

SpeedGeeking  
**NSD Express**  
Fault Analysis in 5 Minutes

**Lotusphere**  
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# About the presenter



- **Daniel Nashed**

- Nash!Com - IBM/Lotus Advanced Business Partner/ISV
- Member of The Penumbra group
  - an international consortium of selected Business Partners pooling their talent and resources
- focused on Cross-Platform C-API, Domino® Infrastructure, Administration, Integration and Troubleshooting
- Platform Focus: W32, xLinux, zLinux, AIX® and Solaris®
- Regular speaker at International Conferences

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# Why NSD?

- **Part of the RAS Efforts**
  - **Reliability Availability Serviceability**
- **Serviceability**
  - Ability to quickly **pin-point** and **fix problems**
- **Ongoing effort in each incremental release**
  - New versions of NSD/Memcheck (D8.x) are back-ported to maintenance releases (D6.5.x and D7.x)
    - See reference slides for details

# Quick - Overview Diagnostic Features

- **Directory ..\IBM\_TECHNICAL\_SUPPORT**
  - Single place for log file collection
- **ADC - Automatic Data Collection / Configuration Collector**
  - Server and Client mail self-acting, configuration snap-shot
- **Dynamical Console Log**
  - Log file containing all log information
- **Fault Recovery**
  - Generates NSD files, restarts servers automatically if configured!
- **Fault Analyzer**
  - Servertasks centrally annotates and categorizes crashes
- **NSD**
  - Notes System Diagnostic

# NSD - Notes System Diagnostics

- **Fully available since Domino 6.0 cross platform!**
  - Was first available on Unix - Replaced "**RIP**" on Windows
- **Invoked automatically if Server/Client crashes**
  - Can be manually invoke for troubleshooting on command line
- **Single Binary on Windows**
  - **Shell Scripts** and **Binaries** (nsd, memcheck) on Unix
  - Users platform debuggers (dbx, gdb, pstack)
- **Huge collection of system diagnostics information**
  - Domino & OS level

# Quick - Major Sections of an NSD - Part 1

- **NSD**
  - Header: Version and System
  - Process Table / Active Users
  - **Call-Stacks of running Processes**
- **MEMCHECK: - Notes / Domino Memory Analyzer**
  - Shared memory handles and blocks
  - Open Databases, Open Documents
  - Memory Usage
  - Sometimes NSD generates “**memory dump**” or “**core file**”

# Quick - Major Sections of an NSD - Part 2

- **Configuration**

- **notes.ini**
- User OS-level Environment
- Executable & Library Files
- Data Directory Full Listing
- Local Disks
- Installed software, Configuration, etc

- **Performance/System Data**

- vmstat on UNIX
- Network Stats
  - Active Connections, Ethernet Stats, Routes, Protocol Stats

# Why Server Freeze and Server Panic?

- **Domino uses shared memory to allocate global resources used by most parts of Domino**
  - NIF, NSF, SEC, ... e.g. views are mapped in memory ...
  - Corrupt Memory-Handle, DB, Note, ... -Handles, abnormal terminated tasks can have impact on other running tasks and result in **Corrupted databases**
- **Domino "halts" the Server or Client with a "PANIC" to avoid further damage**
  - "Freezing" all tasks/threads
  - Diagnostics and Restart Routines are called to recycle the server
    - NSD and Fault-Recovery



# What can cause server crashes?

- **Design Elements/LotusScript/Java**
- **Non-Core/Third Party code**
  - Virus Scanners, DECS/LEI, Oracle, DB2, JDBC, etc.
- **Corrupt data**
  - Corrupt documents, etc ...
- **Memory Management issues**
  - Overwrites, handle locking, memory leaks
- **Insufficient Memory**
  - Often caused by „**Memory Leaks**“

# First Steps Analyzing a Crash

- **Find the crashing thread**

- **"Fatal"** is the most common indication of the crashing task
- Other keywords
  - **"Panic", "Access Violation"**
  - **"Segmentation Fault", "Signal"** messages on Unix/Linux
- **Tip:** Last lines on console.log is helpful in many cases

- **Analyze the call-stack**

- Check the C-API toolkit (SDK) to understand function names and parameters involved
  - Not all function calls are exposed

# Reproducible Call-Stack = Likely a Bug, Corrupted Database?

- **Best case scenario**
  - Reproducible call-stack on independent machines which does not occur on boxes with other releases
- **But we are not always that lucky ...**
  - If the call stack is similar at the end of the stack it could be a low-level API problem
  - If the call stack is similar at the higher level of the stack always in the same Servertask it could be the Servertask
  - If you see **EM\_BEFORE, EM\_AFTER** it might be an Extension-Manager problem
  - If it is always the **same database** it might be a **data problem**

# How to find affected databases?

- **First Match Vthread/PThread and check open databases**
  - Fastest track to affected database if present
- **Else Check “Open Database” Section and match process**
  - Search the Call-Stack for matching DB Handles and NoteIDs
    - e.g. NSFNoteOpen(DBHANDLE hDb, NOTEID NoteID, WORD flags, NOTEHANDLE \*hNote);
- **A handle is represented by a hex number in the call stack**
  - e.g. DBHANDLE, NOTEHANDLE
  - Can be found in open database list for process
  - **Take care:** Handle number in open database list is decimal !
  - NOTEID is also a hex value identifying a Note in a Database

# Recommendation: Enable Fault Recovery, ADC and Fault Analyzer!

- **Enable NSD & Fault Recovery in Server document**
  - Run NSD To Collect Diagnostic Information: **Enabled**
  - Automatically Restart Server After Fault/Crash: **Enabled**
  - Mail Fault Notification to: **LocalDomainAdmins**
- **Server Configuration Doc / Diagnostics Tab**
  - Fault-Recovery Database (Indfr.nsf) as Mail-in Database
  - Enable FaultAnalyzer (new in D7) for **Fault Database**
  - **Senddiag** runs on startup to collect information like NSDs
- **„FaultAnalyzer“ Servertask annotates and categorizes NSDs**
  - Usually Mail-In Database on Admin Server

# Ref - Links and Resources

- **Technotes**

- TN #7007508 - Knowledge Collection: NSD for Notes Domino release 6 and 7
- TN #4013182 - Updated NSD for Domino releases

- **Related sessions**

- BP104 Die Hard - Deciphering a IBM Lotus Domino Server Crash
  - Paul Mooney, Franziska Whitlock – check the slides
- ID206 IBM Lotus Notes and Domino Serviceability
  - Jim Rouleau, SW Mockingbird
  - Wednesday 1:30pm – 2:30pm

# Ref - NSD Update Strategy

- **NSD & Memcheck are updated in each release**
- **Changes are incorporated into new releases and are available for older Domino releases thru special hotfix installer**
  - NSD/Memcheck Code is build independent form Domino release
  - See TN #1233676 - NSD Fix List and NSD Update Strategy
  - See TN #4013182 - Updated NSD for Domino releases
    - Contains FTP download links
  - Too many details details to list on a single slide ...
- **You should keep NSD up to date!**

# The End

... or maybe the start for **Self Server Crash Diagnostic?** ;-)

## Thanks for your time!

- I hope you enjoyed the session

**For questions find me after Speedgeeking or send me a mail**

- Contact

- [nsh@nashcom.de](mailto:nsh@nashcom.de)
- <http://www.nashcom.de>

Hear details form the **RAS** lead developer tomorrow

- **ID206 IBM Lotus Notes and Domino Serviceability**

- Jim Rouleau
  - Development Project Lead - Notes & Domino Serviceability Team
- SW Mockingbird Wednesday 1:30pm – 2:30pm