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ENERGIZING LIFE'S WORK

BP 102: IBM Domino 64bit - All You Need to Know

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About the Speaker

- **Daniel Nashed**
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  - 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, Troubleshooting and IBM® Traveler
  - Platform Focus: Windows® 32/64, Linux®, AIX®
  - Author of the Domino on Linux/UNIX® Start Script
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Agenda

- **Introduction and Basics about 32/64bit**
- **IBM Lotus® Domino® 32bit on a 64bit OS**
  - Best Practices and Experience from the Field
- **Native Domino 64bit**
  - Best Practices and Experience from the Field
- **Q&A**

Operating Systems Covered

- **Focus in this presentation is Windows and Linux 32bit / 64bit**
- **There are other 64bit implementations**
  - **zLinux** is only available in native 64bit mode
    - because previous versions have been technically a 31bit implementation with 2 GB memory address limit
  - **AIX** supports 32bit and 64bit Domino
    - It's strongly recommended to use native 64bit because of address limitations caused by the segmented memory model on AIX
  - **iSeries - i5/OS** has been a true 64bit – or technically 128bit implementation for a long time
  - **Solaris** is not supported any more in Domino 9

A Brief History

- **Domino native 64bit for Windows has been introduced in Domino 8.0.1**
  - But most customers did not switch to native 64bit immediately
  - Has to be seen as a separate platform which needed separate testing
  - With the late 8.5.x and 9.x releases more and more customers moved to native 64bit
  - Specially Traveler customers are moving to 64bit because of higher memory demand for “larger” Traveler installations
- **Domino native 64bit for Linux has been introduced with Domino 9.x**
  - Quite new platform but we already see customers migrating to native 64bit on Linux
    - Traveler Servers
    - Servers moved from Domino 8 with new hardware
    - Important: Domino 9 requires SLES 11.x and RHEL 6.x

32 Bit / 64 Bit Basics

- **Without “tricks” a 32 Bit OS can only address at most 4 GB Memory**
  - That's why 32 Bit Process can at most allocate 4 GB Memory

- **Address Space Limits**
  - 32 Bit = 2^32 = 4 GB
  - 64 Bit = 2^64 = 18,446,744,073,709,551,615 = 18.45 Exabytes
    - That's more than we will “ever” need …
    - But that's what we thought about 32bit (and long time ago 8bit) as well

- **Windows 32bit Limits**
  - Split memory into 2 GB for System and 2 GB for applications
  - Total memory available was only 2 GB for applications
  - /3GB switch to change to 3/1 Memory limit was not really a solution

- **So it makes a lot of sense to at least switch to a 64bit Operating System**

Domino 9.0.1 - System Requirements

- **Windows**
  - Windows Server 2008 Standard Edition R2 / Enterprise Edition R2 **x86-64** plain + SP1
  - Windows Server 2012 Standard Edition/Datacenter Edition **x86-64**
  - **Windows Server 2012 R2**

  - Starting with Windows 2008 R2 there is no supported 32bit Microsoft Server OS anymore
  - 32bit and 64bit Domino is supported

- **Linux**
  - Red Hat Enterprise Linux (RHEL) Server 6.x **x86-64**
  - SUSE Linux Enterprise Server (SLES) 11.x **x86-64**

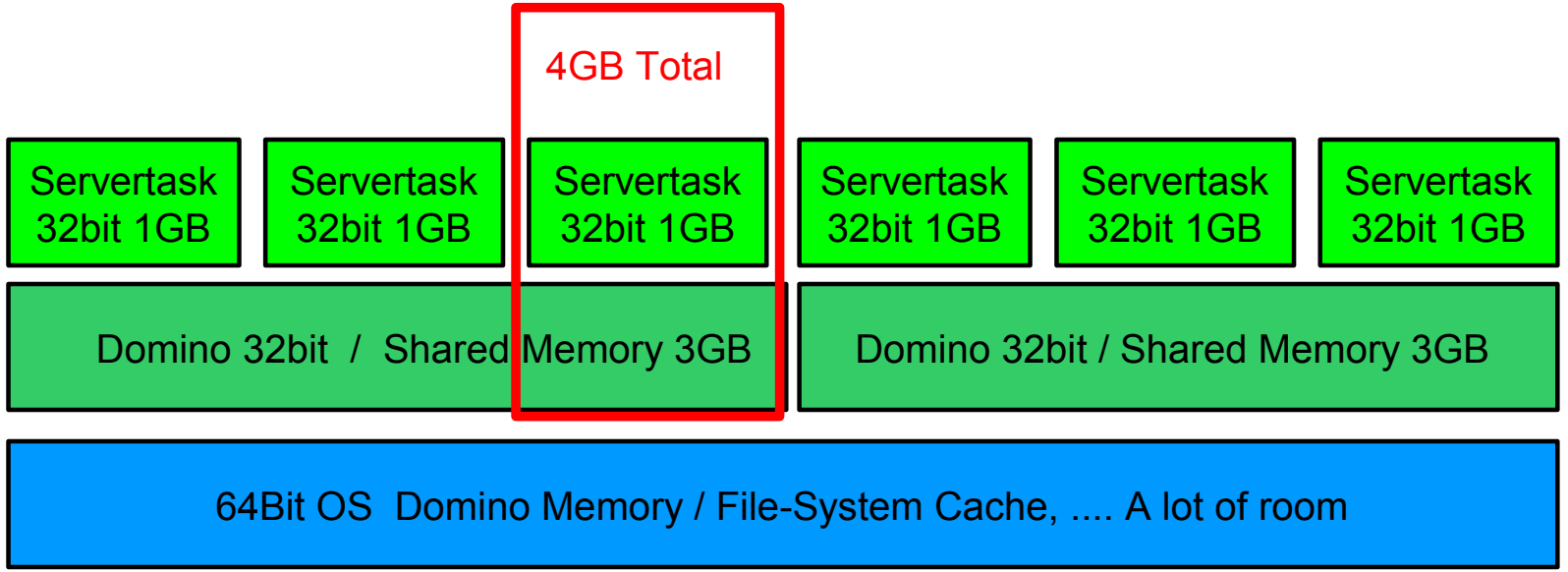
  - Domino only supports 64bit Linux
    - 32bit and 64bit Domino is supported

Domino 32bit Limits on 64bit OS

- **Domino uses Local Process Memory and Shared Memory**
  - **Local memory** = each process has local memory only used by this process
    - Http, Router, Amgr Traveler use a lot of local process memory
  - **Shared memory** = shared among all processes for different pools
    - All shared memory is mapped to all Domino processes
    - Most prominent pool: NSF Buffer Pool (internally known as UBM)
      - Default: 512 MB for 32bit Domino, 1 GB for 64bit Domino
- **On a 64bit OS all Domino 32bit processes have a separate 32bit address space within the 64bit OS address space**
- **<u>But</u> the combination of local and shared memory cannot exceed 4 GB for any process**

Domino 32bit on a 64Bit Operating System

- **Total Memory per Process is 32Bit = 4 GB**
  - Router / HTTP uses most local process memory
  - NSF Buffer Pool is the biggest Shared Memory block (512 MB)



Domino 32bit on a 64Bit OS

- **64Bit OS allows multiple partitions with dedicated 32Bit address space per process**
  - Very good for consolidation of multiple Domino servers
- **Memory Limits**
  - In normal cases shared + local process memory does not exceed 3-4 GB
- **The remaining memory is used by the 64Bit OS**
  - File caching, buffers, internal resources
- **Running 32Bit Domino on 64bit OS gives you already most of the performance and scalability benefits**
  - But there are some details you should take care about (see next slides)
  - And there are still good reasons to migrate to native 64bit

Memory Considerations

- **Add memory for file-system caching**
  - Domino will only use 3-4 Memory for each Domino Partition
    - This will not change dramatically with native Domino 64bit
  - But the OS will use the remaining memory for file-system caching
  - Specially on virtual servers this can dramatically improve performance and reduce read I/Os
- **We have seen dramatic reduction of I/Os when increasing RAM from 4 to 16 GB**
  - This is true for large mail and application servers on physical and virtual machines
  - RAM is relatively inexpensive and modern system boards offer sufficient slots for RAM
- **But you need to be aware some issues of file-system cache that can occur**
  - Details on next slides

Large System Cache for 64 Bit Windows

- **By default there is a very high physical memory limit for the file-system cache**
  - It will try to use all memory which can cause Domino Memory to be swapped out
    There is a Windows 64bit call “SetSystemFileCacheSize()” to limit the cache
    - Available since Win2003 R2 or SP2 64Bit

- **Domino uses this system call on start-up to limit the Windows OS Level Cache**
  - Domino 8 ships a 64bit helper binary “cacheset.exe” to set the cache size for Domino 32bit
    - Domino 64bit has this call integrated into the core code
    - Will need the system privilege “SE_INCREASE_QUOTA_NAME”
    - See TN #1391477 for details

  - **Default is 30% of memory**
    - Can be tuned via notes.ini **MEM_FSCachePercentMem=n**
    - Set depending on the RAM in your machine – **also required for native Domino 64**
    - Example: 16 GB RAM, 6 GB reserved for Domino/OS = MEM_FSCachePercentMem=65
    - You can check the current settings with “cacheset.exe -g”

File-System Cache Issue with Windows 64bit

- **Windows 32bit only used around 300 MB of File-System cache**

- **With 64bit the file-system cache can grow to 1 TB virtual memory**
  - File-system cache is implemented in virtual memory in the same way applications use memory
    - Windows also keeps file cache in memory when it is not located in physical memory
  - You can end-up with 1 TB of virtual memory file-system space which is not in physical memory at all
  - At 1 TB of open file data the cache is reorganized which leads to very high CPU spikes
  - It turned out that Domino opens all files with "**random-optimized**" flag which lead to long caching of file-data in cache (FILE_FLAG_RANDOM_ACCESS)
  - Specially during backups on a large Domino server you can run into performance issues because even the database is already closed by the backup application it is still open in the DB cache

- **Solution**
  - Not really a Domino issue but IBM had to disable the RANDOM Access optimization flag
  - SPR# KBRN899NF6 (8.5.3/8.5.2 FP1) : **Disable_Random_RW_File_ATTR=1**
  - SPR# KBRN8AKKA9 (8.5.3/8.5.2 FP3): **Default enabled on Windows**

Platform Support for 32bit Sub-Systems on 64bit OS

- **Windows uses the WOW sub-system to allow 32bit applications to run unchanged**
  - Take care that registry parameters change
    - HKEY_LOCAL_MACHINE\SOFTWARE**Wow6432Node**\Lotus\Domino
  - See http://en.wikipedia.org/wiki/WoW64 for details
- **Linux needs 32bit sub-system libs to be installed**
  - On SLES you can install 32bit libs for all your libs with a single setting in YaST
  - On RHEL 6 either install all libs manually or set **multilib_policy=all** in **/etc/yum.conf**

Application Considerations for Domino 32bit on 64bit OS

- **There are no changes required for LotusScript®, Java and @Formula code**
- **You should take care that ODBC need 32bit versions of the ODBC drivers installed**
  - Separate configuration for native 64bit and 32bit ODBC resources
- **Usually no changes for system calls**
  - System finds the right 32bit implementation of the call
- **No change for C-API calls from LotusScript**
- **No code changes of C-API based code**
  - See one important detail for larger servers next slide

32 Bit Domino on Windows 64 over 2 GB

- **Add-On Applications need to be recompiled and linked with Visual Studio .Net 2003 with link flag /LARGEADDRESSAWARE**
  - Else if any process (servertask) exceeds 2 GB limit (local + shared memory) it would crash!
  - Check via dumpbin
  - Example: dumpbin /headers nnshdbcat.exe
- **Result of dumpbin /headers should contain:**
  - FILE HEADER VALUES
  - Application can handle large (>2GB) addresses
- **Default Max Shared Memory is set to 2GB**
  - So beyond 2 GB Shared Memory Domino would crash without increasing the limit
  - Increase the limit via notes.ini **ConstrainedSHMSizeMB=3072** gives you a maximum of 3GB
  - That means 1 GB left for local process memory per task

Tivoli® Data Protection Support for Domino 32bit

- **Mixed Mode = “Domino 32bit and OS is 64bit” is only supported in older versions**
  - Last Version with Mixed Mode Support is TDP 5.5.3
- **First Release with Domino 9.x support is TDP 7.1**
  - Which does not support any mixed mode implementations
- **TDP 6.x releases did not support Linux at all**
  - TDP 7.1 does support 64bit Linux only – Domino 9 only supports Linux 64
- **You can run TDP 5.5.3 for a while but once you are updating to Domino 9.x you need TDP 7.1 or higher**
  - TDP 7.1 on Linux is supported on 64bit Domino
  - because there is no supported 32bit OS for Domino 9 on Linux
- **We still have a PMR open with Tivoli but it looks like with Domino 9 TDP forces us to switch to native 64bit → which is in generally OK from strategy point of view**

64bit Support for Add-On Products

- **IBM Sametime® (Community Server)**
  - Only available on 32bit but supports 64bit OS
  - Not much data to backup. Take a manual off-line backup or replicate the few important databases
- **Lotus Quickr®**
  - Only available on 32bit but supports 64bit OS
  - No new version. Domino 8.5.x is still supported with TDP 5.5
- **IBM Enterprise Integrator (LEI)**
  - Native 64bit Version for Windows for 8.5.x and 9.0
  - New with 9.0 native support for 64bit on Linux
- **Traveler**
  - Recommended to install 64bit native
  - Only LotusTraveler.nsf needs backup, state DB is either local Derby DB or DB2/SQL Server

Domino Native 64bit

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What should you expect from Native 64bit

- **Should run a bit faster**
  - But the performance you gain moving from Domino 8.x to Domino 9.x is bigger
  - Also switch from 32bit OS and 64bit gives bigger boost, specially on Windows

- **It not double as scalable**
  - Sizing the “number of users” on 64bit should be similar to 32bit

- **Will better perform in high load scenarios**
  - Helps when you already have high memory utilization
  - That's does not mean that memory leaks with not hurt you!

- **Will need a bit more RAM (e.g. 30% more)**
  - Pointers are 64bit instead of 32biz

New Server Platform Native 64bit Intel Linux

- **Domino 9.0 introduces 64bit on xLinux**

- **True 64bit implementation**
  - Specially Traveler will benefit from it (Traveler 9.0 also supports 64bit on Linux)
    - Traveler needs a lot of local process memory for the traveler servertask
    - Side Note: Traveler ships both sets of binary in the same installer for Windows and Linux

- **For developers this requires a new development environment**
  - SLES 11 x86_64 (64 bit)
  - GNU Compiler Collection (gcc/g++) version 4.3.x
  - Each new compiler + environment uses a newer set of LIBs
    - By the way this is why SLES 10 and RHEL 5.x is not supported any more
  - Not a big change for application developers if already ported to other 64bit platforms (e.g. Win64)
  - You can run 32bit applications compiled for Domino 8 but you might need compat libs
    More details about C-API background later

Native Domino 64bit

- **Supported Platforms**
  - since Domino 8.0.1 on AIX64
  - since Domino 8.0.1 on Win2003 R2 64Bit
  - since Domino 9.0 on Linux SLES 11/RHEL 6
  - (iSeries and zLinux available for a longer time)

- **Domino as a 64Bit Application allows much more memory**
  - In theory a Win64 application could use up to 8 TB of data
  - But Domino 8.0.x / 8.5 64bit does allow more memory but is not specially optimized for larger memory
    - There are some performance enhancements in Domino 9 for native 64bit

Native 64bit Resources

- **A 64bit application – if compiled correctly – will run faster on a 64bit OS**
  - No WOW-Sub-System on Windows
  - No separate 32bit LIBs on Linux
  - Native 64bit Pointers
  - More registers available for 64bit applications
  - Better Process/Thread scheduling
  - Optimized direct memory access

- **Increased memory requirements**
  - Because of 64bit addresses, alignment changes and larger size for some data-types Domino 64bit will need more memory.
  - It's hard to say how much and it also depends on your environment.
    - I would assume 30%
  - But more memory usually is not big cost issue
  - You should have more memory for file-system caching anyway

How 64bit Native looks like - Linux

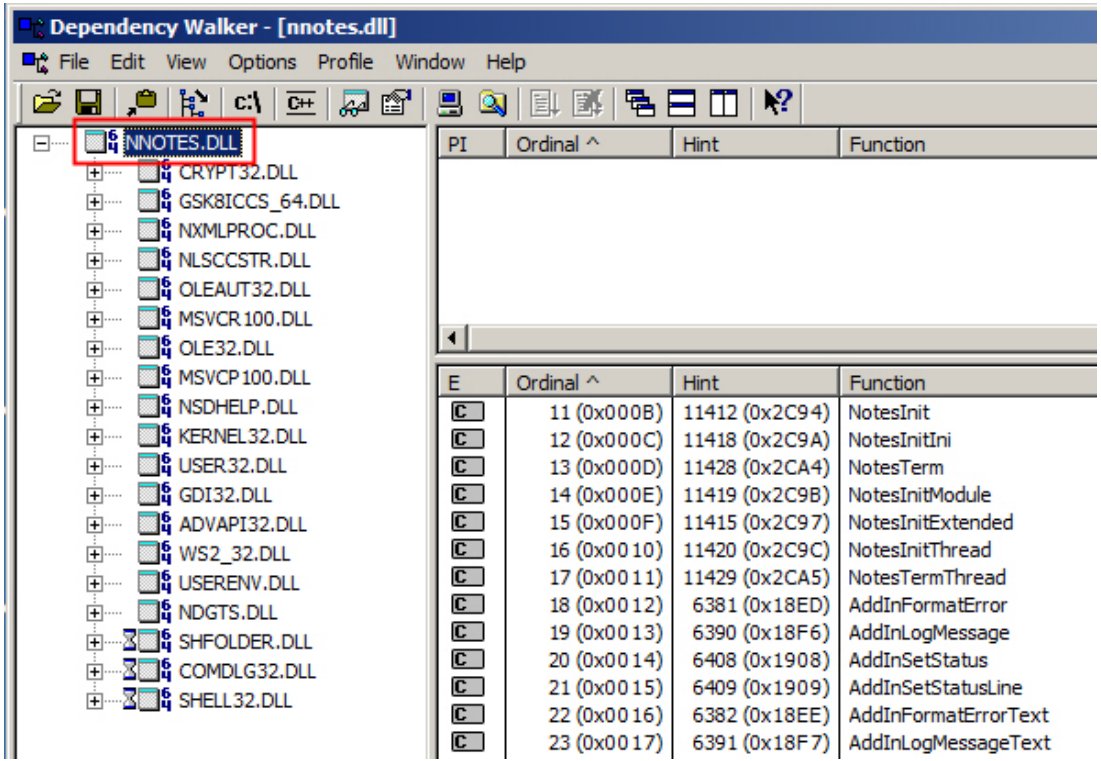
- **Use the “file” command to figure out if the binary is 64bit**
- **Use “ldd” command to check dependencies of binary**
  - Note: resolves only libs from the path

```
file libnotes.so
libnotes.so: ELF 64-bit LSB shared object, x86-64, version 1 (SYSV), dynamically linked, not stripped

 ldd libnotes.so
        linux-vdso.so.1 =>  (0x00007fff589fd000)
        libndgts.so => /opt/ibm/domino/notes/latest/linux/libndgts.so (0x00002b14a6568000)
        libdl.so.2 => /lib64/libdl.so.2 (0x00002b14a6770000)
        librt.so.1 => /lib64/librt.so.1 (0x00002b14a6974000)
        libstdc++.so.6 => /usr/lib64/libstdc++.so.6 (0x00002b14a6b7c000)
        libpthread.so.0 => /lib64/libpthread.so.0 (0x00002b14a6e83000)
        libresolv.so.2 => /lib64/libresolv.so.2 (0x00002b14a70a0000)
        libc.so.6 => /lib64/libc.so.6 (0x00002b14a72ba000)
        libxmlproc.so => /opt/ibm/domino/notes/latest/linux/libxmlproc.so (0x00002b14a764f000)
        libgsk8iccs_64.so => /opt/ibm/domino/notes/latest/linux/libgsk8iccs_64.so (0x00002b14a7c79000)
        libm.so.6 => /lib64/libm.so.6 (0x00002b14a7dd3000)
        libgcc_s.so.1 => /lib64/libgcc_s.so.1 (0x00002b14a8058000)
        /lib64/ld-linux-x86-64.so.2 (0x00002b14a377a000)
```

How 64bit Native looks like - Windows

- **Use “Depends” application to check dependencies and platform**



How to figure out if the Server is 64bit

- **Show Server**

```
sh server

IBM Domino (r) Server (64 Bit) (Release 9.0.1 for Linux/64) 31.12.2013 12:30:42
IBM Domino (r) Server (64 Bit) (Release 9.0.1 for Windows/64) 31.12.2013 12:30:42
```

- **show stat Server.Version.Architecture**

```
show stat Server.Version.Architecture

Server.Version.Architecture = 64 Bit
```

Check Platform via LotusScript

- **Domino 9.0.1**
  - Check via
    - @Formula Language → @Platform([Specific])
    - LotusScript → session.Platform
  - Not completely consistent on Linux

	Domino 32bit Linux	Domino 64bit Linux	Domino 32bit Windows	Domino 64bit Windows
@Platform([Specific])	Linux	Linux/64	Windows/NT 6.1	Windows/NT 6.1
session.Platform	UNIX	Linux/64	Windows/32	Windows/64

Porting Applications to Native Domino 64bit

- **Client based application code is not affected**
  - You only need to take care of code invoked on the server (HTTP, Agents etc)
- **Standard LotusScript/Java/@Formula Code is safe**
  - Usually no change needed
- **ODBC needs to be reviewed**
- **All add-on C-API based applications need to be ported to 64Bit**
- **All C-API from LotusScript calls need to be ported to 64Bit**
- **All native Operating System calls, calls to different libs need to be ported**

Porting C-API Applications to 64bit

- **You need the right 64bit compiler**

- **Compiler has changed for Domino 9 on Windows**
  - Domino 8 used Intel Compiler because at first porting the Microsoft compiler was not “ready”
  - Now IBM switched back to the Microsoft Visual Studio Compiler also for Win64
  - That's good news because it makes porting easier
  - You need: “**Visual Studio 2010 SP1 Standard for x86 and x64**”
  - Free download:
    - Microsoft Windows SDK for Windows 7 and .NET Framework 4
      - http://www.microsoft.com/en-us/download/details.aspx?id=8279
    - Microsoft Visual C++ 2010 Service Pack 1 Compiler Update for the Windows SDK 7.1
      - http://www.microsoft.com/en-us/download/details.aspx?id=4422

- **For Linux the official supported Build Platform is SLES 11 with gcc/++ 4.3.x**

Porting to Native 64bit for ISVs

- **You can expect more and more software that is available for Domino 9 64bit**
  - Some ISVs might now look into 64bit for Domino 9 because of the new compiler support
  - Porting of stand-alone applications should not be too complicated

  - Most of the changes are straight forward and C-API has own defines for most important data-types
  - If the developer did use the right C-API data types like LONG, WORD, NUMBER. DBHANDLE, applications can be compiled on 32bit and 64bit with just some changes

  - One difference: HANDLE on Windows is now 64bit and remains 32bit in Domino
    - Domino switched to DHANDLE for all generic C-API handles → code needs to be changed
    - That also means that Domino handles (DHANDLES) are still limited to 32bit
      - And there are even some 16bit handles → So 64bit does not remove all 32bit “limitations”

  - Be aware that instead of the 1-byte alignment you need the natural platform alignment
    - Another reason why 64bit needs a bit more memory

Porting to Native 64bit for ISVs

- **Not all applications can be ported straight forward**
  - More complexity in ISV applications often depends on external libs from other vendors
  - All external resources like RSA Libs, ZIP Libs, Antiv-Virus Engine Code, program-libs like the “boost lib” need to be available for 64bit
  - Sometimes interfaces between the LIBs and C-API code needs to be changed

  - **Not as straight forward than porting native C-API code**
    - The Domino team has done a great job porting the back-end infrastructure to 64bit
    - And the C-API is a sub-set of what IBM uses to build Domino

- **This is not a C-API porting session but for details about porting check the following resources**

  - C-API reference guide section “Porting 32bit Domino applications to 64bit Domino”
  - Check the current example code and make-files

SYM/PDB File Support for Add-On Products

- **Domino uses a special SYM file format integrated into one large SYM file**
  - Since D6.5.1 Domino is able to read SYM files for individual binaries
- **Lotus Development (Iris) Tool Map2iSym to create matching SYM files is part of the Lotus C-API Toolkit since Domino 6.5.1**
  - Has not been shipped with all C-API toolkits since then
- **Domino 9.0.x**
  - Domino 9 64bit still uses SYM files but uses a new SYM file format
  - But add-on/ISV applications have to use PDB files instead
  - NSD is enabled to use PDB files
  - ISVs have to ship PDB files instead of SYM files for Domino 9 64bit

Porting LotusScript to C-API Calls

- **First of all re-think if you still need the code**
  - Often you are using legacy code that could be meanwhile coded in LotusScript
- **Depending on the complexity of the C-API calls it can be quite complicated to be ported**
  - Structures passed between C-API calls
  - Callback functions
  - In many cases a native C-API solution (servertask) which interfaces with LS code is the better solution
    - More stable and easier to maintain
- **Data-Types stayed the same but pointers are now 64bit instead of 32bit**
  - The only data-type that can hold a pointer in LotusScript is a "**double**"
  - So depending on the code you will end up with separate implementations for 32bit and 64bit

Porting LotusScript to Native Platform Calls

- **Mostly used on Windows**
- **Again - First of all “re-think” if you still need the code**
- **Take care of changes data-types**
  - For 64bit Values you need “double”
  - Addresses are 64bit (you need “double” like for C-API calls)
- **There are some issues you should be aware of**
  - See details on next slides

Known Issues when Calling native APIs from LotusScript

- **Each of those issues causes the Domino Server to hang, crash or causes abnormal process terminations**
  - If you are calling any API from LS you should update to the latest fixpacks!
  - Current Status: Domino 8.5.3 FP6, Domino 9.0.1

- **8.5.3 FP3 / 9.0**
  - **SPR# EFEN8MJJCY** - Fixed an issue that would occur on 64-bit Domino platforms running an agent that integrated with C code. Prior to this fix, extra padding was added to the return value of the various data types which causes data issues going back and forth from 32-bit to 64-bit Domino versions.
  - In other words: Re-aligns the data properly for C callouts using Types.
  - **SPR# RDJS8W6QYE** - This is a companion fix to EFEN8MJJCY also fixed in this release.

Known Issues when Calling native APIs from LotusScript

- **8.5.3 FP3 / 9.0**
  - **SPR# PCHE8QLKPT** - Companion fix to SPR EFEN8MJJCY also fixed in this release.
  - Additional Info: Fix for functions returning pointers. Compiler when optimized uses a float register when LotusScript sets Double as a return value. So the return value is always NULL
  - Important: For the fix to work you need to set notes.ini **LS64BITCCALLOUTPointerSupport=1**
    - Tells LotusScript to do Callouts as if a pointer is returned, not Double.
    - If you not a C-API from LotusScript developer ignore this
      - The developer should tell you when to use this parameter

Known Issues when Calling native APIs from LotusScript

- **9.0.1 / 8.5.3 FP5**
  - **SPR# RDJS94GTVD** - Fixes Domino crash on 64 bit platforms, caused by having a LotusScript agent that makes C API calls to Operating System APIs iteratively, such as in a loop. This is a regression in 8.5.3 FP2.
  - **SPR# TTSU94HQZJ** - Fixes issue where LotusScript: Lotus C API REGNewUser registers Alternate Name of users without converting to LMBCS
    - This is a general issue with international character sets when calling C-API functions
  - **SPR# KJKJ9468AY** - Fixed a Windows Domino 64-bit Server Lotusscript OLE crash. Domino in this environment was not handling the size of parameters being passed in.
  - **SPR# JFRA8EAJGE** - Fixes Domino 64-bit Server crash on fpoplong and SlowFloatToLong.
    - Fixed in 9.0.1 only. No additional information available

LotusScript 64bit Limitation

- **Stack size for variables was not increased in Domino 64bit**
  - TN #1451119 “32k limit for string arrays applies to both 32-bit and 64-bit Notes/Domino”
  - Example: Dim myArray(1 to 8000) as String
    - 32K limit for a static string array at entry 4049.
    - On 32-bit platforms, there can be 8190 elements declared

    Work-Around: Use dynamic arrays
    - Dim myArray() as String
      ReDim myArray(1 to 8000) as String

ODBC Connections

- **You need native 64bit ODBC drivers**
  - With Domino 32bit you needed the ODBC 32Bit drivers on a 64bit OS
  - In general this will be easier than in mixed mode specially with database drivers like Oracle
- **Lotus Connector (LC) is the recommended technology**
  - LSXODBC (LS:DO) is not supported in Domino 64bit
  - Lotus Connector is the more current technology. LSXODBC is legacy code
- **Native JDBC connections work unchanged and connect directly to the remote DB**
- **“IBM ODBC Driver for Notes/Domino 9.x (for Windows 64-Bit English)”**
  - Can be used to access Domino data
  - Available for 32bit and 64bit

Migrating to Domino 64bit

- **1. Uninstall Domino 32bit**
  2. Install Domino 64bit
  - You cannot just install 64bit, Domino 32bit and Domino 64bit are two different platforms
  - Data Should remain untouched

- **Delete and re-create all physical FT indexes when the server is still down**
  - You could also switch FT Index to a different disk via notes.ini **FTBasePath=**f:\ftdir
    - New setting since 8.5.3. Makes sense for larger servers with large FT Indexes

- **All view/folder indexes need to be rebuild**
  - There are multiply ways depending on your migration scenario

Rebuilding View/Folder Index

- **a.) Via Updall**
  - Simple way: Load updall -r

- **b.) Compact / DBMT**
  - 1.) Discard all view indexes via Compact -D (can run multi-threaded in Domino 9 via -# switch)
    Example: load compact -D -# 4 mail/

    Note1: if you want to ensure all Dbs use design/data compression add **-n -v** flags
    Note2: In case databases have the wrong DB class upgrade them to current ODS via -C **-upgrade**

  - 2.) Leverage DBMT to only build most important views only
    Example l**oad dbmt -updallThreads 4 mail/**

  - Takes a while but would be more clean than just rebuilding views

Performance Tuning

- **NSF_BUFFER_POOL_SIZE_MB**
  - By default 512 MB for 32bit Domino
  - By default 1 GB for 64bit Domino
  - Some other default values depend on the buffer pool size
- **Notes.ini NSF_DbCache_Maxentries=3000**
  - default value around 3 times the buffer pool size in MB
    if you have more than n users or more than n open files you can increase the value
- **EVENT_POOL_SIZE=41943040**
  - Needed on all servers if higher number of log messages
- **Increase internal pools – also required by larger 32bit Servers**
  - CATALOG_POOL_SIZE_MB=100
  - dirman_poolsize_mb=100
  - nsf_monitor_pool_size_mb=200

General Performance Tuning for 32bit and 64bit

- **Server_Pool_Tasks=80**
  - Number of IOCP pooltasks per Notes Port
- **Server_Max_Concurrent_Trans=160**
  - maximum concurrent transactions. should be Server_Pool_Tasks multiplied by number of ports.
- **UPDATE_FULLTEXT_THREAD=1**
  - Separate Thread for Full-Text indexing
- **Disable_BCC_group_expansion=1**
  - Disables Router BBC Group expansion for performance reasons
- **FT_FLY_INDEX_OFF=1**
  - Disables on the fly FT indexing when agents use search queries on a not FT indexed DB
    - Avoids “extremely inefficient” temporary FT index
    - Agent will not run and code should be changed

Domino 9.0 - Performance Improvements

- **Source: IBM presentation at IBM Connect 2013**

- **Large UBM support for 64 Bit Exploitation**
  - e.g. NSF_BUFFER_POOL_SIZE_MB=8192 settable in notes.ini
  - Improved View Access with more Views remaining cached in memory

  Increased MAX Pool Sizes for 64 Bit Exploitation
  - MAX_NETPOOLSIZE to 1Gig (from 512 MB)
  - MAX_TASK_POOL _SIZE to 16 MB (from 4 MB)
  - NETSESSIONPOOL_SIZEMAXMB to 20000 MB (from 2000 MB)
  - MAX_GROUPCACHE_POOLSIZE to 32 MB (from 15)

- **It's hard to tell how much the extra memory will help because usually customers switch to new hardware and Domino release in the same step**

Session Summary

- **Domino 64bit Native is stable and not new anymore and you should consider it**
  - Already used for larger Traveler deployments
  - Many customers already migrated to Domino 64bit Windows
  - Domino on Intel Linux is quite new
    - But is the platform used for IBM SmartCloud® for Social Business
    - And Domino 64bit on zLinux has been also around for a while

- **It's not that complicated but needs some details to consider**
  - Specially with “custom”/add-on code
  - Your IBM Business Partners should help you with their add-on applications and custom code
    - Now you are aware what to ask for :-)

- **Native 64bit is a strategic decision**
  - You don't have to move servers now
  - But you can consider it already for your Domino 9 upgrade
  - Specially when you switch to new hardware – or start deploying virtual servers

Thank You!

Your feedback is important!

- **Access Connect Online to complete your session surveys using any:**
  - Web or mobile browser
  - Connect Online kiosk on-site

- **Questions?**
  - Now, after the session or via email

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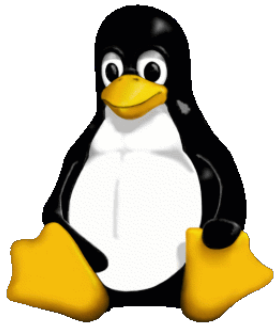
Get the Line on Linuxfest V!

Back for another informative all-inclusive Linux session in 2014
Join Bill Malchisky, Wes Morgan, and guest Daniel Nashed!

When: **Thursday**, 30 January
Where: **Dolphin Hotel – Oceanic 2 (End of hallway between Asia 1 & Australia 3)**
Time: **12:30 - 1:30 pm**
Other: Bring your box lunch!
Audience: Admins, Developers, Architects
We're not in the program guide, so mark your calendar, or see our listing in the ConnectOsphere agenda Notes app



Red Hat is providing our session swag—third consecutive year

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