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Lotus Notes and Domino Performance Tips
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Agenda

• **Overview**
• Easy things
• Upgrades
• Server considerations
• Lotus Domino
• Lotus Notes
• Application Design
Overview

• Performance problems usually aren’t caused by any one thing
  – Outdated hardware
  – Insufficient disk or memory
  – Old releases of Notes/Domino
  – Configuration settings
  – Errors
  – Large, frequently used databases
    • Mail, but also other high use applications
  – Application code
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Easy to Use Tools

There are two easy things you should be doing, even if you don’t think you have performance problems:

- Domino Domain Monitor (DDM)
- Domino Configuration Tuner
Domino Domain Monitor (DDM)

- A run-time server feature for detecting, understanding and acting on run time issues
- Release 7 and up – that was 2005!
- Monitors and consolidates server errors
- Suggests solutions for many errors
- Collaboration features such as event assignment and Sametime awareness
- Customizable and extensible
DDM Example

Open Event
(This event is not assigned to anyone)

Generated by: 
in Domain: Simple

Most Recent Event

Warning High

Sunday, May 08, 2011 - 6:59:14 AM
Warning: Debug parameters could impact operation or performance.

Explanation
- Reported by: Server
- Severity and type: Warning High in Server

(There is no additional explanation or help available for this event)

Event Change History:
10/18/2009 12:49 AM: 
- changed state to Open
Domino Configuration Tuner (DCT)

• A client based static analysis tool which scans servers
• Resolve problems and improve performance
• Examines server documents, NOTES.INI, and database advanced properties
• Settings are flagged when their values are known to cause problems, are out-of-range, or are unexpected
• Works with any version, but configured for R7 and later
DCT Example

Status: The 'Server_Session_Timeout' setting is currently absent from NOTES.INI.
Server: Running Domino 8.5.2 on Windows.
Severity: Warning (Low)

Explanation

Specifies the number of minutes of inactivity after which the server automatically terminates network and mobile connections. The minimum recommended setting is 30-45 minutes. A lower setting may negatively impact server performance. The ideal setting depends on factors such as server load and the number of concurrent users on the server.

UI equivalent: None.

Default: No default entry, but in the absence of the setting, Domino terminates a session connection after 240 minutes of inactivity (four hours).

Restarts: Changes to this setting will be automatically detected.

Recommendations

Set Server_Session_Timeout to 30 or 45
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Upgrade to squeeze more life out of your hardware

- **Release 8 vs. 7**
  - CPU reductions across the board
  - I/O reductions on most platforms
  - Some increase in network utilization, and, on some platforms, increased memory utilization

- **Release 8.5 vs. 8**
  - Substantial I/O reductions
  - Reduction in disk ops per second by 22 % to 33 %
  - Reduction in disk bytes transferred per second by 31 % to 67 %
  - Reduce processor utilization by as much as 20 %
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Disk I/O

• The “Best-Case” is multiple drives on different drive controllers
• One Disk may have multiple partitions
  – Different partitions are NOT different spindles
• Multiple drives in a RAID array don’t count
• Put transaction logging files on a separate drive
• Move view indexing temp files to another drive
• Move disk-intensive apps to a separate drive
• If you must have memory swapping, give it its own drive
Disk I/O

- Consider the benefits of a SAN
  - Highly redundant storage
  - Single backup point
  - Consolidated free space

- Local high speed disks outperform a SAN
Periodic Maintenance

- Periodic rebooting is typically required
  - OS/Hardware dependent
  - Defragments memory
  - Provides a predictable window for patches, fix packs
  - Run database maintenance on system databases
  - Tape backup restoration tests

- Hard-disk is the slowest component of a server
  - Defragment periodically if appropriate for your OS
It’s the Network!

• **Ping**
  – The ping utility is used to test the TCP/IP connection
  – Ping times larger than 100ms are “high” latency

• **Netstat**
  – Utility used to display statistics about the current network connections and their state
  – i.e. on windows, you can run “netstat 5” where 5 is the number of seconds between polls

• **Tracert (windows)** or **traceroute (Linux and i/OS)**
  – A command that is used to show the route that a TCP/IP packet takes to reach its destination
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Size matters

• Database Size impacts performance
  – Large database with many users and high transaction rate
  – Large files require more memory
  – Reducing file size improves performance of view indexing, compact, backup and restore, and transaction logging

• Adequate free disk space is imperative on any IO intensive system
  – Affects disk service times (reads, writes, disk accesses)
  – Disruptive once critical level is reached
  – Lack of adequate free disk space to perform Notes/Domino function
  – Seek to maintain 20% free disk space
Size matters…in mail files

- CPU usage increase vs. mail file size is nearly linear
- Reducing # of docs in the Inbox reduces peak CPU usage
- The number of documents in a mail file, and especially the number of documents in the Inbox, has greater impact on performance than the file size itself
Size matters... recommendations

- Compact databases
- Set database size quotas
- Delete inactive documents by archiving tool or agents
- Use replication settings to limit the size of a replica
- Decrease the database purge interval
- Set database performance properties
  - Disable the default user activity recording in databases
  - Disable soft deletions in databases
  - Disable Stored Forms
  - Don't maintain unread marks
  - Limit entries in $UpdatedBy and $Revisions fields
Full-text indexes

• For databases searched regularly (like mail), it is generally better to create a full-text index, however…
  – Adjust Full-Text Index Options (frequency and attachments)
  – If you don't need to maintain an index on a database, then don’t!
• Disabling On-The-Fly Full-Text Indexing
  – FT_FLY_INDEX_OFF=1
• Spawning Full-Text Indexing to its own Thread
  – Good to do it you have heavy full-text indexing operations
  – Update_Fulltext_Thread=1
Log files

• **Log.nsf file**
  - Critical because of constant writes
  - Size is not usually a problem, but check it
  - Purge settings may be wrong or not applied
  - May be logging too much information

• **Domlog.nsf**
  - If present, it often grows until it’s unusable
  - Verify that it’s purged
  - Limit what you log
  - Consider logging to text files
Server odds and ends

- Server tasks = what are all those things?
- DBs on the server don’t normally need to be encrypted
- Disable unused ports
- Program documents
  - Be conservative
  - If transaction logging is on and AutoFixup is enabled on the server, then don’t run fixup
- Mail.box - use at least two unless you have a small number of users
- Define Anonymous in the ACL
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Client Hardware

• CPU and RAM Memory
  – Processor speed and memory are key to client performance
  – The more memory your system has available, the less time it will spend swapping memory to disk

• Hard Drive Disk Speed
  – Faster disk = better performance
  – Disk runs faster when the files are defragmented
  – Once a month is a good guideline

• Disk Space Available
  – Space is needed for swap files, temporary files, indexes, etc

• Disk Encryption
  – Running encryption slows performance
  – Consider encrypting just sensitive information
  – If you encrypt .nsf files, do not implement encryption in Notes

• # of applications running
  – If you don’t have lots of memory, consider closing some apps to reduce swapping
The Notes Client

- Client version
- Basic vs. Standard Mode
- Local Replicas
  - The IBM recommended best practice is to use local replicas
  - Managed local replicas
- Disable unused ports
- Network Compression
- Full-Text Index
Data on the Notes Client

- Smaller is better for performance
  - Large mail files use more memory
  - Number of Documents
  - Number of Folders & Views
    - PDA and smartphones may limit the number of folders that will sync
      - Number of file attachments
      - Use the right tool
Tuning the JVM

• In releases 8 and higher, the standard version of Lotus Notes uses Java Virtual Machine (JVM)
• The client configuration has a value that defines the maximum megabytes of RAM Lotus Notes can use for JVM
• The default value is too low for PCs with more than 1 GB RAM
• Default is = 256 MB, but should be 768 MB if you have 2GB, 1028 if you have more
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Application Design

- `@dblookup`
  - NoCache – it’s not always necessary
  - Create special views for lookups
- Declare Your Variables (and not as Variant unless really necessary)
- Evaluate Formulas Once
- Consider using a computed subform instead of a hide-when formula
- Profile Documents instead of Environment Variables
- Variables vs. Extended Syntax

```vba
Dim views as Variant
views = db.Views
Forall view In views
  ** do stuff
Next
```

*OR*

```vba
Forall view In db.Views
  ** do stuff
Next
```
Application Design - Agents

- Scheduling matters – off hours and frequency
- Read View Entries – Not Documents
- Turn off view updating while working with documents
  - set autoUpdate = False
- Turn off MIME conversion when working with mail
  - NotesSession.ConvertMime=False
- Run agents periodically
- Don't use "Print" so much
- Remote agent debugging – turn off when not using it
The biggest performance killer of all - Views

- View indexing is very disk intensive
- Performance was fine when I tested!
- What can a developer do?
  - Less Data
  - Less Sorting
  - Fewer Views
  - Eliminate TIME Values
  - Eliminate Highly Complex Formulas

- Where should I start???
  - Check Your View Index Sizes
    - "show database [dbname]" command at the server console
Resources

• Administrator Guide for Domino Server maintenance
  – http://www-01.ibm.com/support/docview.wss?rs=0&uid=swg27006573

• Domino 7 Performance Tuning Best Practices to Get the Most Out of Your Domino Infrastructure

• Tuning the JVM

• Performance Considerations for Domino Applications (SG24-5602)
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