



Troubleshooting server crashes and hangs for a Lotus Domino implementation on IBM i or i5/OS

Module 1 of 2

 software



@business on demand software

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This education series consists of two modules that will introduce you to troubleshooting Domino server crashes and hangs on the IBM i or i5/OS operating system. In this module you will learn how to distinguish between a server crash and hang, how to gather the data needed to diagnose a server crash and steps to take if your server has crashed and will not restart.

Server crashes and hangs



■ Domino server crash

- ▶ The moment when one of the Domino tasks ends in error, and as a result all other Domino tasks end as well. The server no longer responds to any user requests.
- ▶ In most cases, this ending of the tasks happens in a more or less controlled way, and the Notes System Diagnostics tool (NSD) is started to dump all available data of this failing task to the NSD file.
- ▶ Ending your Domino server immediately (*IMMED) is considered a crash.

The difference between a Domino server crash and hang is often confused. On this slide and the next you will see the definition for both a crash and a hang. The important thing to remember here is that a crash occurs when the Domino server ends abnormally or unexpectedly.

Server crashes and hangs



- Domino server hang
 - ▶ A server that becomes unresponsive to client requests and may or may not respond to console commands
 - ▶ Domino jobs are still active
 - ▶ Typically the server cannot be ended controlled when this occurs
 - ▶ Caused by resource contention

A hang is occurring if the Domino server is running, but one or more of the server tasks is not responding to user requests. In most cases the server must be ended with the *IMMED option. While ending the server with the *IMMED forces your server to crash, in this case you should debug your problem as a hang, not a crash.

Server crash – what really happens

- All Domino tasks attempt to end
- NSD task runs to create diagnostic information to assist in troubleshooting the crash
- A message is sent to the QSYSOPR message queue (LNT099C)
- Based on your configuration, you may need to answer a message in order for the server to restart
- When the server restarts, diagnostic data may be sent to a Fault Recovery database

A crash is typically caused by an unhandled exception in one of the Domino server tasks. When this occurs, all of the Domino server tasks attempt to end. NSD begins to run and collect diagnostic information. A LNT099C message is sent to the IBM i or i5/OS QSYSOPR message queue to notify you of the crash. At this point the server will attempt to restart; however, if you have chosen not to restart the server automatically another message is sent to the QSYSOPR message queue stating “Enter a character to allow Domino job to continue”. Once the server restarts the diagnostic data may be automatically sent to a Fault Recovery database. Later in this presentation you will see how to enable automatic diagnostic collection.

Notes System Diagnostic tool

- Notes System Diagnostic (NSD) tool is a Lotus tool designed to gather information about a failing Domino server.
 - ▶ Generates files, for example:
nsd_ServerName_Date_Time.nsd
 - ▶ Files are located in the IBM_TECHNICAL_SUPPORT subdirectory

The Notes System Diagnostic tool is typically just referred to as NSD. It is the critical piece of data needed to diagnose a server crash.

Notes System Diagnostic tool

- **NSD will collect the following data:**

- Domino, operating system and hotfix level *New in Domino version 8*
- Invocation stack trace or Notes Process Info
- Dump of thread call stacks
- Environment variables
- Job log of current job
- List of all active jobs
- Dump of notes.ini file
- Dump of console entries
- Dump of group PTFs (program temporary fixes) *New in Domino version 8*
- Dump of pid.nbf file

Here you can see a list of the data pieces collected in the NSD on IBM i.

Sample configuration – Server document

Basics
tab

Automatic Server Recovery	
Run This Script After Server Fault/Crash: (This script must not run NSD)	
Run NSD To Collect Diagnostic Information:	<input checked="" type="checkbox"/> Enabled
Automatically Restart Server After Fault/Crash:	<input checked="" type="checkbox"/> Enabled
Cleanup Script / NSD Maximum Execution Time:	600 seconds
Server Shutdown Timeout:	300 seconds
Maximum Fault Limits:	3 faults within 5 minutes
Mail Fault Notification to:	Mail UserXX

NSD is enabled by default; however, you can verify this by reviewing the Server document, Basics tab. In the Automatic Server Recovery section you can enable or disable NSD. You can also decide whether you want to automatically restart the server after a crash. You can set a maximum fault limit. By default this is three faults within five minutes. This means that if the server crashes three times within a five minute time period, the server will not automatically restart. The last setting in this section allows you to specify a user to receive an e-mail notification when a crash occurs.

Server crash recovery checklist

- If the server restarts normally
 - ▶ Review NSD file
 - ▶ Verify if crash matches any known issues
 - ▶ Send data to IBM Support for analysis

If you ever experience a server crash you may wonder what your next steps should be. This slide gives you an overview of actions you should take. You will see these steps in detail as this presentation continues.

Server crash recovery checklist

- If the server continues to crash...
 - ▶ Review NSD to determine responsible task
 - ▶ If each NSD shows the same task or call stack
 - Start the server without the offending task
 - Create a new mailbox file if it is the Router job
 - Run database utilities against corrupt database
 - Set debug on the task to determine what function is causing the crash
 - Delete the existing the transaction logs and allow them to re-create
 - ▶ If NSDs vary
 - Clean up shared memory
 - ▶ Send data to IBM Support for analysis

If your server does not automatically restart there are other actions you may need to take for your server to recover. You will see these steps in detail as this presentation continues.

How do you review the NSD?

- What task took the exception?
- From the call stack of the fatal thread, can you determine what function was being attempted?
- Are there messages on the console that will tell you what may have caused the crash?
- Are there any messages in the joblog that tell you what may have caused the crash?
- Will you need debug to determine the cause of the crash?

Here you can see the types of questions you should ask yourself when looking at an NSD file.

IBM Software Group

Reading a NSD file

```

/lotus/domino/data/IBM_TECHNICAL_SUPPORT/nsd_12_28_05@14_26_59.nsd

Server: MailSvr
Date: Wed Dec 28 14:26:59 2005

System: System1
OS: OS400
Release: V5R3M0
Notes Version: Release 7.0/August 18, 2005

<@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@>
Section: Notes Process Info
<@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@>

JOB: 008700/QNOTES/HTTP  THREAD: 0x1d
LE_Create_Thread2_FP12crth_parm_t      20  QLECRTH QLESPI
ThreadWrapper                          18  THREAD LIBNOTES
HTThreadBeginProc                       9  HTTHREAD LIBHTPSTA
ThreadMain_14HTWorkerThreadFv          9  HTWRKTHR
CheckForWork_14HTWorkerThreadFv        75
StartRequest_9HTSessionFv              150 HTSESSION
ProcessRequest_9HTRequestFv            215 HTREQUEST
Authenticate_21HTRequestExtContainerFv  14  HTEXTCON
Authenticate_15HTInotesRequestFv       11  HTINOTES
InotesHTTPAuthenticate                  133 INOTESIF LIBINOTES
SpecialUnauthorizedHandling_4HTTPFP10ReqContext 42  HTTP
ProduceSessionLogin_4HTTPFP10ReqContextiPcT3P3C 78
ProduceCustomSessionLogin_14CustomResponseFR8HT 102 RESPONSE
GenerateHTML_5NFormFP3CmdR8NDocNoteR10HTMLfilter 161 NFORM
GenerateBodyHTML_5NFormFR8NDocNoteR10HTMLfilter 9
__ct_22FormCDtoHTMLtranslatorFR9NDatabaseR5NFor 2  FORMCDTO
__ct_18CDtoHTMLtranslatorFR9NDatabaseR8NCDfield 74 CDOHTML
GetReplicald_9NDatabaseFv              12  NDB
NSFDbReplicaInfoGet                     1  NSFSEM2 LIBNOTES
InitDbContext                            1  DBLOCK
InitDbContextExt                         20
HANDLEDreferenceToNSFBLOCK               1  DBHANDLE
HANDLEDreference                          8
Halt                                      2  OSPANIC
Panic                                     29

```

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Here you can see the beginning portion of the NSD file. It starts very simple by providing the file name, the Domino server involved, the name of the physical system and the Domino and operating system release. You can then see the beginning of the Notes Process Info section. Can you see what task took the exception? In this case it is the HTTP task. Next you should review the call stack. By reading the procedure names do you have any idea what might have been occurring? In this case you can see that a user had authenticated with the server through HTTP and was trying to open a database. You get the idea that the server was generating HTML, but it is not very specific. In a case like this, you will want to search the Lotus Knowledge Base for any matching issues or for information about debugging HTTP, like HTTP thread logging. You will see more of the NSD file in a moment. While you are here, do you have any idea what you will use as a search string? You should start from the bottom of the call stack and move up when selecting a search string. In this case a good starting search is “panic” and “HANDLEDreferenceToNSFBLOCK and HTTP”.

Reading a NSD file (continued)

```
<@@ Environment -> Job log of current job @@>

SQL7908 Completion      00 12/16/05 11:20:10.445496 QSQROUTS  QSYS  *STMT  QSQCLI  QSYS  *STMT
From module .....: QSQRVRC
From procedure .....: QSQSERVER
Statement .....: 4466
To module .....: SQLCON
To procedure .....: SQLConnect
Statement .....: 5080
Thread .....: 0000001F
Message .....: Job 008881/QUSER/QSQSRVR used for SQL server mode
processing.
Cause .....: A Structured Query Language (SQL) statement was executed
while running in SQL server mode. SQL statements for this connection or
thread will be processed in job 008881/QUSER/QSQSRVR. Technical description
.....: SQL server mode was requested by either setting the SQL
server mode job attribute, or by setting the server mode environment
attribute via the SQL Call Level Interface. When running in this mode, SQL
statements are processed by a separate job, which runs under the user
profile specified for the connection. The thread identifier is 38 and the

<@@ Environment -> notes.ini @@>

[Notes]
Directory=/lotus/domino/acme1
KitType=2
UNICODE_DISPLAY=1
Passthru_LogLevel=0
Console_LogLevel=2
VIEWIMP1=Lotus 1-2-3 Worksheet,0_IWKSV,,WKS,WK1,,WR1,,WRK,,WK3,,WK4,,4,
VIEWIMP2=Structured Text,0_ISTR,,LTR,,CGN,,STR,,1,
VIEWIMP3=Tabular Text,0_ITAB,,PRN,,RPT,,TXT,,TAB,,1,
```

In this slide you can see more of the NSD file. It is always a good idea to review the Job log. In this example you can see the end of the Job log. In this case the last message posted is SQL7908. That is a normal message which you can ignore. You can also see the beginning of the notes.ini file.

Searching for known issues

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

The screenshot shows the IBM Support Knowledgebase search results page. The search criteria are 'HANDLEdereferenceToNSFBLOCK and panic and http'. The search results are limited to 'All document type' and sorted by 'Relevancy'. The results list two entries:

1. HTTP crash on 'HANDLEdereference' on Domino 7. You upgrade a Lotus Domino server from release 6.x to 7.x, and the server starts crashing. The HTTP task on the crashes with the message "PANIC: Object handle is invalid" during DbCache clean up. Release date 04 Jul 2006
2. Domino 6.x server crashes with 'PANIC: Object Handle out of Range'. The Domino 6.x server panics with "PANIC: Object handle out of range", and displays one of the fatal stacks below. Module "TransferThread"

The page also includes a navigation menu on the left with options like Services, Downloads, Library, Case studies, News, Training and certification, Events, and Support. There are also related links, system availability information, and support feedback options.

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Once you have reviewed the NSD file you will want to search for known issue. Based in the call stack you reviewed earlier you decided to search on HANDLEdereferenceToNSFBLOCK and panic and HTTP. You can see that the search string yielded 16 results.

IBM Software Group IBM

A match...

Software > Lotus >

Lotus

Products A to Z

Products by category

Services

Trials and demos

Library

Case studies

News

Training and certification

Events

Support

Communities

- IBM Business Partners
- ISVs
- DeveloperWorks

HTTP crash on 'HANDLEDreference' on Domino 7

Technote (FAQ)

Problem

The HTTP task on a Lotus® Domino® server crashes with the message "PANIC: Object handle is invalid" during DbCache clean up. You might notice this crash after upgrading from Domino 6 to Domino 7. The NSD file generated during the crash shows one of the following call stacks:

```
JOB: 704762/QNOTES/HTTP THREAD: 0x66
LE_Create_Thread2_FP12crth_parm_t 20 QLECRTH QLESPI
ThreadWrapper 18 THREAD LIBNOTES
HThreadBeginProc 9 HTHREAD LIBHTTPSTA
ThreadMain_14HTWorkerThreadFv 9 HTWRKTHR
CheckForWork_14HTWorkerThreadFv 75
StartRequest_9HTSessionFv 150 HTSESSON
ProcessRequest_9HTRequestFv 330 HTREQUEST
ProcessRequest_21HTRequestExtContainerF19HTAppl 126 HTEXTCON
ProcessRequest_15HTInotesRequestFv 3 HTINOTES
InotesHTTPProcessRequest 3 INOTESIF LIBINOTES
InotesHTTPProcessRequestImpl_FP18_InotesHTTReq 256
Execute_3CmdFv 5 CMD
Handler_10CmdHandlerFP3CmdPv 31 CMDHAND
PrivHandle_10CmdHandlerFP3Cmd 13
PrivHandle_14CmdHandlerBaseFP3CmdT1 12 CMDHANDB
HandleCmd_5HaikuFP3CmdR14CmdHandlerBase 165 HAIKU
HandleOpenFileResourceCmd_10CmdHandlerFP19OpenF 3 OPFLRHD
dispatch_19OpenFileResourceCmdFP10CmdHandler 222
NSFDbAccessGet 1 DBACCESS LIBNOTES
InitDbContext 1 DBLOCK
InitDbContextExt 20
HANDLEDreferenceToNSFBLOCK 1 DBHANDLE
HANDLEDreference 8
Halt 2 OSPANIC
Panic 29
fatal_error 33 BREAK
OSFaultCleanup 1 CLEANUP
```

Document information

Product categories:

Software

Messaging Applications

Advanced Messaging

[Lotus Domino Server](#)

Operating system(s):

AIX, Linux, OS/390, OS/400, Solaris, Windows, i5/OS, z/OS

Software version:

7.0

Reference #:

1223282

IBM Group:

Software Group

Modified date:

2006-07-04

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In this case you can open the first document and see that it is a match for the issue. Only a small portion of the document is shown here. If you were to look at the complete document you will see that this issue has been resolved in Domino version 7.0.1.

Call stack from another NSD

```

JOB: 026495/QNOTES/SERVER  THREAD: 0x2da
LE_Create_Thread2__FP12crtth_parm_t      20  QLECRTTH QLESPI
ThreadWrapper                             18  THREAD LIBNOTES
Scheduler                                 64  SCHED SERVER
ShutdownMonitorTask                       26  POLL
OSFaultCleanup                            1  CLEANUP LIBNOTES
OSFaultCleanupExt                         86
OSRunExternalScript                       39
__system_a                                2  STDLIB_A
system                                     6  QC2SYS QC2SYS
                                           297  QCMDEXC
_C_peg                                     0  NSD NSD
main                                       89

```

- See technote 1236058 for details regarding the Shutdown Monitor at <http://www-1.ibm.com/support/docview.wss?rs=1041&uid=swg21236058>

Here is another example call stack from a NSD file. In this case you can see that the Server task was responsible for the crash. Reviewing the call stack you can see that the Shutdown Monitor Task was involved. This is actually a normal stack and will occur anytime the server does not shut down before the allotted time. You will find the server shut down timeout defined on the Basics tab of the Server document. By default it is set to 300 seconds or 5 minutes.

One more example...

Notes Version: Release 8.0.1|February 07, 2008
Hotfixes for product 5733LD8, V8ROM1 and Product Option 11: none.

```
JOB: 002045/QNOTES/SERVER  THREAD: 0x106
LE_Create_Thread2__FP12crtth_parm_t      17  QLECRTTH QLESPI
pthread_create_part2                      19  QP0WSPTHR QP0WPINT
ThreadWrapper                             20  THREAD LIBNOTES
Scheduler                                 65  SCHED SERVER
PollTask                                  126  POLL
SECImportRecoveryInfo                    13  RECOVERY LIBNOTES
BSAFECreatRecoveryInfo                   87
CreateCookies                             58
SECMemFreeLocked                         6  BSAFEMEM
OSLockObject                             1  MEMLOCK
LockHandle                                19
Panic                                     35  OSPANIC
fatal_error                               34  BREAK
OSFaultCleanup                            1  CLEANUP
OSFaultCleanupExt                         86
OSRunExternalScript                       40
__system_a                                2  STDLIB_A LIBCAW
system                                     6  QC2SYS QC2SYS
```

Here is another NSD file. Can you tell what task caused the crash? It is the Server job. Any idea what you might use for a search string? Try SECMemFreeLocked, CreateCookies or BSAFECreatRecoveryInfo.

More from the previous NSD file

Section: Domino Console Entries (Time 17:32:01)

Lotus Domino (r) Server, Release 8.0.1, February 07, 2008
Copyright (c) IBM Corporation 1987, 2008. All Rights Reserved.

03/03/2008 17:31:46 Event Monitor started
03/03/2008 17:31:46 Warning: All Domino Domain Monitoring probes are disabled resulting in the loss of valuable diagnostic information. Please configure DDM probes in events4.nsf. Assess DDM reports in ddm.nsf.
03/03/2008 17:31:47 License tracker: Initialization complete
03/03/2008 17:31:48 Server started on physical node System1
03/03/2008 17:31:49 The Console file is /Domino/Data/IBM_TECHNICAL_SUPPORT/console.log
03/03/2008 17:31:49 Console Logging is ENABLED
03/03/2008 17:31:54 Database Server started
03/03/2008 17:31:54 Index update process started
03/03/2008 17:31:54 Schedule Manager started
03/03/2008 17:31:55 Database Replicator started
03/03/2008 17:31:55 Replicator is set to Ignore Database Quotas

Thread=[002045:00174:00067-00000106]

PANIC: LookupHandle: handle out of range

Fatal Error signal=0x00000005 JOB=SERVER/QNOTES/002045 PID/TID=174/0x000001

Reviewing the Console entries from this NSD file gives you the idea that the server did not run long before the crash. In cases like this it is a good idea to check to see if additional NSD files are present as this may be a secondary problem caused by a previous crash. Cleaning up shared memory is also a good idea. You will see how to clean up shared memory later in this presentation.

Is Diagnostic Collection set up on your server?

Server Configuration document > Diagnostics tab

Diagnostic Collection Options	
Mail-in Database for diagnostic reports:	<input checked="" type="checkbox"/> Lotus Notes/Domino Fault Reports ▾
Maximum size of diagnostic message including attachments (in MB):	<input checked="" type="checkbox"/> 5 ▾
Maximum size of NSD output to attach (in MB):	<input checked="" type="checkbox"/> 2 ▾
Maximum amount of console output file to attach (in KB):	<input checked="" type="checkbox"/> 10240 ▾
Diagnostic file patterns:	<input checked="" type="checkbox"/> ▾
Remove diagnostic files after a specified number of days:	<input checked="" type="checkbox"/> Yes ▾
Number of days to keep diagnostic files:	<input checked="" type="checkbox"/> 5 ▾
Fault Analyzer	
Run FaultAnalyzer on Fault DBs on this server:	<input checked="" type="checkbox"/> Yes ▾
Run Fault Analyzer on:	<input checked="" type="checkbox"/> Specific mail-in databases ▾
Databases to run fault analyzer against:	<input checked="" type="checkbox"/> Indfr.nsf ▾
Remove attachments from duplicate faults:	<input checked="" type="checkbox"/> No ▾

In the previous examples of NSD files, you saw snapshots of the native NSD from the server's IBM_TECHNICAL_SUPPORT subdirectory. There is another way to collect and view NSD files. This is done using Diagnostic Collection and the Fault Recovery database.

Diagnostic collection is configured in the Server's Configuration document. You should enable Diagnostic Collection to gather NSDs and other relevant information when the Domino sever crashes. You enable Diagnostic Collection by choosing a mail-in database for diagnostic reports. You can create this database or you can let the server create the default database named "Lotus Notes/Domino Fault Reports" as shown here. You can run allow Fault Analyzer to run to see detailed information regarding the crash. Fault Analyzer groups similar crashes together. At a minimum, enable the option to "Remove diagnostic files after a specified number of days" so the IBM_TECHNICAL_SUPPORT directory is cleaned up for you.

Automatic Diagnostic Collection tasks

- **FILERET**
 - ▶ Automatically removes files from the system
 - ▶ Runs every time the Domino server starts
- **SENDDIAG**
 - ▶ Collects diagnostic files from IBM_TECHNICAL_SUPPORT and sends the data to the Fault Reports database
 - ▶ Runs during a server restart after a fault
- **FAULTANALY**
 - ▶ Annotates and analyzes the call stack from a NSD file after it has been put in the Fault Reports database by the SENDDIAG task

Once you enable Diagnostic Collection you may see the following tasks running on your Domino server: FILERET, SENDDIAG and FAULTANALY. FILERET automatically removes files from the system while SENDDIAG sends diagnostic files to the Faults Reports database if you have it configured. Optionally the FAULTANALY task will analyze the call stack for you and group similar crashes together.

Fault Reports database

- Use to easily see when the Domino server has crashed and the status of the crash.
- Use to easily forward data to IBM Support

User Name	Notes/Domino Version	Occurrences	Unique IDs	Process Name
02/22/2006		1		
mailbox/common	Release 7.0 August 18, 2005	1	1	SERVER
03/10/2006		5		
mailbox/common	Release 7.0 August 18, 2005	5	1	SERVER
Additional Occurrence (Exact fault for mailbox/common on Release 7.0.1 January 17, 2006 at 05/1/06)				
Additional Occurrence (Exact fault for mailbox/common on Release 7.0 August 18, 2005 at 05/03/06)				
Additional Occurrence (Exact fault for mailbox/common on Release 7.0 August 18, 2005 at 04/15/06)				
Additional Occurrence (Exact fault for mailbox/common on Release 7.0 August 18, 2005 at 03/18/06)				
05/12/2006		2		
mailbox/common	Release 7.0 August 18, 2005	2	1	SMTP
Additional Occurrence (Exact fault for mailbox/common on Release 7.0.1 January 17, 2006 at 05/1/06)				
		8		

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Here is an example of the Fault Reports database after the Fault Analyzer task, faultanaly, has run. You can see that each crash event is reported in the database and all similar crashes have been grouped together.

Example Fault Report

Fault Report

Notes/Domino Version	Occurrences	Process Name	OS Version	Size	Error Message
mailbox/common					
Release 7.0 August 18, 2005	2	SMTP	OS400	575026	<Not available>
Additional Occurrence (Exact fault on mailbox/common at 05/12/2006 15:42:09)					





Diagnostic Data

Name: mailbox/common
Notes/Domino Version: Release 7.0 August 18, 2005
Machine Name: RCHASSQ1
OS Version: OS400
Start Time: 05/12/2006 11:50:23 AM
Crash Time: 05/12/2006 12:19:58 PM

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You can open the fault report to see additional information. Here you can see the initial screen in the Fault Reports database. Additional details are provided regarding the Domino and operating system release and the time of the crash.

Example Fault Report (continued)

 Edit Report	 New Response	 Forward	 Close
Uptime:	0 day(s) 00:29:35		
Error message:	<Not available>		
Process:	SMTP		
Callstack:	system _system_a OSRunExternalScript OSFaultCleanupExt OSFaultCleanup fatal_error Panic LockHandle OSMemRealloc OSExtendPool AllocBlock OSAllocBlockExtended AllocVBlock OSAllocVBlockExtended HTMLParser::AddClassOrID HTMLParser::ParseStyle HTMLParser::EmitPopMarker SGMLParser::ParseFSM SGMLParser::ParseNext HTMLParserParseNext GetFilteredHTMLText GetMimeText MIMEGetText HNoteContext::GetField Compute::GetVariable		

The fault report also contains the call stack of the fatal thread (the thread that caused the crash). One thing you may notice here is that the call stack is reversed compared to the raw NSD. This means that the first procedure called is the last procedure listed in the call stack.

Example Fault Report (continued)

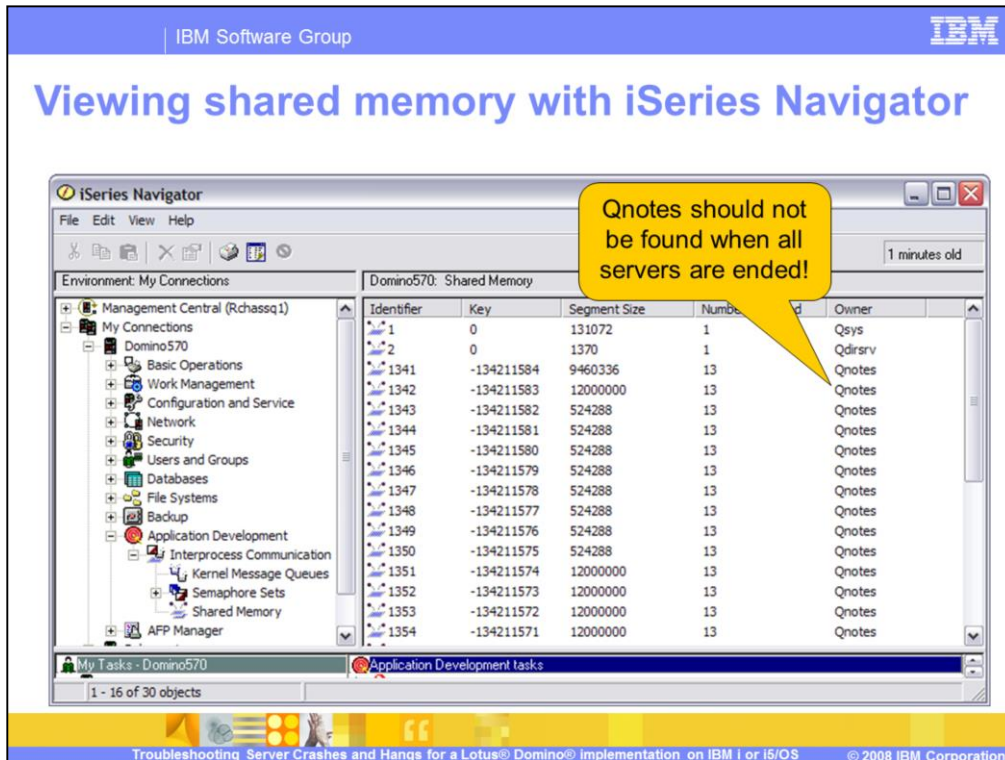
Administrative Section	
SPR #:	
PMR ID:	
Occurrences:	2
Resolved:	No
Status:	
Comments:	
Clients/Servers Affected: 1	
	
nsd_05_12_06@12_19_58.nsd console_mailbox_2006_05_12@11_50_23.log diagindex_mailbox_2006_05_12@11_50_23.nbf	

Use the Administrative section of the fault report to track the SPR number, PMR number and release that resolves the problem. The last part of the fault report is the attachments. Notice the NSD file and Console logs are automatically attached. If you have an EBCDIC viewer on your system, you can double click to open and view the raw files. Alternately, you can forward the document to lotus_support@ecurep.ibm.com and the PMR number as your subject to have them reviewed by IBM Support.

Domino server will not start (shared memory)

- QNNINSTS and SERVER jobs start but end immediately - no nsd file created.
 - ▶ Examine spool file for job QNNINSTS
 - ▶ Message LNT0928 will contain error codes returned by server.
 - ▶ An error code between 0x100 and 0x200 means there is chance that there is shared memory not cleaned up from previous invocations of Domino or an ENDJOBABN was run against a Domino job.
 - ▶ Shared memory and semaphores must be cleaned up.

Under normal conditions when the server crashes it will immediately restart. However, there are cases where the server may not restart. In this case you will typically see the QNNINSTS and the SERVER jobs start, but end immediately. In this case you should examine the Job log for the QNNINSTS job to see what error is occurring. Many times you will find that shared memory or semaphores were orphaned because of the crash. You can end all Domino servers and use iSeries® Navigator to clean up shared memory and semaphores.



You can easily view shared memory and semaphores from iSeries Navigator. Note that you must have the Application Development component installed. If you do not see this option, you can choose to install Additional Components or perform a selective setup. When all Domino servers are ended, you should not be able to find any entries owned by QNOTES in “Semaphore Sets” or “Shared Memory”. In this example, you can select all entries owned by Qnotes and press the Delete key to remove them. Again, you must end all Domino servers before deleting these entries.

Delete Domino Shared Memory (DLTDOMSMEM)

- Tool to clean up shared memory and semaphores
- Can be run on a system with multiple Domino servers (dparms)
- Other Domino servers can be running
- Available only from IBM Support
 - ▶ If you have additional Domino partitions running that you cannot shut down to clean up shared memory, contact IBM Support for assistance and access to this tool.

If you have multiple Domino servers running on one System i or one logical partition (lpar) ending all servers to clean up shared memory may not be an option for you. In this case, the Delete Domino Shared Memory (dltdomsmem) tool may be useful for you. This tool will clean up shared memory for one specific Domino server and not affect any other Domino servers. Note that this tool will clean up only Domino shared memory. Any memory allocated by a third-party product, Sametime® or Lotus Enterprise Integrator (LEI) is not cleaned up by this tool.

Domino server will not start (Domino files)

- Object ownership and authority
 - ▶ All data files should be owned by user profile QNOTES.
 - ▶ QNOTES must have read and write access to these data files.
 - ▶ Domino writes temporary files to /tmp. User profile QNOTES must have write access to this directory.
- A problem with notes.ini or names.nsf will prevent the server from starting!
- External modifications
 - ▶ No external changes should be made to database files while the server is running.
 - ▶ Performing backups while the server is up has caused many problems. Use a supported online backup utility such as Backup Recovery and Media Services (BRMS) or Tivoli® Data Protection for Domino.

When a server does not start properly, it is important to review the Domino files. All files in the Data directory must be owned by the QNOTES user profile. It is always a good idea to check the integrity of the notes.ini file after a crash. In some cases the notes.ini or names.nsf file becomes corrupted by a crash and must be manually fixed or replaced. A process outside of Domino can also prevent the server from starting. No external changes should be made to a Domino database while the server is running. You should also ensure that if you are running a backup with the server active that your backup method is an approved online backup such as BRMS or Tivoli Data Protection for Domino.

Checking owner and coded character set (CCSID)

```

Directory: /compress/notes/data
Position to : _____ Record : 97 of
New File : _____
2=Edit 4=Delete File 5=Display 6=Path Size 9=Recursive Delete

Opt Name          Size      Owner      Changed      Used          CCSID or Symbolic Link
- shm.nbf          8K        QNOTES     08/22/08 12:33 08/22/08 12:33  CCSID = 37
- mq.nbf           8K        QNOTES     08/22/08 12:33 08/22/08 12:33  CCSID = 37
- frstrings.dat    8K        QNOTES     10/30/07 05:48 08/22/08 12:33  CCSID = 37
- <M_TECHNICAL_SUPPORT *DIR  QNOTES     08/22/08 12:33 08/22/08 12:33
- pid.nbf          8K        QNOTES     08/22/08 12:33 08/22/08 12:33  CCSID = 37
- ini.nbf          8K        QNOTES     08/22/08 12:33 08/22/08 12:33  CCSID = 37
- doclbs7.ntf     1,024K    QNOTES     06/10/08 05:00 06/10/08 05:00  CCSID = 819
- certlog.nsf     768K     QNOTES     06/10/08 05:00 06/10/08 05:00  CCSID = 37
- lndfr.nsf       200,704K  QNOTES     06/10/08 05:00 06/10/08 05:00  CCSID = 37
- names.nsf       22,528K   QNOTES     08/22/08 12:32 08/22/08 12:32  CCSID = 37
- cert.id         8K        QNOTES     09/12/07 13:14 11/20/07 20:26  CCSID = 37
- user.id         8K        QNOTES     09/12/07 13:14 11/20/07 20:26  CCSID = 37
- cluster.ncf     8K        QNOTES     06/10/08 18:07 06/10/08 18:07  CCSID = 37
- DOMIN003.NOTESHST 304K     QNOTES     08/22/08 12:33 08/22/08 12:33  /QSYS.LIB/QUSRNOTES.LIB/CSLHST03.USRSPC
- cppfbus.ntf    640K     QNOTES     06/10/08 05:00 06/10/08 05:00  CCSID = 819
- ticket.idt      8K        QNOTES     08/22/08 12:33 08/22/08 12:33  CCSID = 37
- log.old        195,584K  QNOTES     12/13/07 15:54 12/13/07 15:54  CCSID = 37

More...

F3=Exit  F5=Refresh  F12=Cancel  F16=Sort  F17=Position to  F22=Display entire field

```

Files used by the Domino server must be owned by QNOTES and must have a coded character set (CCSID) that Domino can read. For the notes.ini and template files this will be 819. For Domino databases this should be 37. To quickly and easily see the owner and CCSID values for all files in the server's Data directory, you can use the Edit File (EDTF) command as shown on this slide.

Domino server will not start (IFS locks - files only)

- Common errors involving a lock:
 - ▶ Device is Busy/In Use.
 - ▶ This database is currently being used by someone else.
- The QP0FPTOS API may be used to identify an IFS lock
 - ▶ Use to see which job has a lock on a file.
 - ▶ Use to verify what types of locks remain on an IFS file.
 - ▶ Example:

```
CALL PGM(QP0FPTOS) PARM(*LSTOBJREF  
'/notes/data/filename.nsf' *FORMAT2)
```

It is also possible for a Domino server crash to leave a lock on a file. If you see an error like “Device is Busy/In Use” or “This database is currently being used by someone else”, then you have a lock issue. You can use the QP0FPTOS API to identify the lock. An example of the proper syntax is shown on this slide.

Example QP0FPTOS output

```

List Object References (QP0FPTOS *LSTOBJREF *FORMAT2)
Object ..... : /notes/data/names.nsf
Use Count ..... : 2
The object does have references.
Number of jobs ..... : 2
Number of jobs available ... : 2
Simple Reference Types (# of references):
Read Only          0
Write Only         0
Read/Write       2
Execute           0
Share with Readers Only    0
Share with Writers Only    0
Share with Readers and Writers 2
Share with neither Readers nor Writers 0
Attribute Lock      0
Save Lock           0
Internal Save Lock  0
Link Changes Lock  0
Checked Out        0
Extended Reference Types (# of job's with references):
Read Only, Share with Readers Only    0
Read Only, Share with Writers Only    0
Read Only, Share with Readers and Writers 0
Write Only, Share with Writers Only    0
Write Only, Share with Readers and Writers 0
Write Only, Share with neither Readers nor Writers 0
Read/Write, Share with Readers and Writers 2
Read/Write, Share with neither Readers nor Writers 0
Write Only, Share with neither Readers nor Writers 0
Read/Write, Share with Readers Only    0
Read/Write, Share with Writers Only    0
Execute, Share with Readers Only       0
Execute, Share with Writers Only       0
Execute, Share with Readers and Writers 0
Execute, Share with neither Readers nor Writers 0
Execute/Read Only, Share with Readers Only 0
Execute/Read Only, Share with Writers Only 0
Execute/Read Only, Share with Readers and Writers 0
Execute/Read Only, Share with neither Readers nor Writers 0
Attribute Lock      0
Save Lock       0
Internal Save Lock 0
Link Changes Lock  0
Current Directory   0
Root Directory      0
File Server Reference 0
File Server Working Directory 0
Checked Out        0
Jobs using the object:
Job. .... : 025482/QNOTES/EVENT

```

Here is an example of the output received from the QP0FPTOS API. You can see that there are many different types of locks. While it is not important for you to be able to recognize each type, it is important to be able to see if any locks exist and if any of those locks are a save lock. The entries in bold show you the object that was dumped, the number of jobs that have a lock on this file and the types of locks. Here you can see that there are read and write locks on this file, but no save locks.

Working with IFS locks (files only)

- The RLSIFSLCK command may be used to release a lock on a IFS file
 - ▶ It cannot release a lock on a directory
 - ▶ It cannot release a save lock on a file. A save lock may occur if you abnormally end a backup job using the SAV command
 - ▶ Example:

RLSIFSLCK OBJ('/notes/data/names.nsf')

Once you confirm an object lock is present, you can then use the RLSIFSLCK command to release the lock. Note that the RLSIFSLCK command will release locks only against a file. It will not work on a directory. It will also not work on save locks. An IPL is required to release those type of locks.

Domino server will not start (registry file)

- /IBM i registers all Domino servers in a registry file:
QIBM/UserData/LOTUS/lotus_servers
- User profile QNOTES must have read/write access to this file.
- Never edit this file! Doing so may corrupt the file, which will lead to you reconfiguring all Domino servers if backup of the file does not exist.
- File contains name of server, associated subsystem description name, data directory, and release information.
- Examine if STRDOMSVR command receives error when trying to start the Domino server.
 - ▶ An entry should exist for the server being started.
 - ▶ The data directory and server name in the registry file must match the data directory and server name in the NOTES.INI file.
 - ▶ The partition number for each server should be unique.
 - ▶ Command to display is
dspf 'qibm/userdata/lotus/lotus_servers'

A problem with this file may prevent a server from starting!

Fixing a corrupted database after a crash using RUNDOMCMD

▪ RUNDOMCMD ServerName

**CMD(CALL(QDOMINOXXX/<Task_Name>
PARM('DatabaseName' 'options'))**

- ▶ Note: XXX corresponds to the release of Domino you are running, for example QDOMINO801
- ▶ Do not specify a database name to run these utilities on all databases.
- ▶ Watch the Domino console for status/errors.
- ▶ Use this method to run Fixup, Updall or Compact on names.nsf, log.nsf or any other database always in use.
- ▶ Example:

**RUNDOMCMD Server_Name CMD(CALL(QDOMINO801/FIXUP)
PARM('names.nsf' '-f'))**

If a database was not properly updated and closed before the server ended database corruption can occur. In this case running Fixup against the database suspected of being corrupt or the entire server may resolve the problem. If you suspect a problem with a view or full-text index, you can use RUNDOMCMD to run the Updall task. If you suspect a problem with the database UNK table or just want to compact the database with the server down, you can use the same syntax for the Compact task.

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