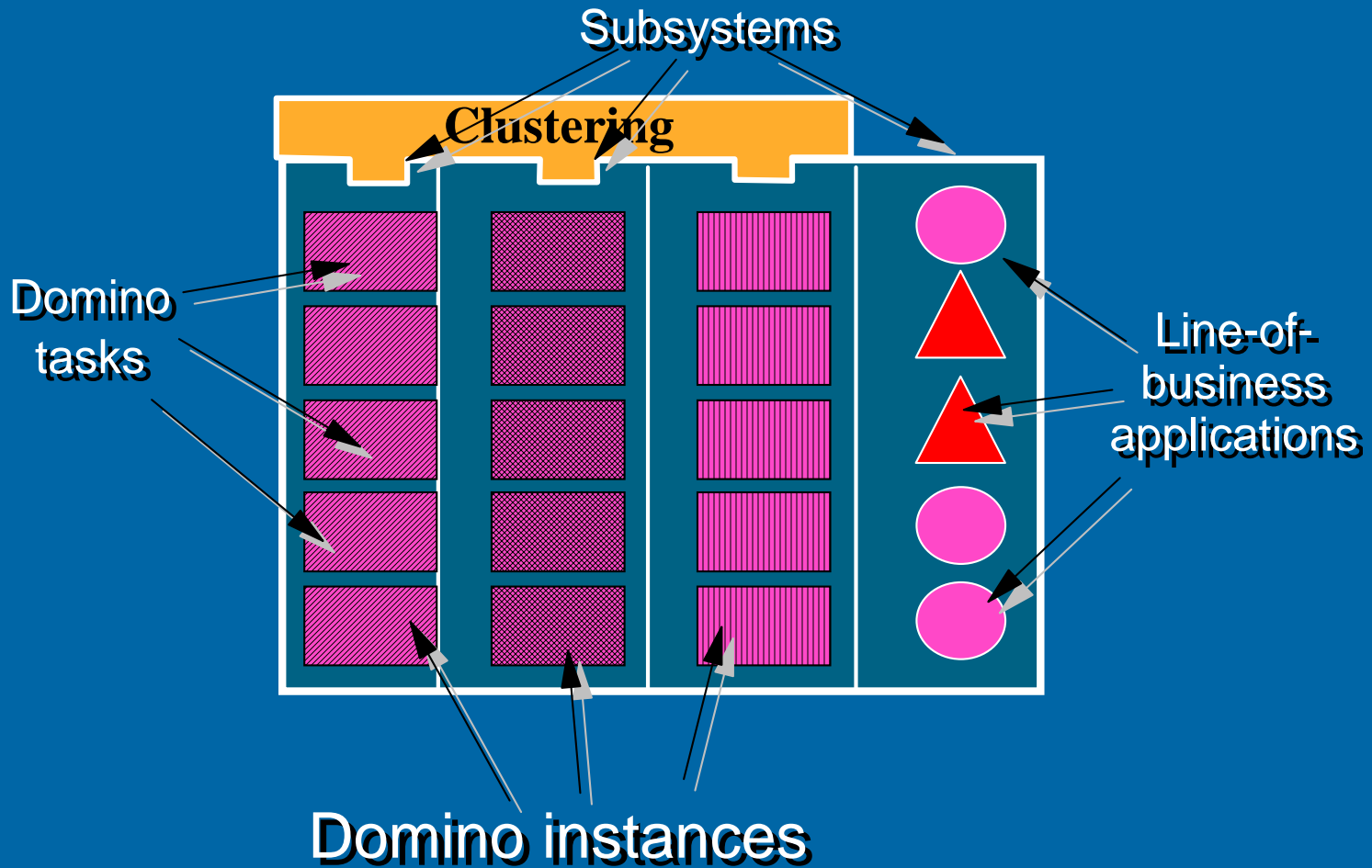
Agenda

- iSeries Architecture
- Database Maintenance
- BRMS
- Performance Tuning
- Sametime for iSeries
- Troubleshooting
- Upgrading to Domino 7

iSeries Architecture

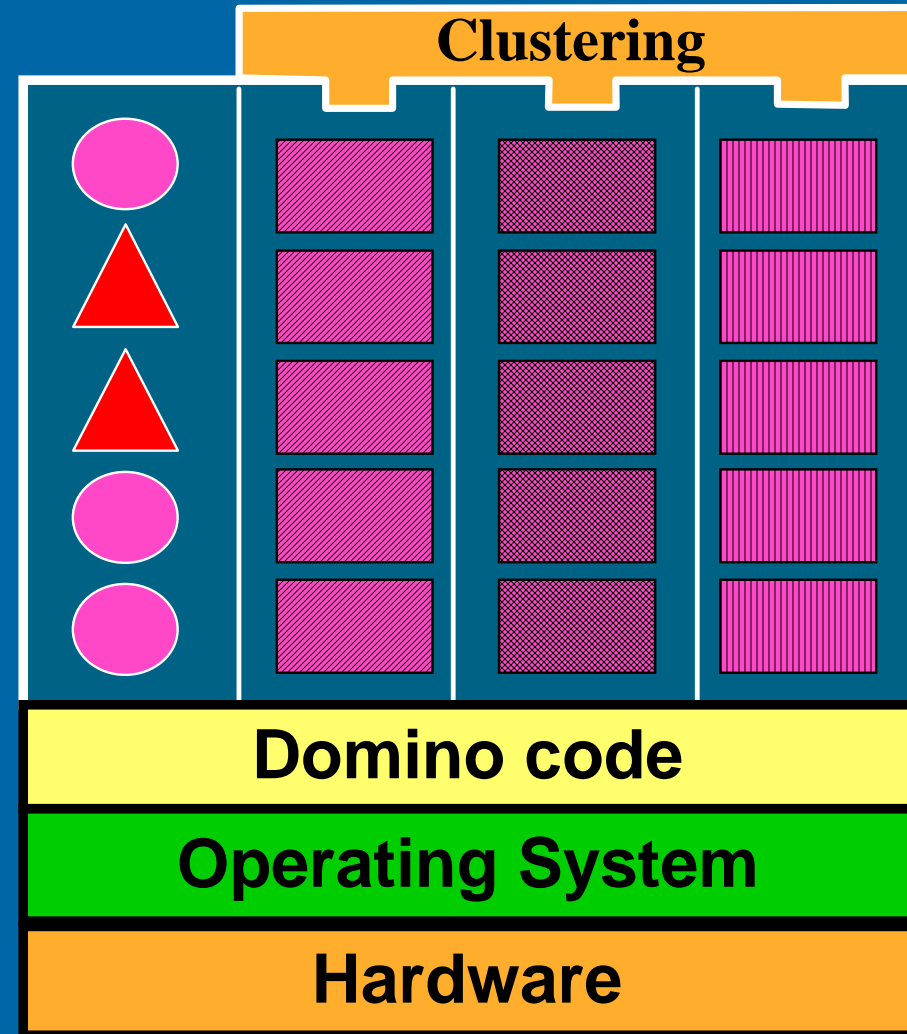
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iSeries Architecture



iSeries Architecture

- One Domino license
- Shared memory
- Shared disk
- Shared processor cycles
- Shared printers
- One tape backup
- Shared domino release options



Database Maintenance

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Database Maintenance

Running Fixup, Compact, and Updall while the server is down

- Why?

- Databases such as names.nsf, admin4.nsf, and events4.nsf are locked while the server is online

- Use the RUNDOMCMD utility

- RUNDOMCMD SERVER(servername) CMD(CALL PGM(QDOMINO654/FIXUP) PARM('names.nsf' '-f'))
- RUNDOMCMD SERVER(SERVERNAME) CMD(CALL PGM(QDOMINO654/UPDALL) PARM('names.nsf' '-R'))
- RUNDOMCMD SERVER(SERVERNAME) CMD(CALL PGM(QDOMINO654/COMPACT) PARM('names.nsf' '-C' '-i'))

Database Maintenance

Utilizing Indirect Files

- Indirect Files are static text files (*.ind) that contain a list of folders or databases to be used for maintenance (fixup, updall, compact)
- Makes routine maintenance more streamlined
- `LOAD UPDALL indirectfiles/generalfolders.ind -R`
- `RANDOMCMD SERVER(servername) CMD(CALL PGM(QDOMINO654/FIXUP) PARM('indirectfiles/root.ind' '-f'))`
- Program Documents
 - Program name: COMPACT
 - Command line: `indirectfiles/generalfolders.ind -B`

Backup, Recovery, and Media Services (BRMS)

Backup, Recovery, and Media Services (BRMS)

- BRMS is an iSeries Licensed Program that can natively backup and restore Domino servers
- Server may be saved while online or offline – reduces need for downtime to perform backups
- Backups can be full or incremental
 - Incremental backups require transaction logging

Backup, Recovery, and Media Services (BRMS)

- SAVDOMBRM_FILES_IN_GROUP=xx
 - Notes.ini variable
 - Default value is 50
 - Maximum value of 120
- Customer example:
 - Our usual save takes 2 hrs 8 mins
 - Changed setting to 30 and save took 2 hours 18 mins
 - Changed to 70 and takes 2 hrs 8 mins
 - Changed to 85 and takes 2 hrs 5 mins

Backup, Recovery, and Media Services (BRMS)

- Additional notes.ini variables
 - BACKUP_TIMEOUT=x
 - The number of minutes to allow each backup group to run
 - Default setting is 15
 - BACKUP_NO_TIMEOUT=1
 - If you increase SAVDOMBRM_FILES_IN_GROUP value, IBM recommends that you enable this value

Backup, Recovery, and Media Services (BRMS)

- Omitting files from control groups
 - May want to only save certain IBM-supplied files once
 - Save them in the first control group and omit from the others
 - QNOTES/SAVDOMB RM SERVER('HQAPP01')
CTLGRP(QLTSDOM01) OMIT((' /HELP/*') (' /INOTES/*'))
 - May not want to save web server log or web navigator database
 - QNOTES/SAVDOMB RM SERVER('HQMAIL01')
CTLGRP(QLTSDOM00) OMIT((' /domlog.nsf') (' /web.nsf')
(' /faultreports.nsf'))

Backup, Recovery, and Media Services (BRMS)

- Adding files to control groups
 - Create a new Link Backup List (DOMEXTRAS, for example)
 - Save the server and/or user ID files
 - Save indirect files if you use them for maintenance
 - If you serve html files, save the /Domino directory and subdirectories
 - Save any other items that are essential

Backup, Recovery, and Media Services (BRMS)

- Ending a save with server online
 - Ending the SAVDOMBRM task abnormally will cause the Domino server being saved to crash
 - Answer all messages and allow the backup to complete without issuing an ENDJOB
 - See IBM Technote 1210226

Backup, Recovery, and Media Services (BRMS)

■ Monitoring backups

- Look through job log and monitor for LNTxxxx messages
- Report LNTxxxx errors to Lotus Support and not iSeries Support
 - Report other errors to iSeries Support first
- WRKLNK '/tmp/brms'
 - flightrec – Detailed information about the most recent save
 - tapetms – Detailed information on tape operations (load, unload, initialize, etc...)

Backup, Recovery, and Media Services (BRMS)

Restoring Single Domino Database iSeries Navigator Plug-in

1. Navigate to your Data directory
 - TIP: create desktop bookmark
2. Right-click the database and click Restore
3. Complete the necessary information on the initial screen

Backup History - Include

Policy: All

Media pool: All

Backup dates: Specific dates

From: December 16, 2005 to: December 19, 2005

Volume: All

Completion status: All

Disk pool number: All

Disk pool name: All

Expiration dates: All

From: December 19, 2005 to: December 19, 2005

Type of backup: All

System: Local system

Backed-up items

Type: Directories or files

Directory: \JO/hqmail01

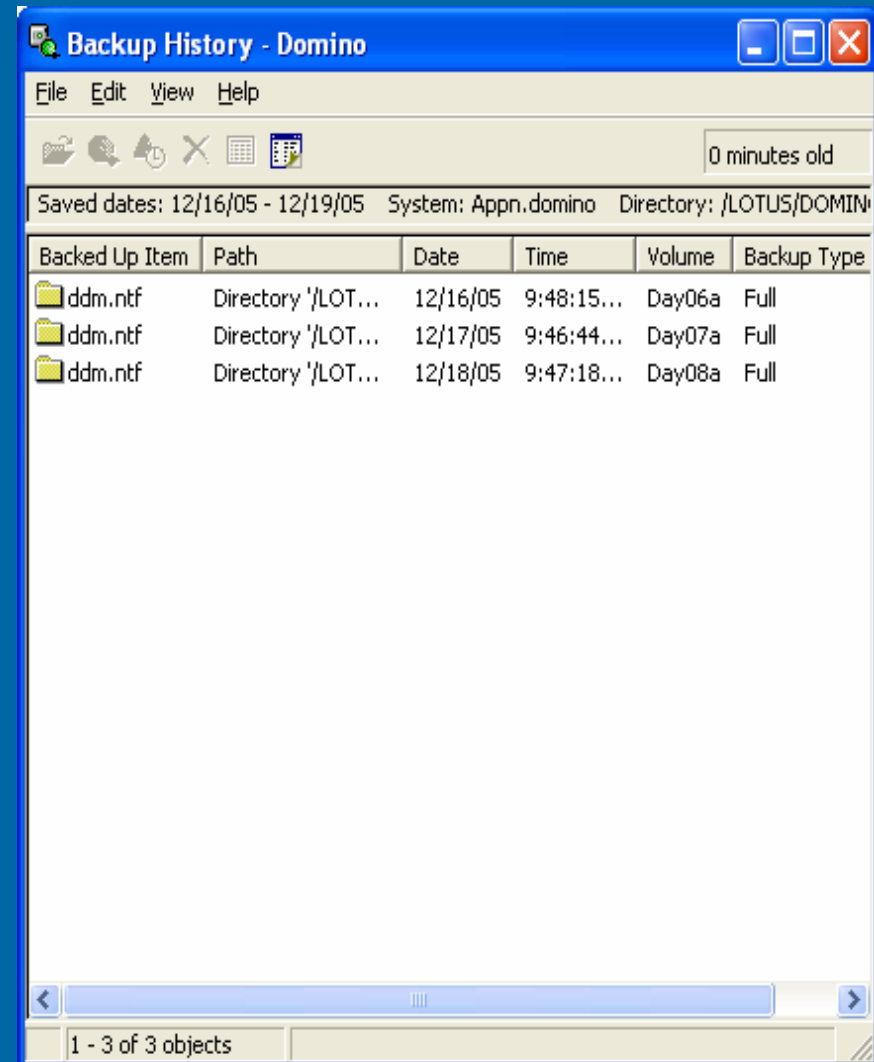
File: ddm.ntf

OK Cancel Help ?

Backup, Recovery, and Media Services (BRMS)

Restoring Single Domino Database iSeries Navigator Plug-in

4. Listing of databases matching the criteria will be displayed
5. Right-click the database and click Restore
6. Remaining screens walk you through how you wish to restore:
 - Same or different file name and/or path
 - Tape device selection
 - Schedule for restore



Backup, Recovery, and Media Services (BRMS)

Restoring Single Domino Database

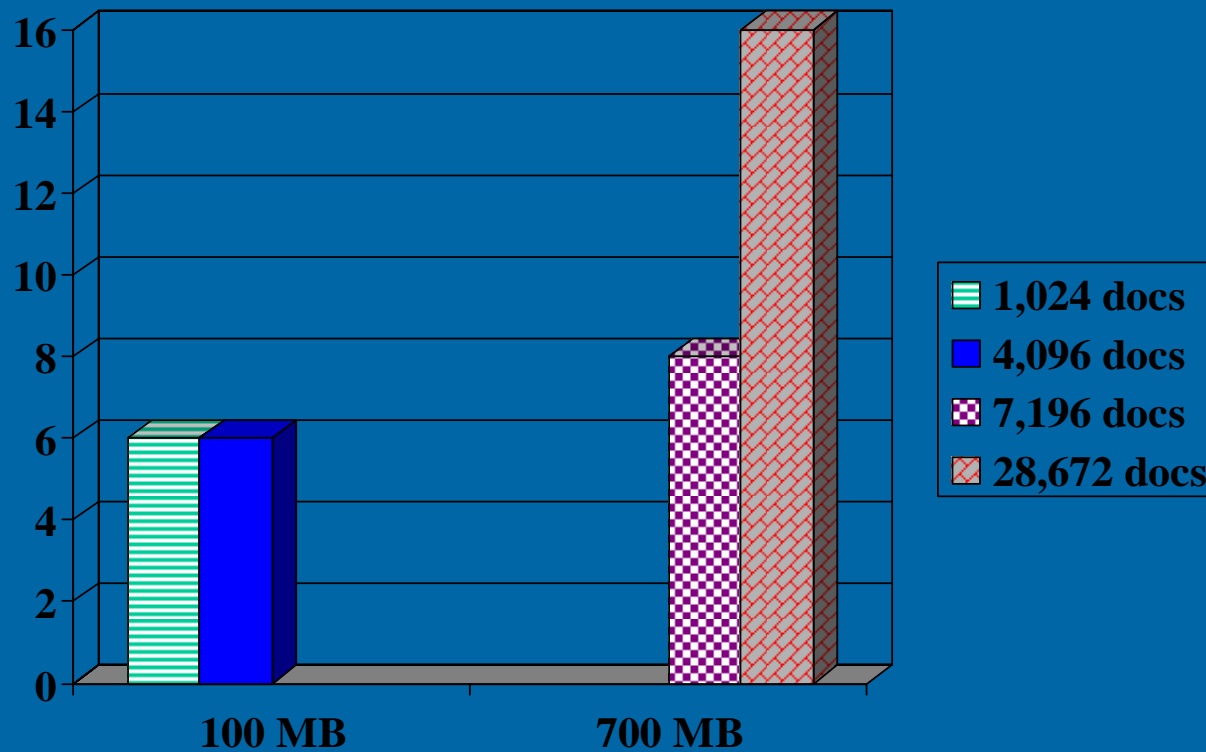
Green Screen

- RST command
- GO BRMS menu
 - Recovery (4)
 - Perform Recovery (2)
 - Work with saved link information (9) – WRKLNKBRM Command
 - Work with Directory Information (9)
 - Work with Objects (9)
 - Restore (7)
 - Specify Object brings up the RST command that will be used
- Using menu faster due to the system knowing the Sequence Number on the tape

Performance Tuning - Mail File Sizes

Impact of Large Mail Files

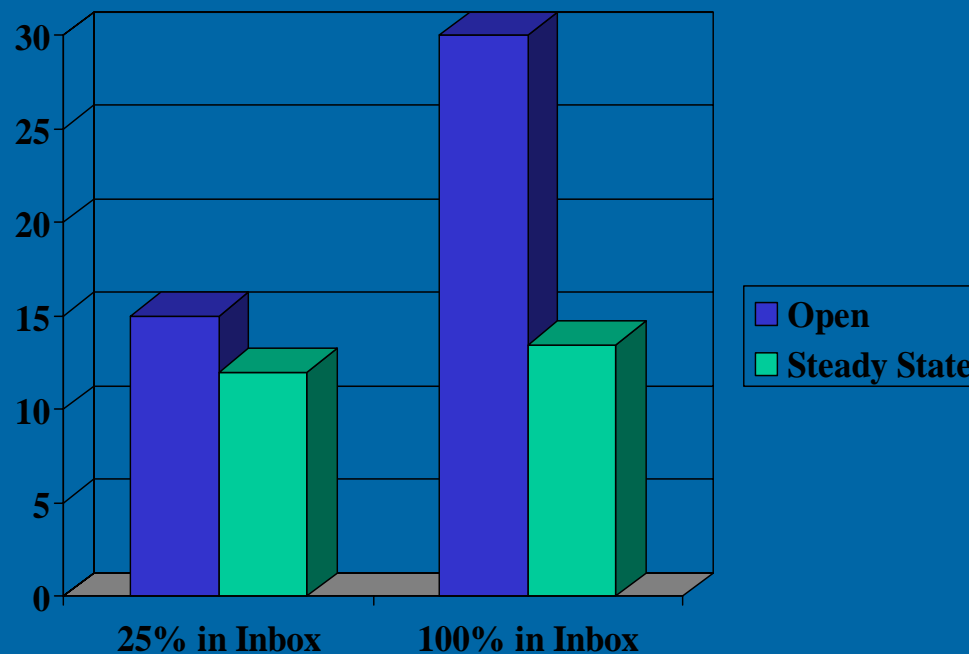
- Number of documents has greater impact as file size grows



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File Those Documents!

• Reducing number of documents stored in Inbox



- Mail file open performance improved 50%
- Steady state performance improved 12%

Mail File Performance Best Practices

- **Inbox is most expensive container in a mail file**
 - *Updated each time user opens mail*
 - *Updated each time user clicks Refresh button*
- **Reducing number of documents in Inbox reduces:**
 - *CPU utilization*
 - *Main storage required to update the view*

Mail Statistics to Watch

■ Mail.Waiting

- *Indicator of ROUTER performance*
- *Number of mail items waiting to be delivered in all MAIL.BOX files*



- May indicate need additional files

■ Mail.TotalPending

- *Number of mail messages resident in all MAIL.BOX files*
- Includes all dead, held, and pending mail

Mail Statistics to Watch

- **Two additional statistics to watch:**
 - ***Mail.Mailbox.AccessConflicts***
 - ***Mail.Mailbox.Accesses***
 - Want a low number of conflicts compared to accesses
 - ***Example:***
 - Mail.Mailbox.AccessConflicts = 155
 - Mail.Mailbox.Accesses = 37632

Run Priorities

Runtime Priority Tuning

- **Change individual job priority permanently**
 - *Specific task is consuming too much CPU*
 - *Domino runs on same system as interactive applications*
- **Steps to follow:**
 1. *Create a class in library QUSRNOTES*
 - CRTCLS CLS(QUSRNOTES/MAILCLASS1) RUNPTY(30)
 2. *Tell Domino which task (or tasks) should use this class*
 - EDTF ('/qibm/userdata/lotus/notes/domino_classes')

- Contents of DOMINO_CLASSES file:

SERVER=Mail01

CLASS=mailclass1

TASKS=calconn,router

CLASS=mailclass2

TASKS=sched

SERVER=App01

CLASS=appclass

TASKS=Amgr

Runtime Priority Adjustment

- **Adjust at subsystem level**
 - ***Helpful if running multiple Domino servers on same system***
 - Prioritize Domino workloads
 - ***Better enablement of automatic performance adjustor***

Are You Wasting Memory?

Memory pool settings

- Check minimum size of memory pools
 - *INTERACT
 - *SPOOL
- Pool size minimums and maximums are used by automatic performance adjustor (QPFRADJ)
 - Adjusting minimums allows memory to be better utilized

WRKSHRPOOL

- Use 'WRKSHRPOOL'
 - PF11 Display Tuning Data

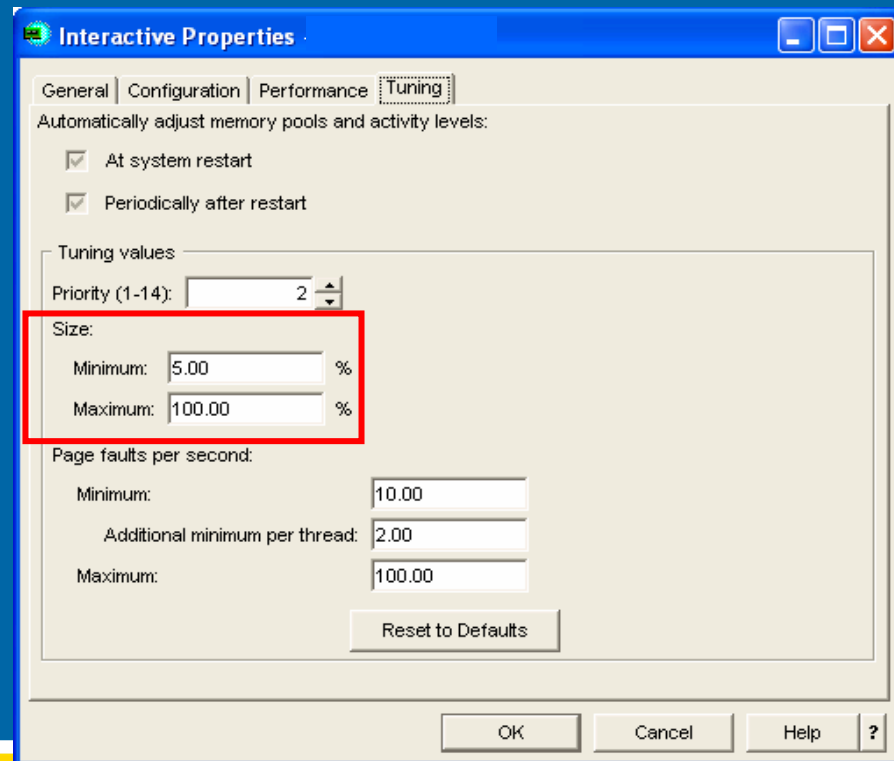
```
Work with Shared Pools                                     System: KIMDEMO
Main storage size (M) . :      2057.40
Type changes (if allowed), press Enter.

-----Size %-----          -----Faults/Second-----
Pool      Priority  Minimum  Maximum  Minimum  Thread  Maximum
*MACHINE      1      6.55     100     10.00    .00     10.00
*BASE         1      5.18     100     5.00     .50     200
*INTERACT     2      5.00     100     10.00    2.00    100
*SPOOL        2      1.00     100     5.00     1.00    100
*SHRPOOL1     2      1.00     100     10.00    2.00    100
*SHRPOOL2     2      1.00     100     10.00    2.00    100
*SHRPOOL3     2      1.00     100     10.00    2.00    100
*SHRPOOL4     2      1.00     100     10.00    2.00    100
*SHRPOOL5     2      1.00     100     10.00    2.00    100
*SHRPOOL6     2      1.00     100     10.00    2.00    100
More...

Command
===>
F3=Exit  F4=Prompt  F5=Refresh  F9=Retrieve  F11=Display text
F12=Cancel
```

iSeries Navigator

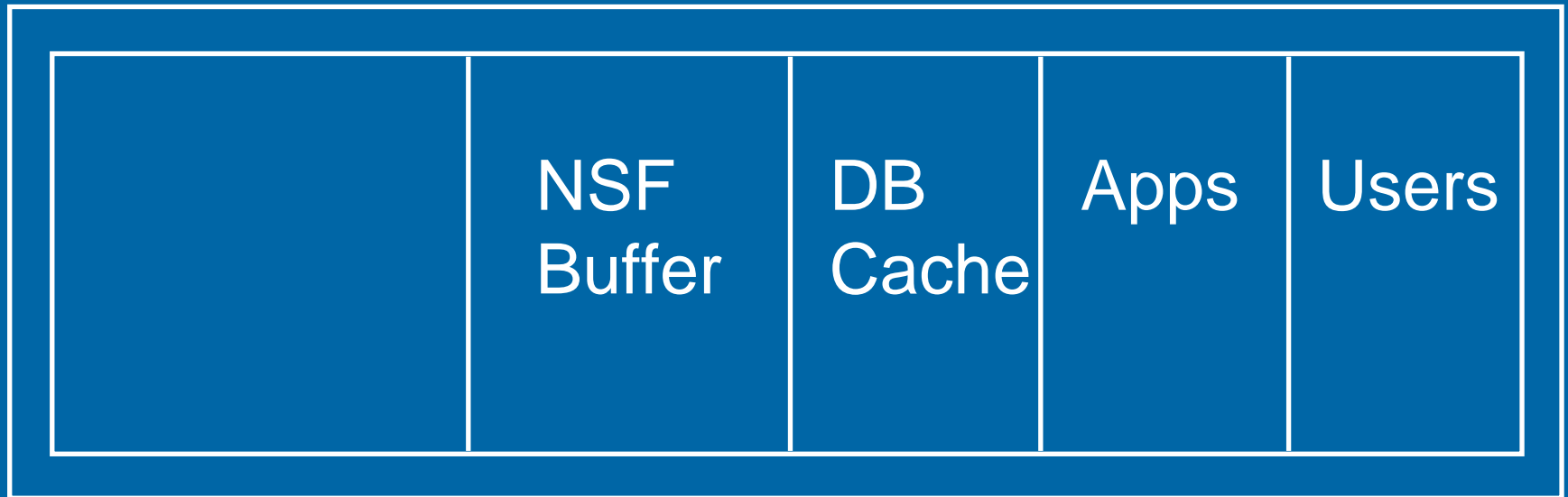
- Work Management -> Memory Pools -> Active pools
- Right click pool -> select 'Properties'
- Tuning tab



Domino Memory Management

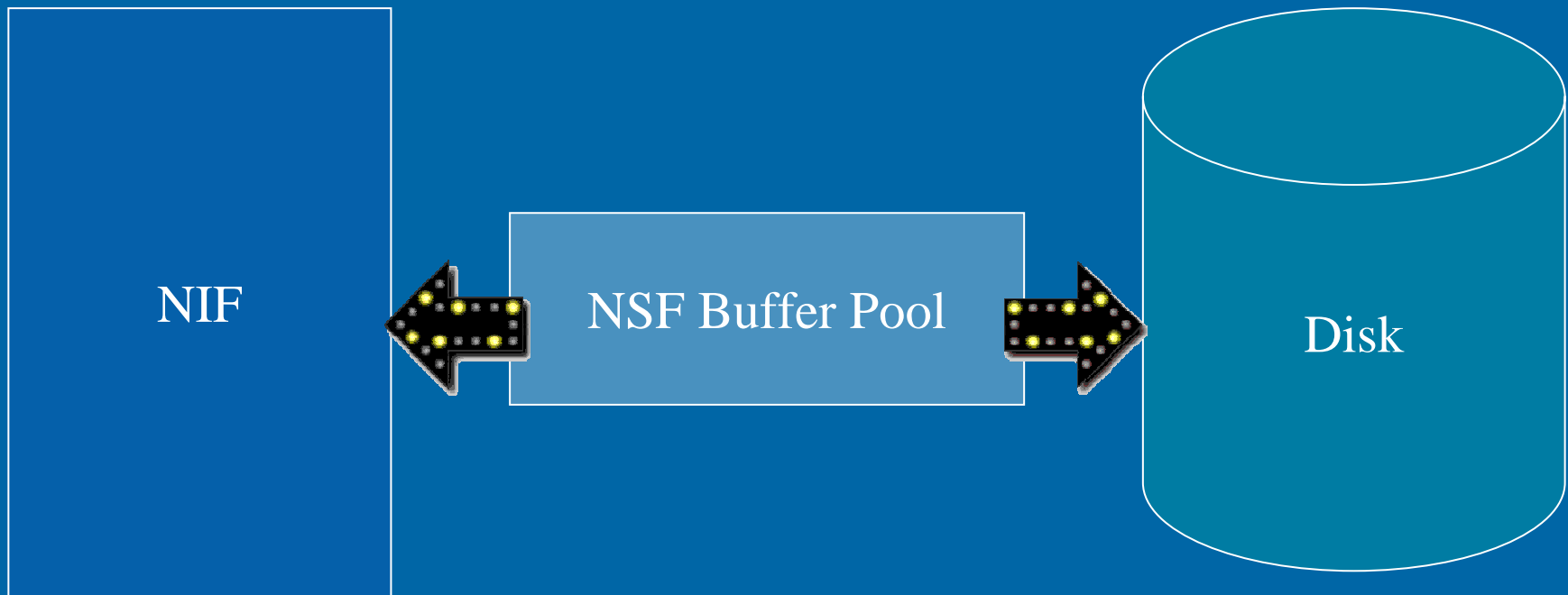
Domino Memory Management

- **How Domino divides main storage**
 - *Domino has it's own memory pools/buffers*
 - *Memory subpools are dynamically adjusted by Domino*



Domino Memory Management

■ NSF Buffer Pool – what it does



■ NSF Buffer Pool – how size is set

- Domino R5
 - Set to **300 MB** by default on iSeries
- Domino 6
 - Set to **748 MB** by default on iSeries
- Domino 7
 - Set to **748 MB** by default on iSeries

■ NSF Buffer Pool:

- *Should you keep the default size?*
 - *Recommend setting based on actual server needs*
 - *Use 'Show Stat Database' command to view statistics*

Domino Database Statistics

- *Database.Database.BufferPool.Maximum.Megabytes*
- *Database.Database.BufferPool.Peak.Megabytes*
- *Database.Database.BufferPool.PercentReadsInBuffer*
 - Want $\geq 95\%$
- *Database.DbCache.CurrentEntries*
 - Number of entries in the database cache
- *Database.DbCache.HighWaterMark*
 - Peak number of entries in db cache since Domino server was started
- *Database.DbCache.MaxEntries*
 - Number of databases that can be cached
- *Database.DbCache.OvercrowdingRejections*

• Customer example – looking good



- *Database.Database.BufferPool.Maximum.Megabytes = 710*
- *Database.Database.BufferPool.Peak.Megabytes = 708*
- *Database.Database.BufferPool.PercentReadsInBuffer = 98.12*
- *Database.DbCache.CurrentEntries = 71*
- *Database.DbCache.HighWaterMark = 256*
- *Database.DbCache.MaxEntries = 300*
- *Database.DbCache.OvercrowdingRejections = 0*



• Customer example – looking very bad

- *Database.Database.BufferPool.Maximum.Megabytes = 170*
- *Database.Database.BufferPool.Peak.Megabytes = 168*
- *Database.Database.BufferPool.PercentReadsInBuffer = 95.44*
- *Database.DbCache.CurrentEntries = 510*
- *Database.DbCache.MaxEntries = 510*
- *Database.DbCache.OvercrowdingRejections = 8385*
 - Huge problem!
- *Options:*
 - Increase NSF buffer pool size
 - Set NSF_DbCache_MaxEntries

■ **NSF_Buffer_Pool_Size_MB**

● ***What to monitor when fine tuning***

1. Non-database paging faulting = < 100 faults/processor
2. Database.BufferPool.PercentReadsInBuffer >= 95%
3. Database cache size
 - Database.DbCache.MaxEntries = 3 X BufferPool
4. View sizes
 - Faulting can occur with NSF buffer pool set too small

Domino Memory Management

- **Two key notes.ini parameters affect Domino memory management**
 - *NSF_Buffer_Pool_Size_MB*
 - *PercentAvailSysResources*
- **Other Domino memory buffers are allocated based on these parameters**



- **PercentAvailSysResources**
 - ***Introduced in R5.0.4***
 - ***Controls % of memory resources available to Domino server***
 - Valid values = 2% to 100%
 - Memory available depends on where Domino server is executing
 - ***Allows dynamic adjustment of buffer sizes***

- **NSF_Buffer_Pool_Size_MB**
 - *Static setting of NSF buffer pool*
 - *Use in combination with*
PercentAvailSysResources
 - PercentAvailSysResources won't override NSF_Buffer_Pool_Size_MB setting

Sametime for iSeries

Sametime for iSeries

- Windows Sametime Attachment Conversion server
 - Windows 2000 (Pro/Server) or Windows XP (Pro)
 - Install Sametime Attachment Conversion Services software
 - Do not install the following applications
 - Lotus Domino
 - Lotus Notes
 - Lotus Sametime
 - Lotus Quickplace
 - On iSeries, Edit meetingserver.ini file:

```
[SOFTWARE\Lotus\Sametime\MeetingServer\ConversionServices]
AttachmentConversionServerTimeout=120
AttachmentConversionServerCompressionEnabled=1
NumberOfAttachmentConversionServers=0
AttachmentConversionServer1=1.1.1.1:19610
AttachmentConversionServer2=2.2.2.2:19610
```
 - IBM Technote 1088127
 - To save attachments: OS/400 V5R2 or later - PASE, (5722SS1, option 33)

Sametime for iSeries

- Always Use Fully Qualified Hostname!
 - Clients – Notes and Internet
 - Server
- Server Document
 - Basics Tab - Fully qualified Internet host name field
 - Ports Tab > Notes Network Ports Tab – Net Address Field
 - Internet Protocol Tab > HTTP Tab
 - Host Name Field
 - Bind to Host Name Field = Enabled
 - DSAPI Filter File Names Field = Null
- Sametime.ini Configuration File
 - VPS_HOSTS=FQDN
 - STLINKS_HOSTS=FQDN
- Correct Host Table Entry – FQDN listed FIRST!

Sametime for iSeries

- Correcting Wrong FQDN Configuration
 - End Sametime Server
 - CHGLSTDOM SERVER(*Sametime_server_name*)
HOSTNAME(*fully_qualified_host_name*)
 - Start Sametime Server
 - Verify Fields on Previous Slide are correct

Sametime for iSeries

■ Collecting Crash Diagnostics

- STDIAGS*.zip file automatically generated for Lotus Support!
- Trace sub-directory of /DATA directory
- ST_Snapshot*.txt files included for OS/400
 - List of installed software
 - PTF levels for OS400, SLIC, Java, Domino and Sametime
 - WRKSYSSTS (for allocated memory)
 - WRKDSKSTS (for number of disk arms)
 - TCP/IP configuration (domain, interfaces, host table, netstat, etc.)
- /Trace/stdiagzip.properties file contains default information for location of files to be included in STDIAGS*.zip file
- CALL QSAMETIME/STDIAGZIP <Sametime-server-name>

Sametime for iSeries

- It's "Free" – start using it!
- IBM Technote 1209709 – “Integrated awareness on Notes 6.5.x results in server outages”
- Use Notes 6.5.4 “HF1” or Notes 7.0 or higher

Troubleshooting

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When Do I Start?

- iSeries system history log
 - DSPLOG OUTPUT(*PRINT)
- System operator message queue
 - DSPMSG MSGQ(QSYSOPR) OUTPUT(*PRINT)
- Notes storage dumps (NSDs)
 - Found in IBM_TECHNICAL_SUPPORT subdirectory
- Domino log file
 - Log.nsf
- QNOTES spool files
 - WRKSPLF SELECT(QNOTES)

iSeries Commands

DMPSVRSTKS

- “Dump call stacks of Domino jobs in a Subsystem”
 - DMPSVRTKS SERVER(servername)
 - A console window will be opened and after the job has completed you will be prompted to hit Enter to continue
- Generates a spool file for each job under the specified domino server’s subsystem
- Great for getting a snapshot of the Domino server’s jobs in the event of a crash or hang

iSeries Commands

DMPCLLSTK

- “Dump Call stack of selected job”
 - DMPCLLSTK JOBNUMB(xxxxxx)
- Used to gather information of all of the call stacks associated with a job
- Generates a spool file with the information found in option 11 of the Work With Job command.
- Use this command multiple times to determine any changes in the call stacks over that time period

iSeries Commands

- DLTDOMSMEM
 - Cleans up Shared Memory

- DLTDOMSEM
 - Cleans up Semaphores

- Must request commands from Lotus Support
- Alternative to iSeries Navigator Application Development section

How to get these commands

- Download DMP SVRTKS and DMP CLLSTK commands at:
 - <http://www-03.ibm.com/servers/eserver/series/domino/devtools/dmp/>
- Run on V5R1 or later version of OS
- Download and install BEFORE you need them!!



- Ship with Domino 7

Upgrading to Domino 7

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Upgrade Requirements

- Upgrade levels
 - Domino 5.0.13 -> D7
 - Domino 6.x -> D7
- Requires V5R3!
- Domino 5.x does NOT run on V5R3
- Remember multi-versioning capability

Performance You Can Expect

- Domino 7 scalability – the facts
 - Increase in number of users supported in a DPAR
 - Domino 6 = 10,000 users
 - Domino 7 = 18,000 users
- Domino web access (DWA) shows increased scalability and CPU reduction
 - 24% reduction in CPU
 - Up to 15,000 DWA users in a single DPAR
- What can you expect to see?
 - ~10-15% reduction in CPU for applications
 - ~15% increase in memory requirements

Upgrade Considerations

- Domino 7.0 HTTP Task Issue
 - DWA User Cache issue causes server outages
 - Hot fix PTF available
- Notes Smart Upgrade Issue
 - Multi-User Installs require completion of Client Setup Wizard
 - IBM Technote 1219467
 - Fix expected for Notes 7.0.1 Client

New parameters on CHGDOMSVR

```
Change Domino Server (CHGDOMSVR)

Type choices, press Enter.

Server host name . . . . . *SAME

Subsystem and object names . . . *SAME           Name, *SAME
Additional services . . . . . *SAME           *SAME, *NONE, *ALL, *MINIMUM ...
      + for more values
Collation . . . . . *SAME           *SAME, *STD, CS, DA-DK-AA ...
Text 'description' . . . . . *SAME

Enable server for DB2 . . . . . *SAME           *SAME, *YES, *NO
Default data store . . . . . *SAME           *SAME, *NSF, *DB2
DB2 access server . . . . . *SAME

F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

More...

New commands

- DMPJOBCLLS
 - Replaces DMPCLLSTK command

- DMPDOMSVRC
 - Replaces DMPSVRSTKS command

- Shipped with the Domino 7 code!!

Related Sessions

- BDD402 IBM Workplace, IBM WebSphere Portal and Lotus Collaboration Rocks with iSeries
 - **Sunday: 4:45pm - 6:00pm**
- BOF513 IBM Lotus, IBM Workplace and IBM WebSphere Portal Software Products on the IBM iSeries Server
 - **Wednesday: 07:00am - 8:00am**
- SPN105 Workplace and WebSphere Portal Deployments Made Easier on eServer iSeries
 - **Wednesday: 1:30pm - 2:30pm**
- BOF514 Deploying IBM Workplace Collaboration Services on the IBM eServer iSeries Server, the Redbook.
 - **Wednesday: 5:45pm - 6:45pm**

References

- PTFs
 - www.ibm.com/s_dir/sline003.nsf/sline003home
- Redbook – Domino 6 for iSeries Best Practices Guide (SG24-6937-00)
 - www.redbooks.ibm.com/redpieces/pdfs/sg246937.pdf
- Sizing Large-Scale Domino Workloads on iSeries
 - publib-b.boulder.ibm.com/Redbooks.nsf/RedpaperAbstracts/redp3802.html?Open
- IBM Lotus Domino for iSeries Performance and Tuning (REDP3843)
 - www.redbooks.ibm.com/redpapers/pdfs/redp2843.pdf
- iSeries Performance Management Resources Library
 - www.ibm.com/servers/eserver/series/perfmgmt/resource.htm

References

- Domino for iSeries Sizing and Performance Tuning on the IBM eServer iSeries Server (SG24-5162-01)
 - www.redbooks.ibm.com/redbooks/pdfs/sg245162.pdf
- iSeries Domino Performance
 - <http://www.ibm.com/servers/enable/site/domino/perform.html>
- Performance Zone
 - www.lotus.com/performance

Your turn!!!

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Questions?