Domino for System i Support

**Best practices and
problem recovery tips for
IBM Lotus Domino on System i**

This presentation covers best practices and procedures to help prevent problems with Lotus Domino servers on System i, or expedite recovery when problems do happen. Essentially, the information includes a collection of tips from IBM Support on administering a production Domino server for optimum utility and stability.

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Agenda

- **Best practices**
  - Notes.ini debug parameters
  - User mail files and performance
  - Spam control
  - Troubleshooting tools
  - Debug and corrective measures
- **Troubleshooting tools**
  - Hang and crash debug
- **System access for direct support**
  - Electronic Customer Support modem and Assist On-Site

This presentation will first cover best practices that help prevent common problems, and then ways to expedite problem resolution when a problem does occur. The final section covers means of accessing your system if that should prove necessary. You should implement the recommendations best suited for your environment.

Common notes.ini debug parameters

- **Run the following parameters at all times**
  - console_log_enabled=1
  - console_log_max_kbytes=10000
  - debug_threadid=1
  - debug_show_timeout=1
  - debug_capture_timeout=10
  - nsd_run_memcheck=1

    Note: Use nsd_run_memcheck only for smaller to midsize environments, if the server is restarted regularly or otherwise if directed by Support. Otherwise, longer outages may occur as NSDs may take longer to generate

- **Minimal performance impact**
- **Having debug in place prevents the need to wait for another occurrence to troubleshoot a problem**

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You should implement these parameters in your server's notes.ini file at all times. Doing so will prevent you having to wait or re-create an issue to generate debug when a problem does occur. These are not specific debug parameters for any one issue, but will generate debug useful in many situations. If more specific debug becomes necessary, these will at least get a necessary baseline of data to begin zeroing in on the problem. The parameters here will implement console logging, thread debug to provide more key data within console logs and NSD files, semaphore debugging, and will add extra information to NSD files. A note about the last parameter, nsd_run_memcheck=1. While there are many problems for which the extra NSD information is immensely useful, you may not want to implement this if you have a larger environment, or if your server will run for extended periods. The larger an environment and the longer a server runs without a shutdown, the more memory data is rolled into the NSD. In this situation the parameter can potentially cause longer outages as there is much more memory data to write to the NSD after a crash. Therefore, use this parameter only in smaller to midsize environments or in environments where you regularly shut down the server.

User mail files and performance

- **Set a maximum mail file size**
  - Large mail files (greater than one gigabyte) tend to extend maintenance windows, and tend to come with a larger Inbox
  - Inbox size has a significant impact on Router performance, as mail in Inbox must be indexed and updated constantly
  - Mail files are active, and not suited to warehousing
  - Store old messages and attachments in mail archive files
- **Set a maximum mail transfer size**
  - One of the most common causes of Router hangs is an attempt to send large attachments to an entire domain
  - Transferring by FTP is a better choice for large files

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The size of user mail files drives some of the greatest impact on drive space, maintenance windows, and Router performance. Larger mail files not only take up more space, they take longer for your maintenance routines to process. Additionally, whenever Router needs to place mail in a mail file, it must sort through the entire contents of the Inbox. If the Inbox is especially large, this can result in a significant Router performance impact. While there is no official maximum recommended mail file size, anecdotally problems begin to mount between 500 MB to 1GB. There are four recommended methods of getting control of user mail files. First, set a maximum mail file size (also referred to as "database quotas") to keep user databases from getting out of control. Second, set a maximum mail transfer size to prevent Router processor spikes caused by sending large files – especially when going to multiple recipients. This also helps keep mail file sizes down by ensuring that attachments cannot be overly large. Third, you can reduce the size of mail files by archiving inactive or old mail. Finally, you can move mail out of the Inbox folder to help alleviate Router performance degradation. The size of the Inbox folder has the biggest impact on the Router task. In Domino 8, the new Inbox Maintenance routine will help manage this.

Program temporary fix (PTF) requirements

- **Stay current on cumulative and group PTF levels**

- **Download PTFs from IBM Fix Central**
  - http://www.ibm.com/jct01004c/systems/support/i/fixes/index.html
  - Fix Central also contains links to:
    - Group PTFs – information on the latest group PTF levels by operating system release
    - Recommended Fixes - information on the latest Cumulative PTF level by operating system release

Staying current on cumulative and group program temporary fix (PTF) levels can prevent a variety of problems. You can download the latest PTFs from IBM Fix Central.

Spam control: Address Lookup

- **Set Address Lookup to "Fullname only"**
  - Advantage: Only mail that is addressed 100% correct will route; no 'fuzzy' routing
  - Disadvantage: Will block legitimate mail if addressing is not complete and correct
  - Default value is "Fullname then Local Part"

There are several native options available for spam control within the Domino server's Configuration Document. These are the available options within Domino to reduce spam, but that does not mean that you necessarily implement them all. Take care when deciding whether to adjust your Address Lookup parameter, or to implement a reverse DNS check on inbound mail, since these will come with drawbacks as mentioned here. First, setting Address Lookup to "Fullname Only" will ensure that an address sent into your domain must be 100% correct in order for it to route. By default, Domino has a powerful algorithm that allows it to interpret mail addresses and send them to the best possible choice if there is any confusion. This allows users to send mail internally using short names only, or even to have misspelled addresses route to the correct location. Unfortunately this also opens up your domain to spam that might be sent to random addresses, which Domino takes, interprets, and routes as it does any other mail. By setting Address Lookup to Fullname Only, this ensures that only complete and correct addresses get routed, shutting off randomly-addressed spam from getting through. The downside that must be taken into consideration, however, is that this makes things a little harder on mail users at the same time, as there is no 'give' to the routing algorithm. For example, users accustomed to sending internal mail addressed to shortnames, or anyone who misspells an address, will find that their mail fails to route.

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Spam control: Reverse DNS lookup

- **Enable "Verify connecting host name in DNS"**
  - Domino performs a reverse DNS check
  - If the sender's host cannot be found in DNS, Domino rejects the incoming message

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Next, the option "Verify connecting host name in DNS" can be set to perform a reverse DNS check against all inbound mail. Often, spammers will send mail from a fake host name, and a reverse DNS check will catch this by verifying that the advertised host name or IP address is valid and resolvable. This can often block a good amount of incoming spam. Keep in mind, however, that this will slightly increase the time it takes for SMTP mail to route in, as the server must perform a reverse DNS check for each message. Also, if a valid sender does not happen to be present in DNS, this setting will cause inbound mail from that sender to fail, even if the mail is legitimate.

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Spam control: Allow sanctioned relaying

- **"Allow messages from the following Internet hosts to be sent to external Internet domains" field**
  - Populate this field with the hosts you want to permit to relay using your Domino server
  - This will implicitly deny all other attempts to relay
    - This field can be found in the Server Configuration document (Router/SMTP > Restrictions and Controls > SMTP inbound controls > Inbound Relay Controls section)

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It is important to carefully control the relaying that your server allows. Your environment might require relaying to be turned on, for example, if your Domino server is a gateway for other mail servers or a third-party device that can send outbound mail. It is important that it not be left wide open, where it can be exploited as a hop for spammers. The best method to do this is to go to your Configuration Document > Router/SMTP > Restrictions and Controls > SMTP inbound controls > Inbound Relay Controls section. There, populate the field "Allow messages from the following Internet hosts to be sent to external internet domains" with the host name or IP address of the external hosts you want to allow to relay. Leave all other Relaying fields blank. This will allow the listed hosts only and implicitly deny all other attempts at relaying. If you do not require relaying at all, shut it off completely by placing an asterisk (*) in both Deny fields within the Inbound Relay Controls section.

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Spam control: Server mail rules

- **Do not use server mail rules as a method of spam control**

- **Server mail rules incur too large a performance impact for this role**

As a final note about spam control: It is not advisable to attempt to use Server Mail Rules as a blacklist or spam filter. Every piece of mail sent into your domain must be processed by your mail rules, and each mail rule populated - especially ones that search the body of the mail - will slow down Router performance. A handful of server Mail Rules are fine, of course, but attempting to list dozens or possibly hundreds of spam domains and common subject lines will have significant impacts on mail performance. Subscribe to a public blacklist or employ a dedicated spam filter if one is necessary.

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Microsoft Windows® and System i integration

- **Do not map drives from Windows to the Server data directory**
  - Corruption and code page issues can ensue
- **Use FTP in binary mode to transfer data from the Client (Windows) to the Server (System i)**
  - Dragging data (through Operations Navigator or mapped drives) will leave it in a format the destination machine cannot interpret

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Since the System i cannot host a client, computers running Windows are the most common clients used to access it. Keep the following things in mind to prevent code page or data corruption problems. First, remember that while mapping network drives to the Integrated File System (IFS) on System i is fine, one should never map drives to the Domino data directory itself, as this can cause database corruption. Also, if files must be transferred from Windows to System i or vice versa, binary FTP should be used to prevent code page problems. Since Windows is an ASCII machine, and the iSeries® is EBCDIC, a file dragged directly from one to the other will not be readable or usable on the destination machine. This includes dragging files from either a mapped drive or Operations or iSeries Navigator.

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Regular maintenance recommendations

- **Run Updall nightly**
  - Set by default in the notes.ini
- **Run Compact weekly**
  - If using transaction logging, run "Compact –b". Otherwise, run "Compact –B".
- **Run Fixup and "Updall –R" to counteract suspected corruption issues**
  - You should run these utilities after hours, or specify only the corrupt database.
    Note: Running Fixup and Updall across the entire data directory is extremely time and processor consumptive!
  - Running certain maintenance tasks on names.nsf will lock clients out of the server until it completes
  - These can be scheduled if care is taken to ensure they do not interfere with users or backups
- **Regular IPLs help the general health of your system**
  - Restarting your system regularly can combat cumulative corruption and other problems
  - Once a month to several times a year is the minimum recommended interval

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For the general health of your system, you should run Compact weekly and Updall daily. Since Fixup and Updall –R are time and processor intensive and will lock users out of the server while they run on names.nsf, you should run them only on specific databases suspected of corruption, or after hours. It is a viable option to run Fixup and Updall –R on a scheduled basis; however, you must take care to ensure they run at times that will not interfere with users or other maintenance, especially backups. Regular IPLs of the iSeries machine are an excellent way to prevent cumulative problems. Restart your iSeries machine once a month if possible, or at least several times per year.

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Debug and corrective measures

- Utilities that help diagnose and correct issues

- Data to collect in general situations

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The second half of the presentation covers ways to deal with problems when they do occur, including utilities and data necessary to diagnose and correct certain issues. It also focuses on expediting time to resolution.

Dump Domino Server Call Stacks (DMPSVRSTKS)

- **Necessary and highly recommended utility**

- **Used for hang and performance debug**

- **Issue "DMPSVRSTKS Server(ServerName)" from the operating system "green screen"**

- **To download and find instructions, go to**
  - http://www.ibm.com/servers/eserver/iseries/domino/devtools/dmp/

- **Note: Utility is built into Domino 6.5.5 and higher**
  - Just take an option 16 next to your Domino server

Dump Domino Server Call Stacks (DMPSVRSTKS) is a critical diagnostic utility that you should install. When run, this utility dumps a spool file for every active task, revealing what is happening behind the scenes at the time. Because this utility must be run while a problem persists to generate useful data, you must install it before a before a problem occurs. The provided link includes complete instructions for download and use. Starting in Domino 6.5.5, Dump Domino Server Call Stacks functionality is built-in and does not require a separate utility. Simply issue a Work with Domino Servers (WRKDOMSVR) command, and then issue an option 16 next to the Domino server to dump the call stacks.

Delete Domino Shared Memory (DLTDOMSMEM) utility

- **May be obtained only from Support**

- **Used to clean up memory without having to IPL**

- **Useful after hard or multiple crashes, and in specific situations where insufficient memory errors are seen**

- **Domino server <u>must</u> be shut down before running the commands**

- **Issue the following two commands in this order from the OS green screen**
  - DLTDOMSEM ServerName
  - DLTDOMSMEM ServerName

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Delete Domino Shared Memory (DLTDOMSMEM) is a corrective utility available only from Support. This utility performs much of the same memory cleanup that an IPL would. Support may recommend its use to combat suspected memory corruption, which may occur after multiple hard crashes or hangs. To run it, the Domino server must be down, and then both commands issued in the order shown.

Domino server hangs

- Server is hung when it is running but stops responding to client connection requests

- Hang debug absolutely relies on the recommended notes.ini parameters being set **before** an issue occurs

- You must troubleshoot the issue before restarting the server. Once it is restarted, the condition is gone, and cannot be diagnosed.

A Domino server is "hung" when it is still running but unresponsive to client connection requests for extended periods without clearing up on its own. The console may still be responsive. You should approach collecting debug data the same way for "short hangs", performance issues that clear up on their own, and "hard" lock hangs. Collect debug before restarting the server; as once it is restarted the condition causing the hang is gone and cannot be retrieved. Therefore having basic debug set before a hang is critical. If console logging and semaphore debug are not set before a hang occurs, it will be necessary to set these and await another occurrence.

Generate debug for Domino server hangs

- **First, during a hang event, issue the following command**
  - DMPSVRSTKS Server(MyServerName)
    - where MyServerName is the name of the server experiencing the issue
- **If the server is still unresponsive, issue the following commands from the Domino Console**
  - SH TASKS DEBUG
  - SH STATS
  - SH SERVER DEBUG
  - SH DIRECTORY
  - SH TRANSACTIONS
  - SH SCHED
  - SH MEMORY DUMP
  - TELL ROUTER SHOW QUEUE
  - TELL AMGR STATUS
- **At this point, you can safely restart your server to clear the hang.**

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In the event of a hang, you must first issue the DMPSVRSTKS command. This is the single most important piece of diagnostic information for a hang or performance issue. Then, assuming that you have already enabled console logging, run the listed console commands in the order shown to populate your server's console log with this useful information. Once done, restart the server.

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Collect the debug files

- **Locate the following files, which you should find in the Domino server's "data/IBM_TECHNICAL_SUPPORT" directory**
  - nsd_mmddyy@timeofday.nsd
  - console_systemname_yyyy_mm_dd@time.log
  - semdebug_systemname_yyyy_mm_dd@time.txt
  - memory_systemname_yyyy_mm_dd@time.dmp
  - Note: For each run of DMPSVRSTKS, multiple QSYSPRINT spool files and one QPDSPSBS list file are generated in the OS Printer Output
- **Use Operations Navigator (v5r1 or v5r2) or iSeries Access (v5r3) to pull the above files down to your PC desktop**
  - Spool files can be found under Basic Operations > Printer Output. Use the file's date and timestamp to match the list file with all task files
  - Console, semdebug, nsd and memory dump files can be foundin the IFS under the Domino server's directory. Use F11 on the WRKDOMSVR screen to find the path name.
- **Alternatively, you can transfer the files by FTP as binary from the iSeries**

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If the prescribed debug was already set and the suggested actions taken, the next step is to gather the diagnostic data and send it to Support for analysis. Include the console log and semaphore debug files that cover the period of the hang. Remember that the date given on console logs indicates the time it began recording. You can FTP the logs down to your PC, or drag them from iSeries or Operations Navigator. Spool files from the DMPSVRSTKS are available under Basic Operations > Printer Output within iSeries or Operations Navigator; you can drag these files to your PC as well.

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Domino server crash debug

Locate all NSD files under the Domino Servers directory within sub-directory IBM_TECHNICAL_SUPPORT:

- **nsd_mmddyy@timeofday.nsd**
  - Any recent NSDs are useful, but particularly the NSD generated at the time of the crash.
- **Use Operations Navigator (v5r1 or v5r2) or iSeries Access (v5r3) to pull the data down to PC**
- **NSD files will be in the IFS under the Domino server's directory**
  - Use F11 on the WRKDOMSVR screen to find the path name
  - Alternatively, you can FTP down the data as binary from the iSeries

A Domino server crash is any abnormal end of the Domino server. Unless the server was ended abnormally or *IMMED by a user, you may see Panic or Fault messages on the console, followed by a crash stack and an attempted auto-restart of the server. In all such cases, the single most important piece of data required is the NSD. Your server generates an NSD every time it ends abnormally, and places it in the IBM_TECHNICAL_SUPPORT directory. Support requires the NSD with the date/time stamp in the file name that corresponds with the time of the crash. Any other NSD logs from the previous week will also be useful, as they may indicate existing or long-running problems.

Send data to Support

- **Compress all data into one file**
  - Naming convention should be your PMR number followed by any relevant text (for example, 99999,999,000,NSD.zip)
- **To send the file through e-mail**
  - Address the message to **lotus_support@mainz.ibm.com**
  - Subject line should be: PMR XXXXX YYY ZZZ Data
    - where XXXXX YYY ZZZ is your PMR number
- **To transfer the file through FTP**
  - Connect to FTP site **ftp.emea.ibm.com** (IP address is 192.109.81.7)
  - Log in as Anonymous and enter your Internet address as the password
  - Navigate to the toibm/lotus directory and upload the file
  - The naming convention of the file must be correct

Once you collect all the data, compress the files together with the given naming convention – the full PMR number, then a comma, then any pertinent comments (for example, 99999,999,000,NSD.zip). You can send the file to your Support representative through e-mail if the compressed file is 10 MB or less. Send a copy to lotus_support@mainz.ibm.com as well, so that the data will attach itself to your PMR, allowing access to any Support representative who assists with your issue. Alternately, you can FTP the file to the ECuRep FTP site, and it will attach to your PMR so long as the file has the correct naming convention.

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Allow remote access to your system

- **Useful for direct support**
- **Often reveals information that is not easily gleaned from debug data**
- **Greatly expedites problem resolution and root cause analysis**
- **Note: For C2-level government access, connections are certified only through Electronic Customer Support (ECS) modems**
    - Other means of connection, such as Assist On-Site, are not ITAR certified and cannot be used

Allowing remote access to your system is a direct and timesaving means of diagnosing a problem. It allows Support to see and work with the system and its pertinent data firsthand, without relying on screen captures or verbal descriptions. This greatly expedites problem resolution and root-cause analysis. The two methods available to access your system are through Assist On-Site or an ECS modem. Support cannot use VPN connections.

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Electronic Customer Support (ECS) modem: Remote dial-in requirements

- **Must provide telephone number of iSeries modem**
- **Session handshaking parameters**
  - Actions must be performed on both sides
    - Remote support must be configured and enabled as described in the following slides
    - Both sides must match
  - Two types of connections - *PPP (internal modem) and *NONSNADS (external modem)
- **Once connection is established, Support will log onto your iSeries using your supplied user ID and password**
  - Typically QSECOFR or equivalent

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For direct connections to your iSeries, an Electronic Customer Support (ECS) modem dial-in is the best option available. You must know whether your ECS modem is internal or external, the resource name of the ECS modem, and the modem's telephone number. You and your Support representative will establish handshake parameters on either side before establishing the connection. Support will require a username and password to log onto your iSeries. QSECOFR is preferred, but a username with SECOFR access will also work. This level of access is required to avoid authority issues as Support troubleshoots your system.

Internal modems are referred to as *PPP. After Support requests that you issue STRRMTSPT *PPP and press F4, you must input the Station Address that your Support representative will provide, and then hit enter. Support will also need the modem's telephone number.

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Start Remote Support [*NONSNADS]

- **Enter "STRRMTSPT *VRT" then press F4**
  - Device class . . . . *VRT
  - Display type 5251
  - Display model 11
  - Station address . . __ (two-digit number provided by Support)
  - User profile . . . . . QPGMR (change to match user sign-on name)
  - Resource name . . *DFT
    - Must be actual ECSMODEM resource name
    - Can be found by issuing DSPLIND QESLINE, check Resource Name field
  - Remote location name . . QREMOTE
  - Local location name . . __ (two-digit number provided by Support)

External modems attached to your iSeries are referred to as *NONSNADS. After Support requests that you issue STRRMTSPT *VRT and hit F4, you will need several pieces of information. The Support representative will provide a Station Address that you must enter in both the Station Address and Local Location Name fields. You must know the ECS modem's Resource name, which you can look up with the command DSPLIND QESLINE. This information should be in the Resource Name field. Leave everything else set to the default values. Support will then require the modem's telephone number.

IBM Assist On-Site

- **Allows secure Support access to your desktop**

- **You decide the level of control the Support representative can obtain**

- **You can regain control at any time**

- **Often greatly expedites problem determination, especially for configuration issues**

Assist On-Site is a tool that will allow Support to view and, with your permission, control your desktop. This is useful for debugging configuration problems in the Domino Administrator, or other PC-side areas that an ECS modem dial-in cannot reach. It is completely secure, as your permission is required for each level of access (view and control), and for other Support representatives to join. Not only can you take back control at any time by using the mouse, keyboard or other input device, you can end the session. You never lose control of your system. If you have a 5250 emulation session running on your desktop, you can use this method to allow Support to view your iSeries in place of an ECS dial-in. However, an ECS dial-in is still preferred for viewing the "green screen", as this indirect Assist On-Site method is a little slower.

IBM Assist On-Site (continued)

- **Go to this link and fill out the information requested**
  - http://www.ibm.com/support/assistonsite/
  - Support will provide you with a connection code
- **A small plug-in will install and then delete itself once the session completes**
- **After the session launches, you will receive a prompt to choose which level of access to grant**

To use Assist On-Site, go to the link indicated. Fill out the document, including the connection code that Support will provide. A small plug-in will install, which will delete itself after the Assist On-Site session has completed. The session will start once you respond to a prompt for the level of access to allow.

Links and references

- **Domino 6 for iSeries Best Practices Guide**
  - http://www.redbooks.ibm.com/redbooks/pdfs/sg246937.pdf

- **Domino for AS/400® Problem Determination Guide**
  - http://www.redbooks.ibm.com/redbooks/pdfs/sg246051.pdf

- **Domino 6 Multi-Versioning Support for iSeries**
  - http://www.redbooks.ibm.com/redpieces/pdfs/sg246940.pdf

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Here are good links to have on hand that nicely compliment this presentation. Although some of the material refers specifically to Domino 6, the basic information is still pertinent for later releases. Multi-versioning in particular has not changed since Domino 6, as later Domino releases multi-version nicely with any other multi-version compatible Domino installation.

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