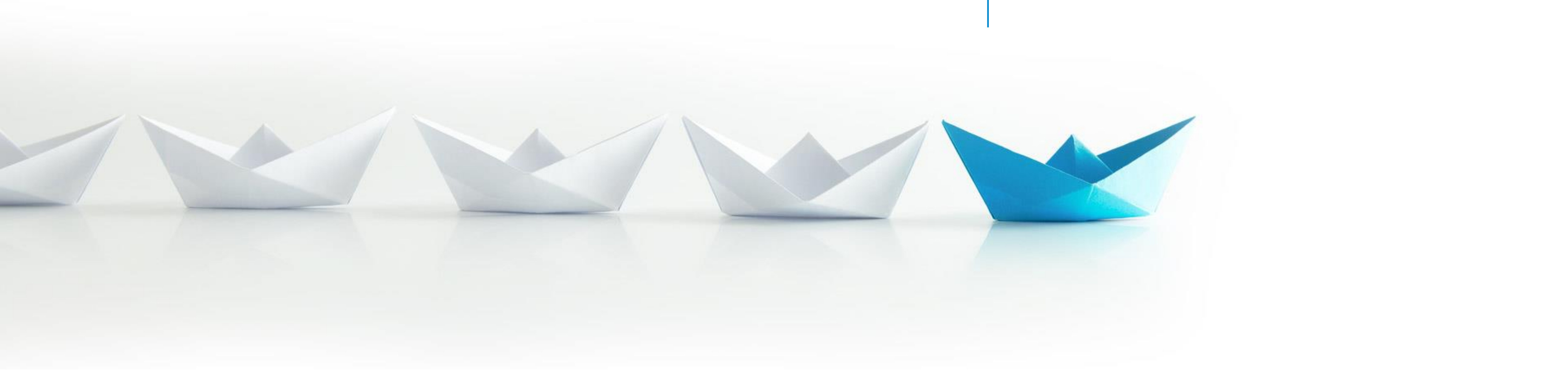
How to Prepare Applications for HCL Notes 64-bit Clients

January 30th, 2024



Upgrade Your Time

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Before We Start

All attendee lines are muted

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The webinar is being recorded

After the webinar, we will send you a mail to give access to the recording and presentation slides.

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Use the link provided at the end to let us know what we can do better.

Agenda

- Why 64-bit?
- Which Client Am I Using?
- HCL Recommendations for 64-Bit
- LotusScript and API Calls
- Java
- Eclipse Plugins
- Q & A

Some Terminology

- **We are talking about 32/64 bit applications, not operating systems**
  - Everyone should be on a 64-bit OS right now
  - Platform == bitness of the **application**, not the OS
- **We are talking about Windows**
  - Not Mac, Linux, iOS, etc.
  - 32-bit == **Win32** or **x86**
  - 64-bit == **Win64** or **x64** or (confusingly) x86_64
- **This presentation is as-of Notes 12.0.2 FP3 and Notes 14.0.0**
  - Some things might change or get fixed later!
  - 12.0.2 FP3 just came out on 17 January 2024

Why 64-Bit?

Why 64-Bit?

- **32-bit applications still work on 64-bit Windows**
  - WOW64 redirection under the covers
  - HKLM\Software → HKLM\Software\WOW6432Node
  - C:\Windows\System32 → C:\Windows\SysWOW64

- **64-bit advantages**
  - **More memory** (virtual address space) per process: 128TB vs 4GB
    - Not just process memory, also used for memory mapping files (less swapping)
    - https://www.panagenda.com/blog/the-out-of-memory-mystery-in-notes-11
  - **More CPU registers** available for use
    - Potentially faster
    - https://learn.microsoft.com/en-us/windows-hardware/drivers/debugger/x64-architecture

Better Security?

- **Larger memory space allows for better address randomization**
  - ASLR high entropy randomization
  - Viruses/exploits can’t guess where your applications are running in memory
- **Win32 App Isolation in Windows 11**
  - https://blogs.windows.com/windowsdeveloper/2023/06/14/public-preview-improve-win32-app-security-via-app-isolation
- **32-bit supporting libraries/programs not maintained**
  - Unmaintained software is potentially open to more exploits

Politics

- **Some organizations have 64-bit only directives**
- **32-bit programs seem “old”**
- **Even Microsoft struggles with this with Office**
  - Still has both 32- and 64-bit versions
  - https://support.microsoft.com/en-us/office/choose-between-the-64-bit-or-32-bit-version-of-office-2dee7807-8f95-4d0c-b5fe-6c6f49b8d261

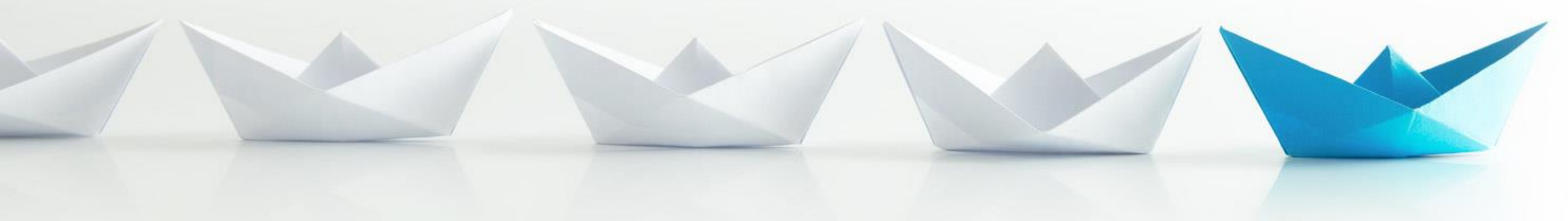
Better Support Long Term

- **Hard to support multiple versions of software**
  - Both HCL and you!
- **Eclipse dropped 32-bit support in 2018**
  - Although 32-bit Java packages are still being built
- **Pain of switching now will be worth it later**
- **Already did it with Domino servers years ago**
  - First Windows 64-bit Domino server was version 8.0.1 (2008)
  - Last Windows 32-bit Domino server was version 9.0.1 (2013)

Domino vs Notes Client

- **Didn’t we figure out all the issues when we switched to 64-bit Domino?**
- **So many differences…**
  - UI code
  - Eclipse integration
  - Third-party libraries and app integration
  - Broader range of API calls (both Notes and Windows)
  - Users do much crazier things than admins do
- **Client has a lot more code running on a much wider variety of machines**

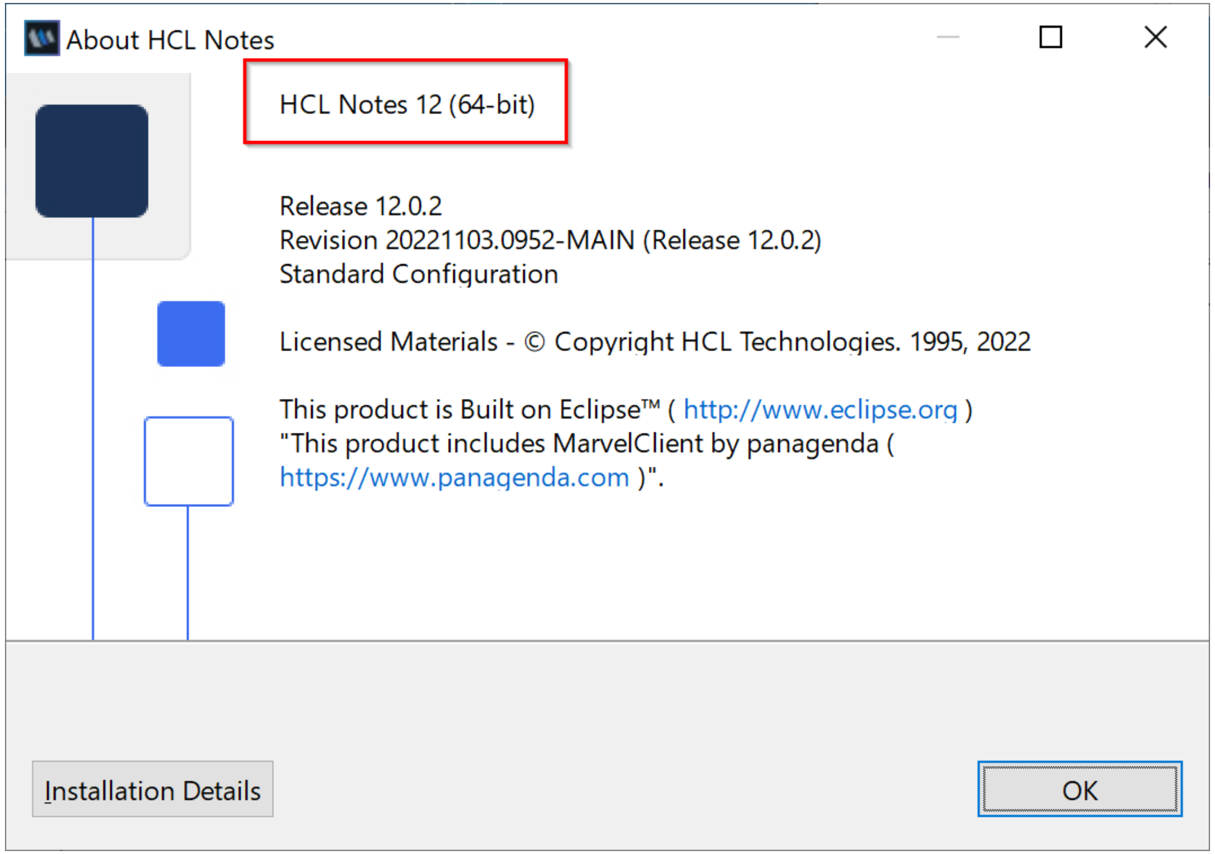
Which Client Am I Using?



How Do I Know?

- **How do you know if you're using a 64-bit client?**
  - **Notes 14:** it's always 64-bit
  - **Notes 12.0.2:** Help – About
  - **Notes 12.0.1 or earlier:** 32-bit

- **12.0.2 is the only version with both 32- and 64-bit**



HCL Notes 12 (64-bit)

Release 12.0.2
Revision 20221103.0952-MAIN (Release 12.0.2)
Standard Configuration

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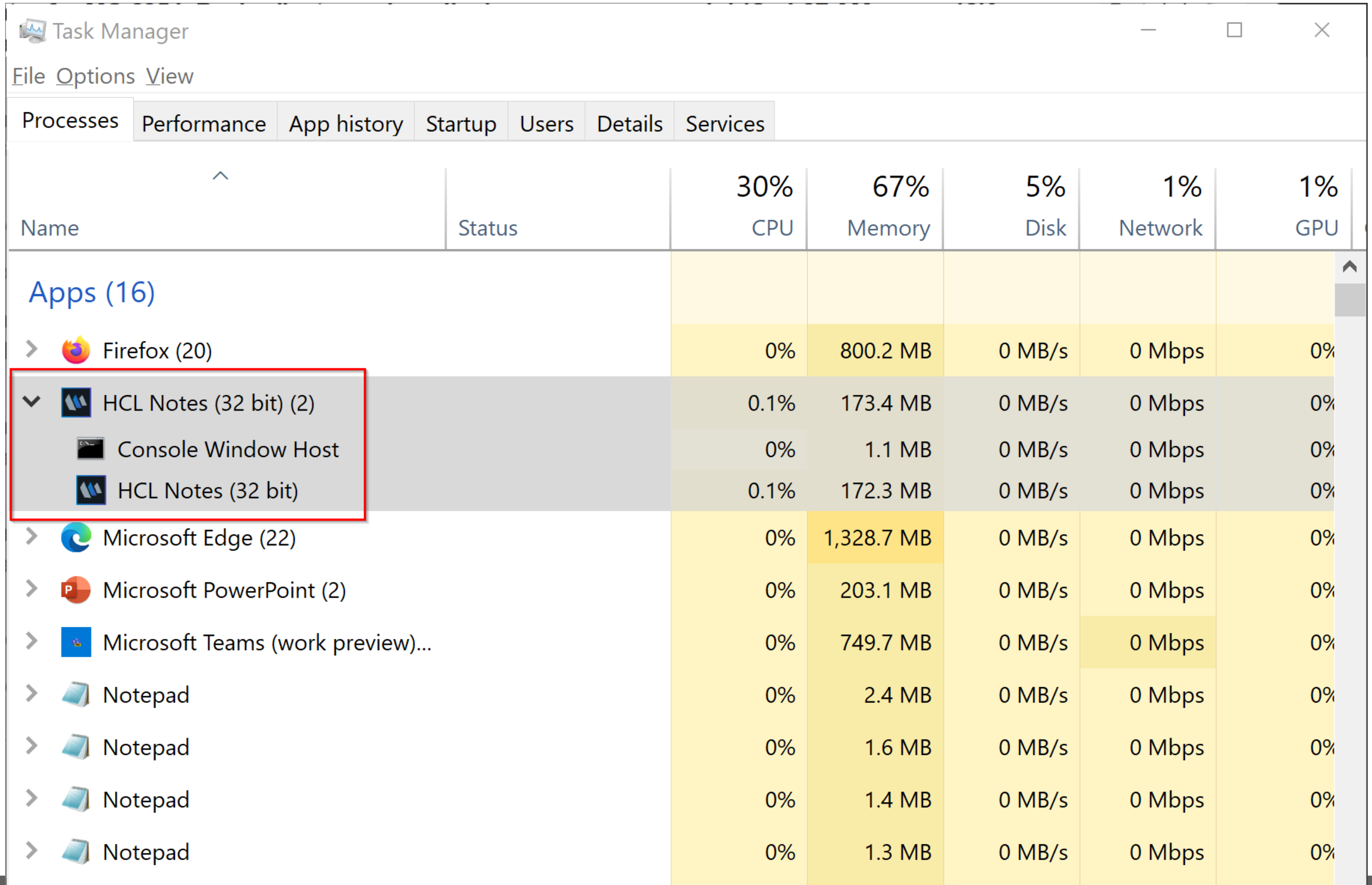
This product is Built on Eclipse™ (http://www.eclipse.org)
"This product includes MarvelClient by panagenda (https://www.panagenda.com)".

64-bit Client: Task Manager

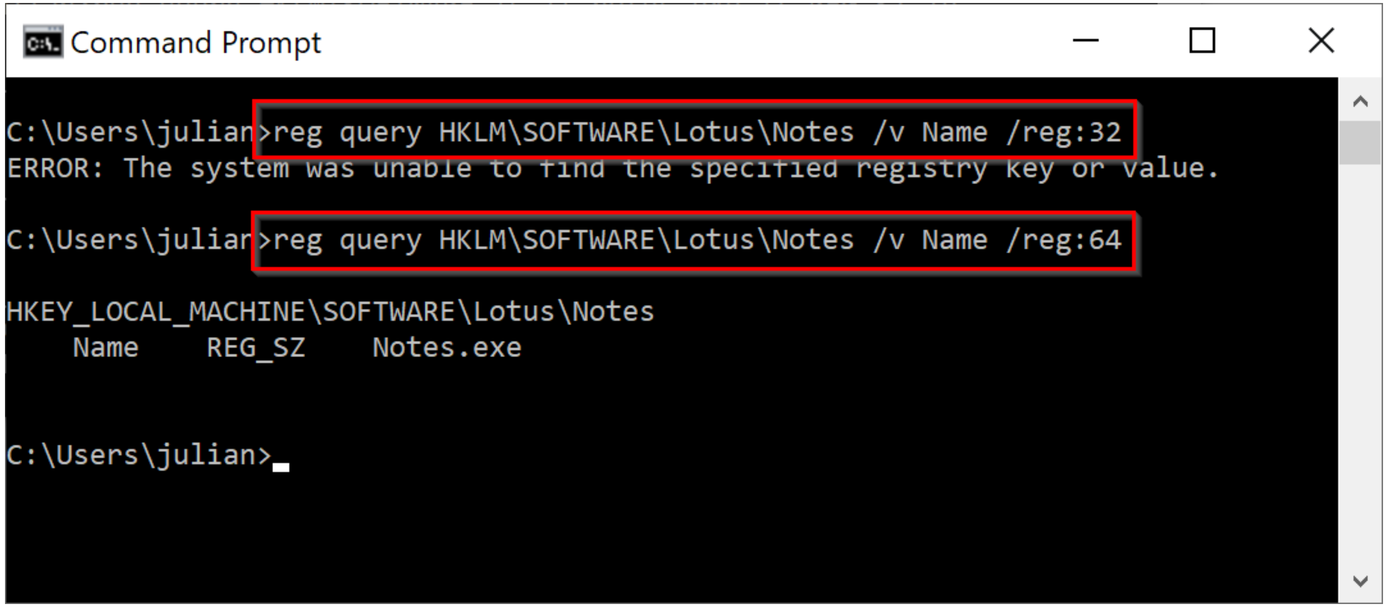
- **Task Manager shows “HCL Notes (32-bit)” for 32-bit client**
  - 64-bit client just says “HCL Notes”


Task Manager
File Options View
Processes Performance App history Startup Users Details Services

Name	Status	30% CPU	67% Memory	5% Disk	1% Network	1% GPU
Apps (16)						
Firefox (20)		0%	800.2 MB	0 MB/s	0 Mbps	0%
HCL Notes (32 bit) (2)		0.1%	173.4 MB	0 MB/s	0 Mbps	0%
Console Window Host		0%	1.1 MB	0 MB/s	0 Mbps	0%
HCL Notes (32 bit)		0.1%	172.3 MB	0 MB/s	0 Mbps	0%
Microsoft Edge (22)		0%	1,328.7 MB	0 MB/s	0 Mbps	0%
Microsoft PowerPoint (2)		0%	203.1 MB	0 MB/s	0 Mbps	0%
Microsoft Teams (work preview)...		0%	749.7 MB	0 MB/s	0 Mbps	0%
Notepad		0%	2.4 MB	0 MB/s	0 Mbps	0%
Notepad		0%	1.6 MB	0 MB/s	0 Mbps	0%
Notepad		0%	1.4 MB	0 MB/s	0 Mbps	0%
Notepad		0%	1.3 MB	0 MB/s	0 Mbps	0%

64-bit Client: Registry

- **32-bit client has registry entries in WOW6432Node branch**
  - Use **reg query** with **/reg:32** or **/reg:64** and see which one works
  - DANGER: sometimes a machine that used to have a 32-bit client still has the old registry entries!



```
C:\Users\julian>reg query HKLM\SOFTWARE\Lotus\Notes /v Name /reg:32
ERROR: The system was unable to find the specified registry key or value.

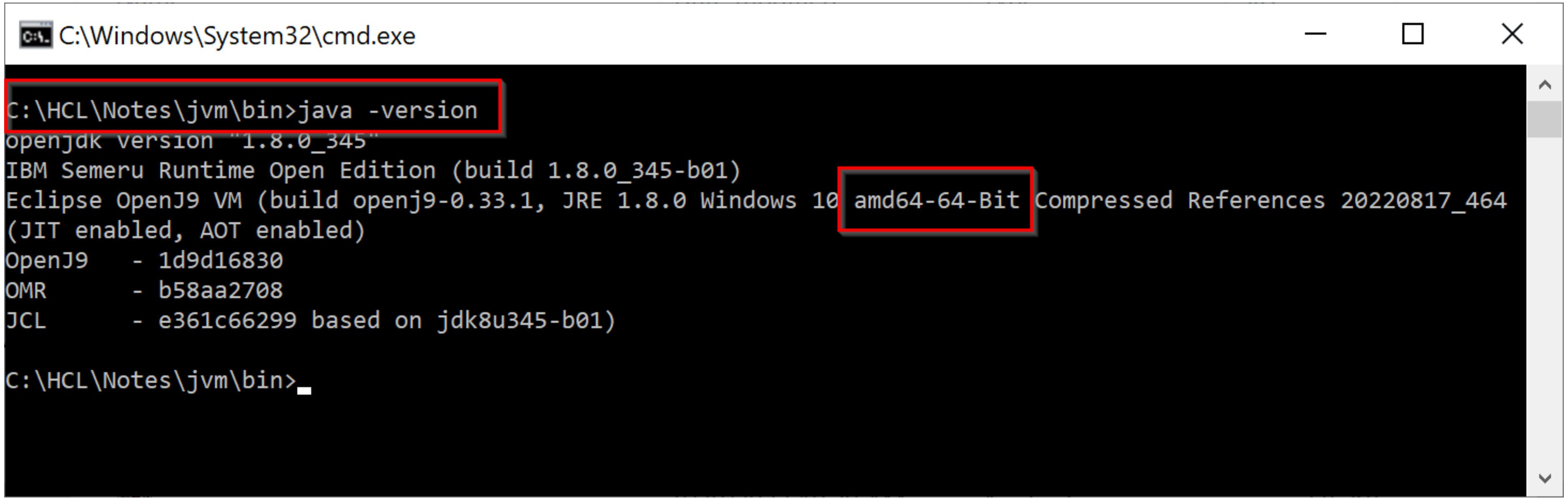
C:\Users\julian>reg query HKLM\SOFTWARE\Lotus\Notes /v Name /reg:64

HKEY_LOCAL_MACHINE\SOFTWARE\Lotus\Notes
    Name    REG_SZ    Notes.exe


C:\Users\julian>_
```

64-bit Client: Check Java Version

- **Run “java -version” from Notes\jvm\bin**
  - Look for 32-Bit or 64-Bit

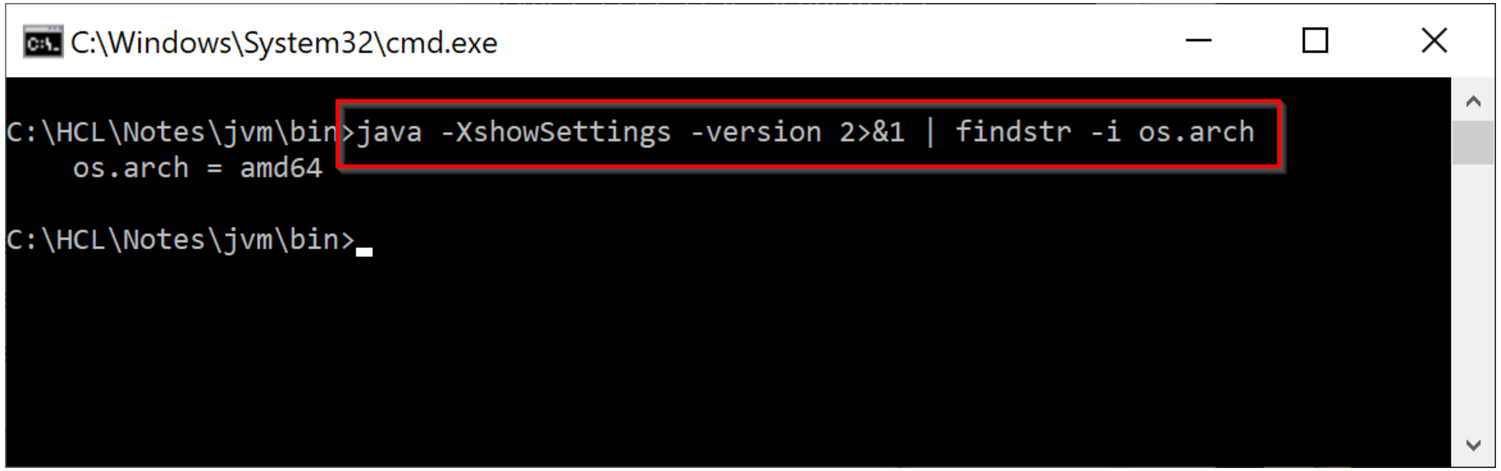


```
C:\HCL\Notes\jvm\bin>java -version
openjdk version "1.8.0_345"
IBM Semeru Runtime Open Edition (build 1.8.0_345-b01)
Eclipse OpenJ9 VM (build openj9-0.33.1, JRE 1.8.0 Windows 10 amd64-64-Bit Compressed References 20220817_464
(JIT enabled, AOT enabled)
OpenJ9   - 1d9d16830
OMR      - b58aa2708
JCL      - e361c66299 based on jdk8u345-b01)

C:\HCL\Notes\jvm\bin>_
```

64-bit Client: Check Java Properties

- **Or run: java -XshowSettings -version 2>&1 | findstr -i os.arch**
  - Check for “amd64” (64-bit) or “x86” (32-bit)
  - Even machines with Intel processors report “amd64” for 64-bit Java

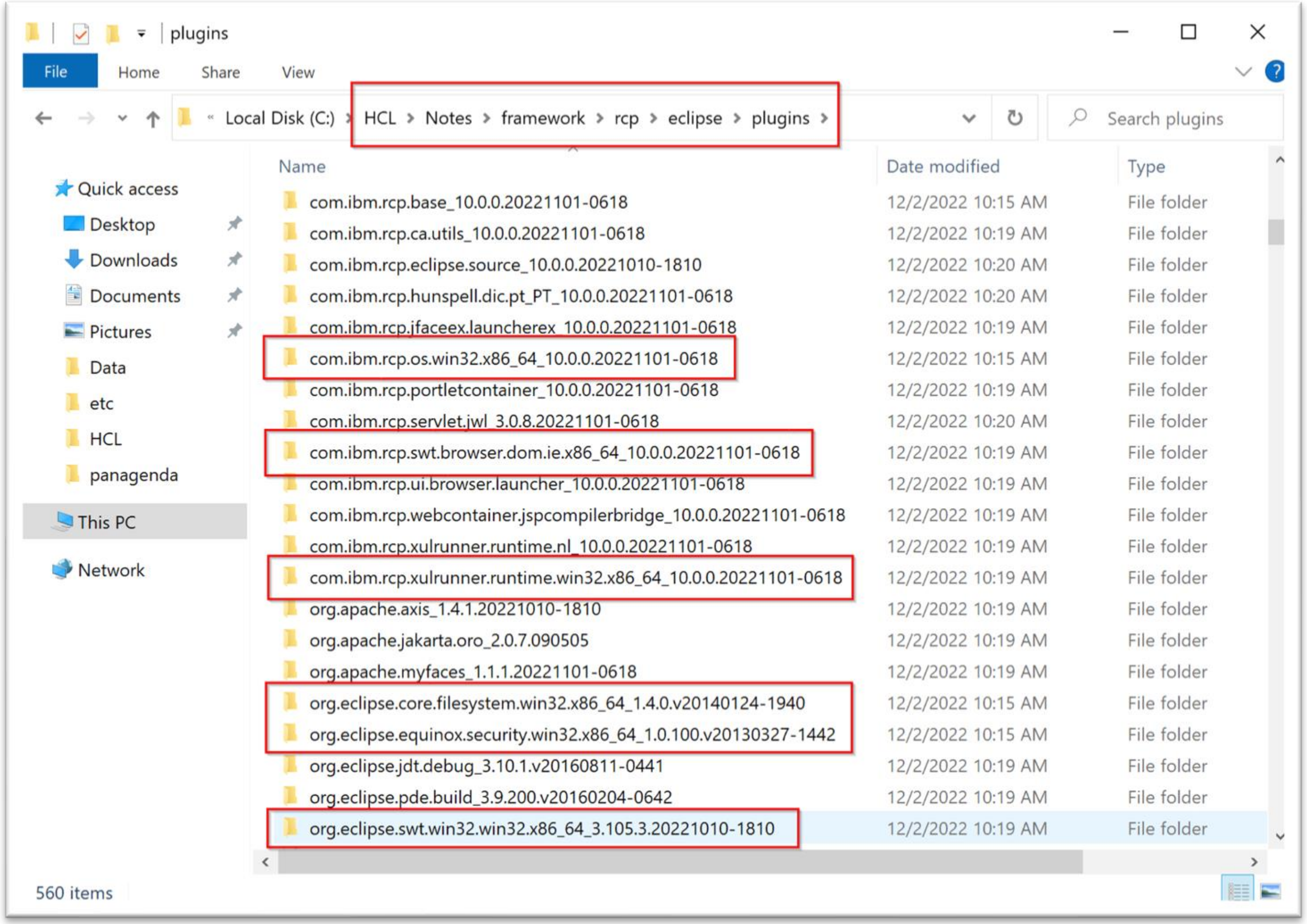


```
C:\HCL\Notes\jvm\bin>java -XshowSettings -version 2>&1 | findstr -i os.arch
    os.arch = amd64

C:\HCL\Notes\jvm\bin>_
```

64-Bit Client: Check for x86_64 Eclipse Plugins

- **In Notes\framework\rcp\eclipse\plugins 64-bit client has x86_64 folders**



Name	Date modified	Type
com.ibm.rcp.base_10.0.0.20221101-0618	12/2/2022 10:15 AM	File folder
com.ibm.rcp.ca.utils_10.0.0.20221101-0618	12/2/2022 10:19 AM	File folder
com.ibm.rcp.eclipse.source_10.0.0.20221010-1810	12/2/2022 10:20 AM	File folder
com.ibm.rcp.hunspell.dic.pt_PT_10.0.0.20221101-0618	12/2/2022 10:20 AM	File folder
com.ibm.rcp.jfaceex.launcherex_10.0.0.20221101-0618	12/2/2022 10:19 AM	File folder
com.ibm.rcp.os.win32.x86_64_10.0.0.20221101-0618	12/2/2022 10:15 AM	File folder
com.ibm.rcp.portletcontainer_10.0.0.20221101-0618	12/2/2022 10:19 AM	File folder
com.ibm.rcp.servlet.jwl_3.0.8.20221101-0618	12/2/2022 10:20 AM	File folder
com.ibm.rcp.swt.browser.dom.ie.x86_64_10.0.0.20221101-0618	12/2/2022 10:19 AM	File folder
com.ibm.rcp.ui.browser.launcher_10.0.0.20221101-0618	12/2/2022 10:19 AM	File folder
com.ibm.rcp.webcontainer.jspcompilerbridge_10.0.0.20221101-0618	12/2/2022 10:19 AM	File folder
com.ibm.rcp.xulrunner.runtime.nl_10.0.0.20221101-0618	12/2/2022 10:19 AM	File folder
com.ibm.rcp.xulrunner.runtime.win32.x86_64_10.0.0.20221101-0618	12/2/2022 10:19 AM	File folder
org.apache.axis_1.4.1.20221010-1810	12/2/2022 10:19 AM	File folder
org.apache.jakarta.oro_2.0.7.090505	12/2/2022 10:19 AM	File folder
org.apache.myfaces_1.1.1.20221101-0618	12/2/2022 10:19 AM	File folder
org.eclipse.core.filesystem.win32.x86_64_1.4.0.v20140124-1940	12/2/2022 10:15 AM	File folder
org.eclipse.equinox.security.win32.x86_64_1.0.100.v20130327-1442	12/2/2022 10:15 AM	File folder
org.eclipse.jdt.debug_3.10.1.v20160811-0441	12/2/2022 10:19 AM	File folder
org.eclipse.pde.build_3.9.200.v20160204-0642	12/2/2022 10:19 AM	File folder
org.eclipse.swt.win32.win32.x86_64_3.105.3.20221010-1810	12/2/2022 10:19 AM	File folder

560 items

64-bit Client: In Your Code

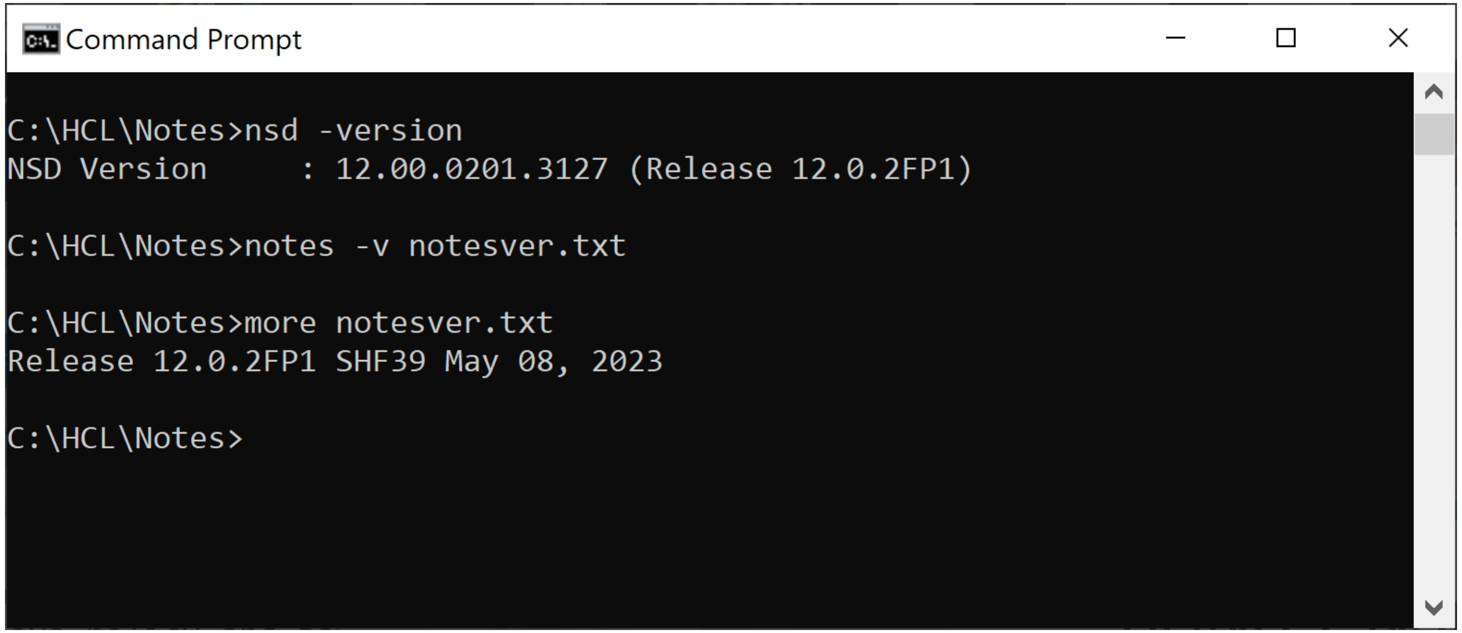
- **LotusScript**
  - NotesSession.Platform = "Windows/64"

- **Formula**
  - @Platform() = "Windows/64"

- **Java**
  - System.getProperty("os.arch").contains("64") && System.getProperty("os.name").contains(“Windows");

BONUS: Notes Client Version from Command Line

- **You can check Notes client version (not bitness) from command line**
  - https://support.hcltechsw.com/csm?id=kb_article&sysparm_article=KB0101159
  - nsd -version
  - notes.exe -v notesver.txt



```
C:\HCL\Notes>nsd -version
NSD Version      : 12.00.0201.3127 (Release 12.0.2FP1)

C:\HCL\Notes>notes -v notesver.txt

C:\HCL\Notes>more notesver.txt
Release 12.0.2FP1 SHF39 May 08, 2023

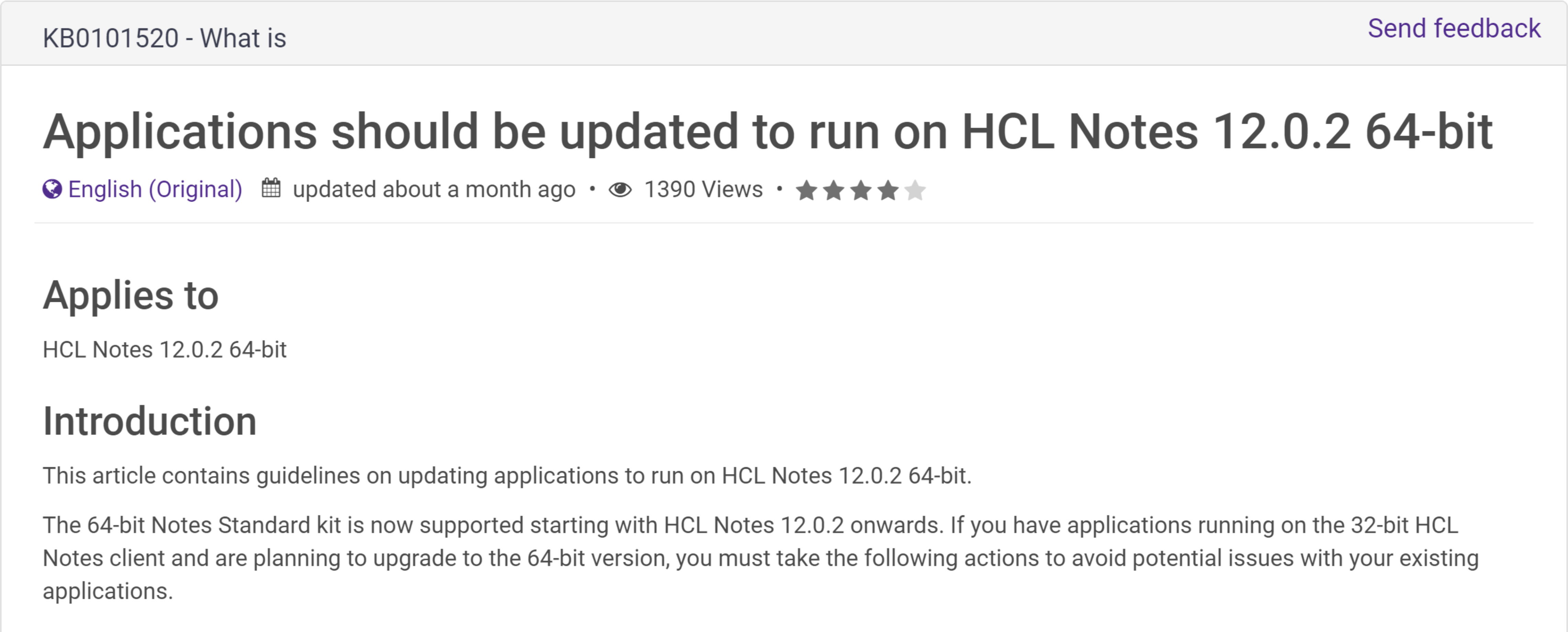
C:\HCL\Notes>
```

HCL Recommendations for 64-Bit

:12

HCL Guidelines For Updating Applications

https://support.hcltechsw.com/csm?id=kb_article&sysparm_article=KB0101520



KB0101520 - What is

Send feedback

Applications should be updated to run on HCL Notes 12.0.2 64-bit

English (Original) updated about a month ago • 1390 Views • ★★★★☆

Applies to

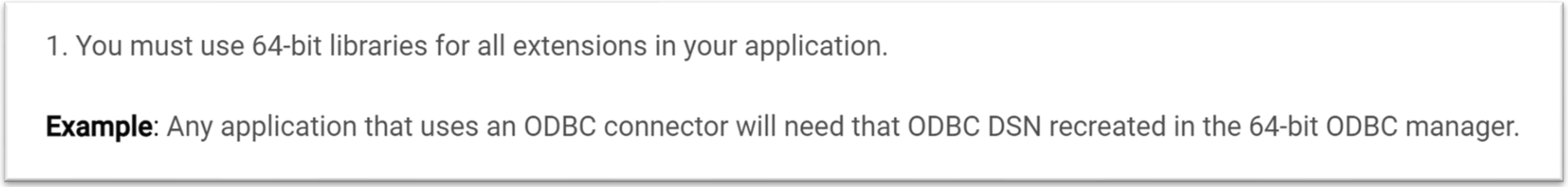
HCL Notes 12.0.2 64-bit

Introduction

This article contains guidelines on updating applications to run on HCL Notes 12.0.2 64-bit.

The 64-bit Notes Standard kit is now supported starting with HCL Notes 12.0.2 onwards. If you have applications running on the 32-bit HCL Notes client and are planning to upgrade to the 64-bit version, you must take the following actions to avoid potential issues with your existing applications.

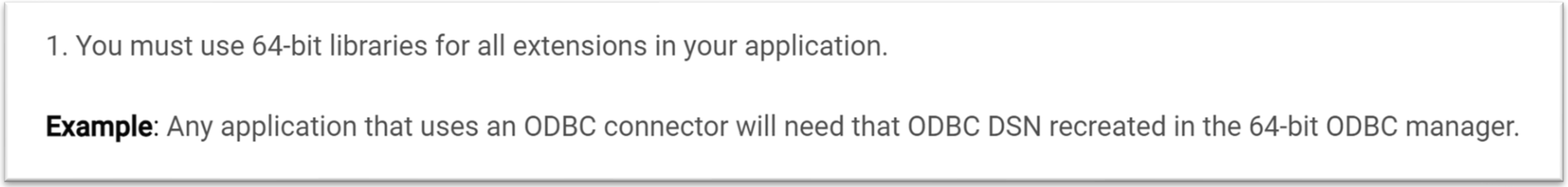
Guideline 1: 64-bit libraries



1. You must use 64-bit libraries for all extensions in your application.

Example: Any application that uses an ODBC connector will need that ODBC DSN recreated in the 64-bit ODBC manager.

Guideline 1: 64-bit libraries



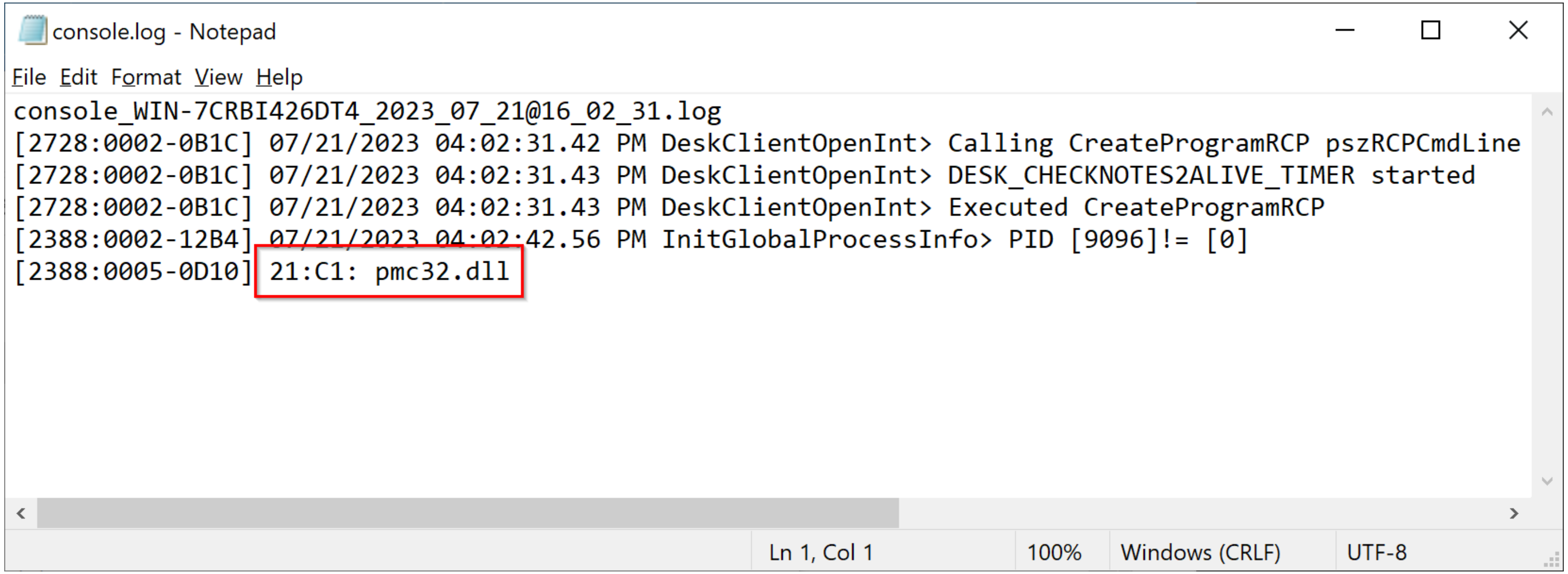
1. You must use 64-bit libraries for all extensions in your application.

Example: Any application that uses an ODBC connector will need that ODBC DSN recreated in the 64-bit ODBC manager.

- **64-bit ODBC drivers to external data sources**
  - Also 64-bit **NotesSQL/HCL ODBC driver** to access the Notes client
  - No longer available (EOM December 2022, EOS June 2024)
  - HCL suggests using https://www.cdata.com/drivers/domino/odbc
- **Any DLLs used as extension manager addins**
  - Virus scan, VOIP, **MarvelClient!**
- **NotesPeek**
  - 64-bit version available on FlexNet

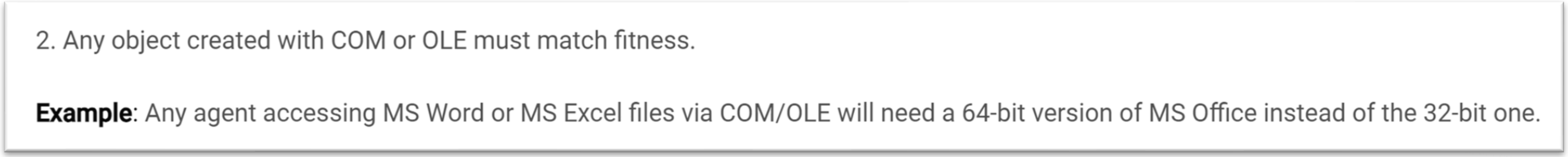
EXTMGR_ADDINS and 32-bit DLLs?

- **What happens if you try to load a 32-bit DLL using ExtMgr_Addins?**
  - Nothing, just a weird **21:C1 error** in console.log
  - 21:C1 = ERROR_BAD_EXE_FORMAT : not a valid Win32 Application



```
console_WIN-7CRBI426DT4_2023_07_21@16_02_31.log
[2728:0002-0B1C] 07/21/2023 04:02:31.42 PM DeskClientOpenInt> Calling CreateProgramRCP pszRCPCmdLine
[2728:0002-0B1C] 07/21/2023 04:02:31.43 PM DeskClientOpenInt> DESK_CHECKNOTES2ALIVE_TIMER started
[2728:0002-0B1C] 07/21/2023 04:02:31.43 PM DeskClientOpenInt> Executed CreateProgramRCP
[2388:0002-12B4] 07/21/2023 04:02:42.56 PM InitGlobalProcessInfo> PID [9096]!= [0]
[2388:0005-0D10] 21:C1: pmc32.dll
```

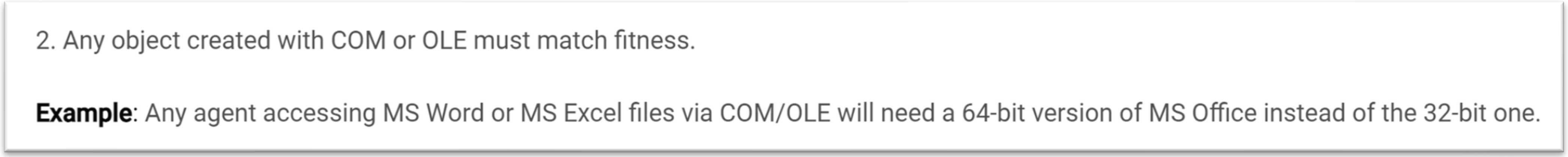
Guideline 2: COM and OLE Compatibility



2. Any object created with COM or OLE must match fitness.

Example: Any agent accessing MS Word or MS Excel files via COM/OLE will need a 64-bit version of MS Office instead of the 32-bit one.

Guideline 2: COM and OLE Compatibility



2. Any object created with COM or OLE must match fitness.

Example: Any agent accessing MS Word or MS Excel files via COM/OLE will need a 64-bit version of MS Office instead of the 32-bit one.

- **Depends on how the called application handles COM/OLE calls**
  - Out-of-process COM servers use RPC, can potentially work with any bitness
  - Can be designed to accept calls from 32- or 64-bit applications (“AnyCPU” or proxy DLLs)
  - Needs registry entries in both the 32- and 64-bit CLSID branches
    - https://web.archive.org/web/20190428064632/https://techtalk.gfi.com/32bit-object-64bit-environment
    - https://stackoverflow.com/questions/38655598/lotus-domino-on-64-bit-system-could-not-create-automation-object-error-208
- **Try it and see what happens!**
  - I tried with some simple OLE calls to Microsoft Word…

Example: Calling Word using OLE

```
Dim wordApp As Variant
Dim wordDoc As Variant

On Error Resume Next
Set wordApp = GetObject("", "Word.Application")

On Error GoTo processError
If IsEmpty(wordApp) Then
    Set wordApp = CreateObject("Word.Application")
End If

If IsEmpty(wordApp) Then
    MessageBox "Could not create Word Application"
    Exit Sub
End If
```

```
wordApp.Visible = True
wordApp.documents.Add
Set wordDoc = wordApp.ActiveDocument

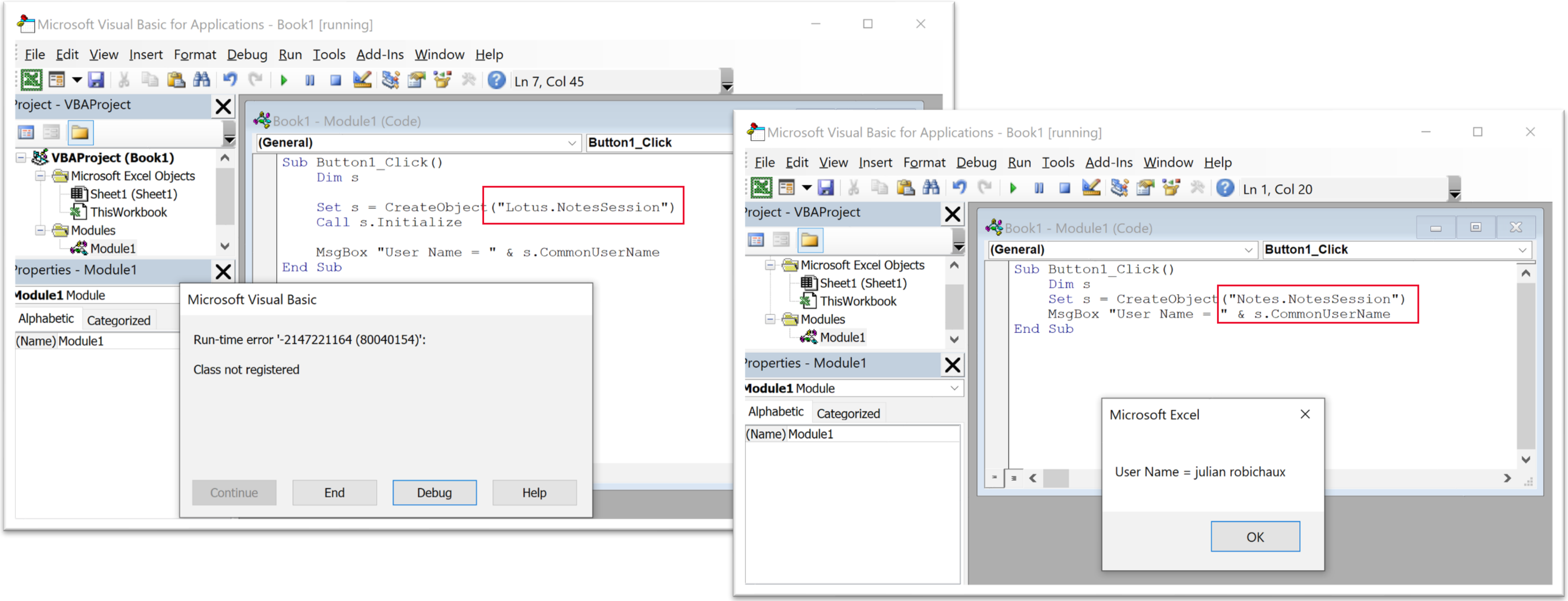
Dim paragraph As Variant
Dim pos As Long
Set paragraph = wordDoc.Paragraphs(wordDoc.Paragraphs.Count).Range
pos = paragraph.End-1
Call paragraph.InsertAfter("Hello Clippy!")

'wordApp.Quit
Exit Sub

processError:
    MessageBox "Error " & Err & " on line " & Erl & ": " & Error
    Exit Sub
```

COM/OLE from Office to Notes

- **Use Notes.NotesSession (OLE) not Lotus.NotesSession (COM)**
  - COM gives Run-time error ‘-2147221164 (80040154)’: Class not registered



```
Sub Button1_Click()
    Dim s

    Set s = CreateObject("Lotus.NotesSession")
    Call s.Initialize

    MsgBox "User Name = " & s.CommonUserName
End Sub
```

Microsoft Visual Basic

Run-time error '-2147221164 (80040154)':

Class not registered

Continue | End | Debug | Help

```
Sub Button1_Click()
    Dim s
    Set s = CreateObject("Notes.NotesSession")
    MsgBox "User Name = " & s.CommonUserName
End Sub
```

Microsoft Excel

User Name = julian robichaux

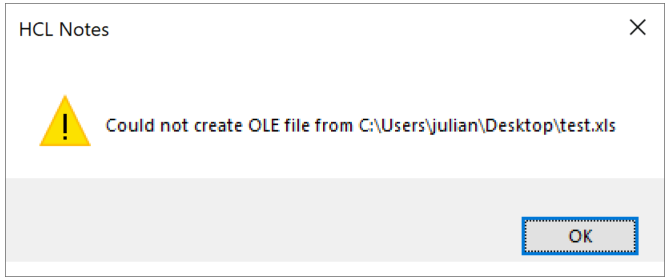
OK

Embedded OLE Objects on Documents

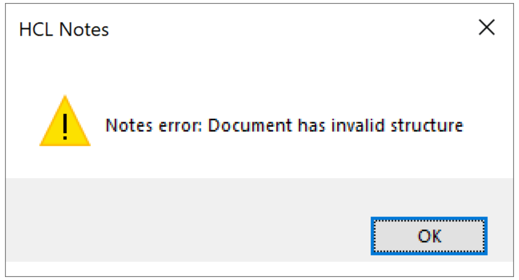
- **Worked for me with 32-bit Notes client and 64-bit Office 365**

- **Embedded OLE object functions might have problems on 64-bit Notes**
  - https://support.hcltechsw.com/csm?id=kb_article&sysparm_article=KB0106900

Command	12.0.2 FP2	12.0.2 FP3	14.0.0
AutoLaunch: First OLE Object	No	No	No
NotesUIDocument.CreateObject	No	No	No
NotesRichTextItem.EmbedObject	No	No	Yes



Could not create OLE file from C:\Users\julian\Desktop\test.xls



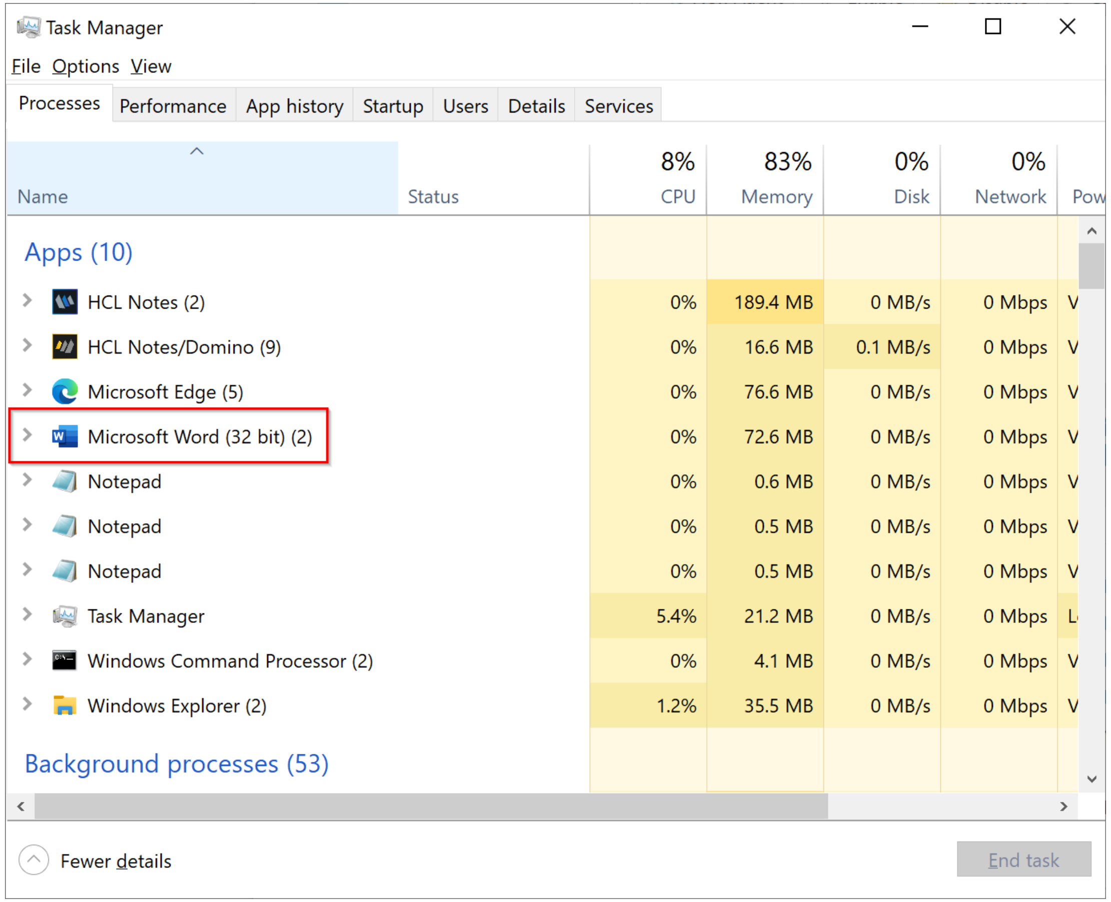
Notes error: Document has invalid structure

So… Does 64-bit Notes Require 64-bit Office?

- **I don’t know man… it depends?**
- **Light testing with different bitness:**
  - 64-bit Word + 32-bit Notes client agent: worked
  - 32-bit Word + 64-bit Notes client agent: worked
  - Office VBA to Notes worked for me using CreateObject(“Notes.NotesSession”)
  - Embedded OLE object on document worked on 32-bit Notes, **not always on 64-bit**
- **Your results may vary, depending on what you’re trying to do**
- **However, if you need to check the bitness of your installed version of Office, here are some ways to do it**

Task Manager: Look for “(32-bit)”

- **While Word (or another Office program) is running, open Task Manager**
  - If it says “**(32-bit)**” after the program name, it’s 32-bit
  - If there’s nothing after the program name, it’s 64-bit



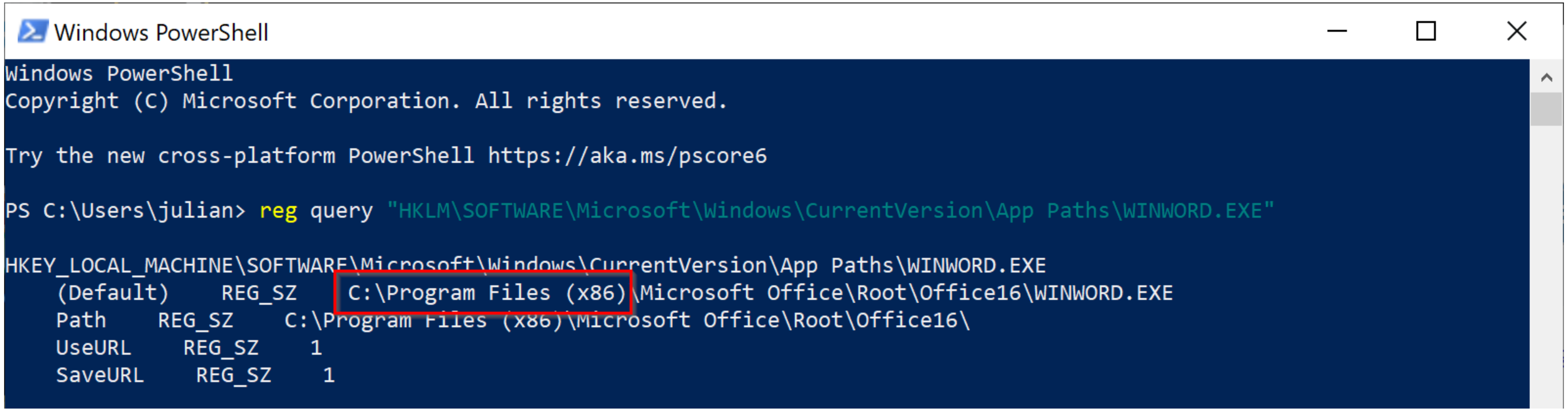
Name	Status	8% CPU	83% Memory	0% Disk	0% Network	Pow
Apps (10)						
HCL Notes (2)		0%	189.4 MB	0 MB/s	0 Mbps	V
HCL Notes/Domino (9)		0%	16.6 MB	0.1 MB/s	0 Mbps	V
Microsoft Edge (5)		0%	76.6 MB	0 MB/s	0 Mbps	V
Microsoft Word (32 bit) (2)		0%	72.6 MB	0 MB/s	0 Mbps	V
Notepad		0%	0.6 MB	0 MB/s	0 Mbps	V
Notepad		0%	0.5 MB	0 MB/s	0 Mbps	V
Notepad		0%	0.5 MB	0 MB/s	0 Mbps	V
Task Manager		5.4%	21.2 MB	0 MB/s	0 Mbps	L
Windows Command Processor (2)		0%	4.1 MB	0 MB/s	0 Mbps	V
Windows Explorer (2)		1.2%	35.5 MB	0 MB/s	0 Mbps	V
Background processes (53)						

Registry: Check the Path

- **Run this from a command prompt or PowerShell:**

```
reg query "HKLM\SOFTWARE\Microsoft\Windows\CurrentVersion\App Paths\WINWORD.EXE"
```

  – If the path is “**C:\Program Files (x86)**” it’s almost certainly 32-bit
  – If the path is “**C:\Program Files**” it’s almost certainly 64-bit



```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\julian> reg query "HKLM\SOFTWARE\Microsoft\Windows\CurrentVersion\App Paths\WINWORD.EXE"

HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\App Paths\WINWORD.EXE
    (Default)    REG_SZ    C:\Program Files (x86)\Microsoft Office\Root\Office16\WINWORD.EXE
    Path    REG_SZ    C:\Program Files (x86)\Microsoft Office\Root\Office16\
    UseURL    REG_SZ    1
    SaveURL    REG_SZ    1
```

LotusScript: Find Bitness of Installed MS Word

```
Const SCS_32BIT_BINARY = 0 'A 32-bit Windows-based application
Const SCS_DOS_BINARY = 1   'An MS-DOS – based application
Const SCS_WOW_BINARY = 2   'A 16-bit Windows-based application
Const SCS_PIF_BINARY = 3   'A PIF file that executes an MS-DOS –
based application
Const SCS_POSIX_BINARY = 4 'A POSIX – based application
Const SCS_OS216_BINARY = 5 'A 16-bit OS/2-based application
Const SCS_64BIT_BINARY = 6 'A 64-bit Windows-based application

' only works on EXEs, not DLLs
Declare Function GetBinaryTypeA Lib "kernel32.dll" (_
    ByVal lpApplicationName As String, _
    lpBinaryType As Long) As Integer
```

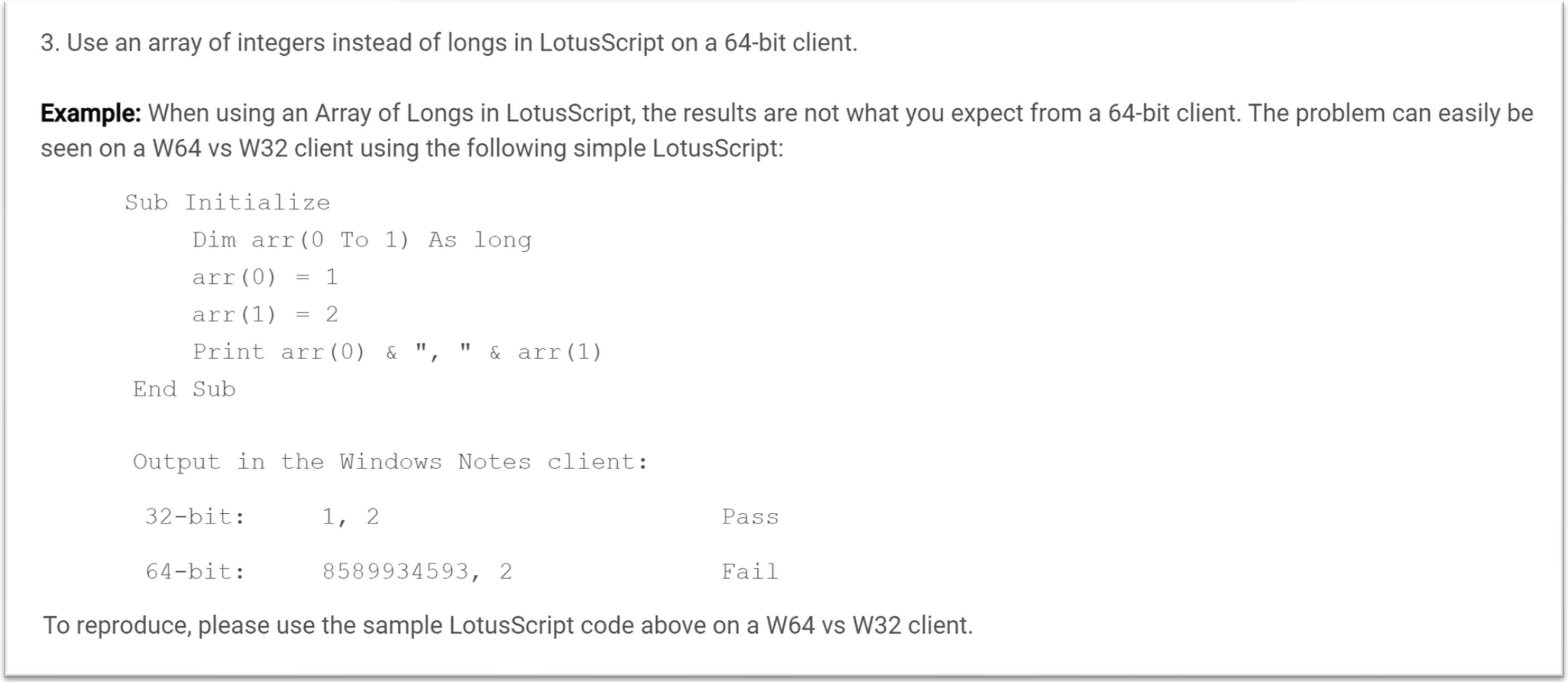
```
'** find the path to the Word executable, e.g.
'** C:\Program Files\Microsoft Office\root\Office16\WINWORD.EXE
Dim RegValue As Variant
RegValue = Evaluate(|@RegQueryValue("HKEY_LOCAL_MACHINE";
"SOFTWARE\\Microsoft\\Windows\\CurrentVersion\\App
Paths\\WINWORD.EXE"; "")|)

If (RegValue(0) = "") Then
    MessageBox "Registry key not found"
    Exit Sub
End If

Dim binaryType As Long
Dim result As Integer

result = GetBinaryTypeA(RegValue(0), binaryType)
If result = 0 Then
    MessageBox "Call failed: " & result
ElseIf (binaryType = SCS_32BIT_BINARY) Then
    MessageBox "32-bit application detected"
ElseIf (binaryType = SCS_64BIT_BINARY) Then
    MessageBox "64-bit application detected"
Else
    MessageBox "Unknown application bitness: " & binaryType
End If
```

Guideline 3: Array of Longs on 64-bit Client



3. Use an array of integers instead of longs in LotusScript on a 64-bit client.

Example: When using an Array of Longs in LotusScript, the results are not what you expect from a 64-bit client. The problem can easily be seen on a W64 vs W32 client using the following simple LotusScript:

```
Sub Initialize
    Dim arr(0 To 1) As long
    arr(0) = 1
    arr(1) = 2
    Print arr(0) & ", " & arr(1)
 End Sub
```

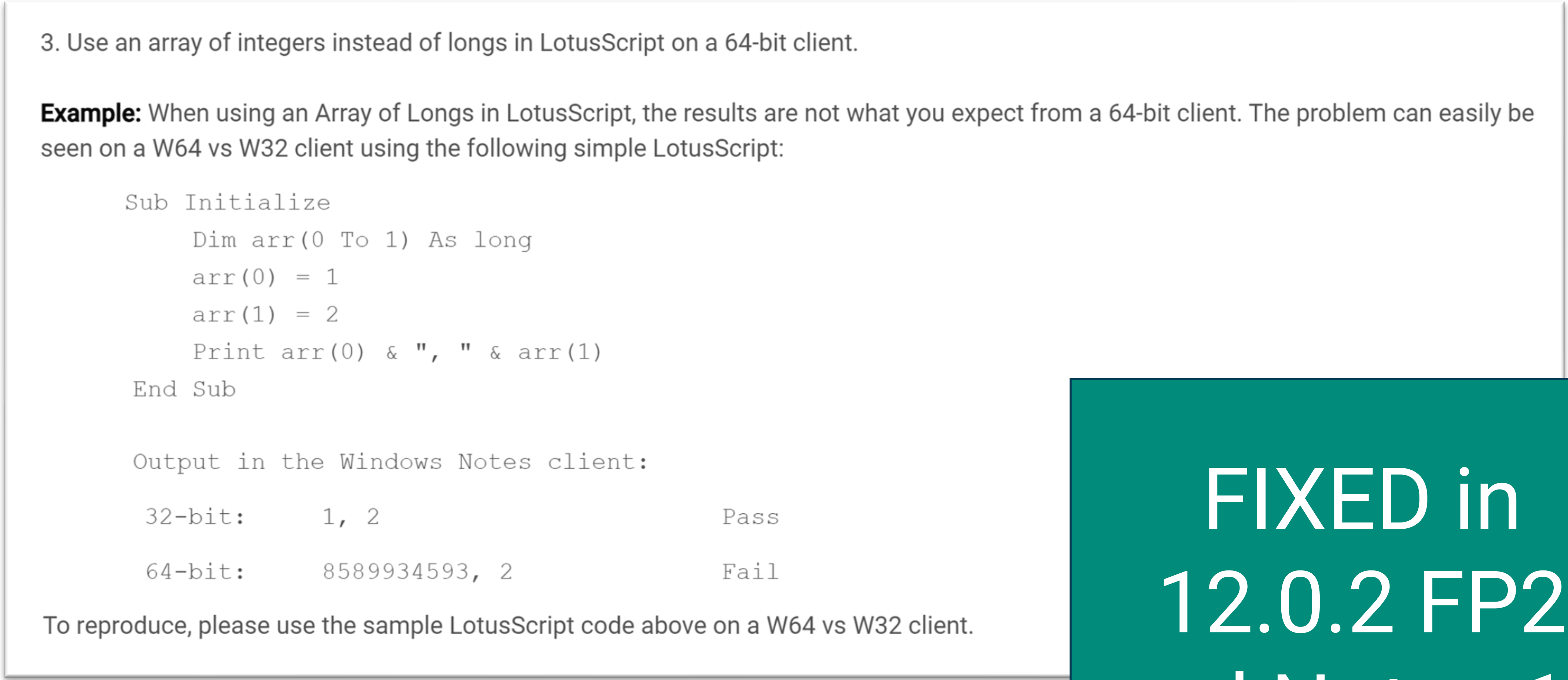
```
 Output in the Windows Notes client:

  32-bit:     1, 2                      Pass

  64-bit:     8589934593, 2             Fail
```

To reproduce, please use the sample LotusScript code above on a W64 vs W32 client.

Guideline 3: Array of Longs on 64-bit Client



3. Use an array of integers instead of longs in LotusScript on a 64-bit client.

Example: When using an Array of Longs in LotusScript, the results are not what you expect from a 64-bit client. The problem can easily be seen on a W64 vs W32 client using the following simple LotusScript:

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    Print arr(0) & ", " & arr(1)
 End Sub
```

```
 Output in the Windows Notes client:

  32-bit:      1, 2                         Pass

  64-bit:      8589934593, 2                Fail
```

To reproduce, please use the sample LotusScript code above on a W64 vs W32 client.

FIXED in 12.0.2 FP2 and Notes 14

LotusScript and API Calls

:19

LotusScript on Windows 64-bit clients

- **In general, LotusScript works the same on 64-bit**
  - No functions/classes were removed
  - No recompile necessary
- **Potential issue with smaller stack size (recursive functions)**
  - https://support.hcltechsw.com/csm?id=kb_article&sysparm_article=KB0102290
- **Max size of static String array is 4049 (was 8190 on 32-bit)**
  - https://support.hcltechsw.com/csm?id=kb_article&sysparm_article=KB0040725
- **A couple functions that can cause problems when compiled on 64-bit**
  - If you compile on 64-bit and run on 32-bit, they don't work correctly!
  - If you compile on 32-bit, they work properly on both platforms

Compiled on 64-Bit, Broken on 32-Bit

- **NotesView.GetAllEntriesByKey**
  - Specifically when using an **array of Variants** for a lookup key
  - When compiled on 64-bit, causes “Invalid key value type” error when run on 32-bit
  - If you use an **array of Strings** it might return the wrong result with no error!
  - https://support.hcltechsw.com/csm?id=kb_article&sysparm_article=KB0102291

```
Sub Initialize
    Dim session As New NotesSession
    Dim key(1) As Variant
    Dim vec As NotesViewEntryCollection
    Dim v As NotesView

    key(0) = "Value1"
    key(1) = "Value2"

    Set v = session.CurrentDatabase.GetView("Sorted")
    Set vec = v.GetAllEntriesByKey(pKey, True)

    MsgBox "vec.Count = " & vec.Count
End Sub
```

When compiled on 64-bit

Run on	Result
64-bit	e.g.: vec.Count = 1
32-bit	Error: Invalid key value type

Compiled on 64-Bit, Broken on 32-Bit

- **Replace(str, arr1, arr2)**
  - Specifically when using an **array of Strings** for the search value
  - When compiled on 64-bit, always returns “” when run on 32-bit
  - There is no error! **Fixed in 32-bit 12.0.2 FP3** , broken on all other (older) 32-bit clients
  - https://support.hcltechsw.com/csm?id=kb_article&sysparm_article=KB0109692

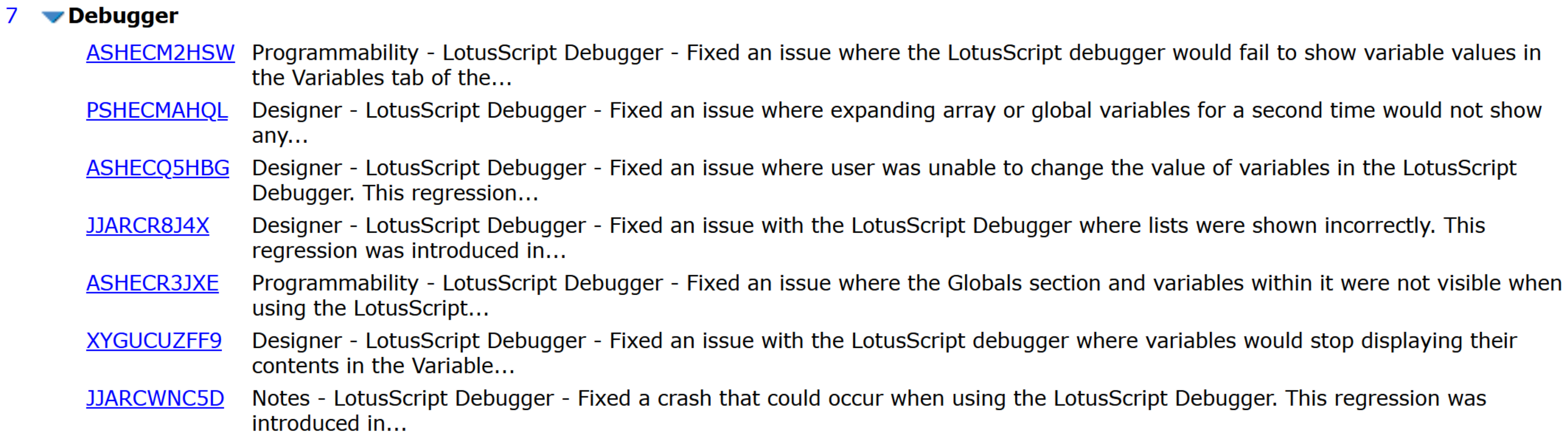
```
Sub Initialize
    Dim s As String, arr(7) As String
    arr(0)="\"
    arr(1)="/"
    arr(2)=":"
    arr(3)="*"
    arr(4)="?"
    arr(5)="<"
    arr(6)=">"
    arr(7)="|"
    s = "Hello : World"
    s = Replace(s, arr, "")
    MessageBox s
End Sub
```

When compiled on 64-bit

Run on	Result
64-bit	“Hello World”
32-bit	“”

LotusScript Debugger: Buggy in 12.0.2, Better in 14

- **Lots of fixes in 14 to solve Debugger problems you saw in 12.0.2**
  - 12.0.2 FP3 got some (all?) of these fixes too



7 ▼ **Debugger**

ASHECM2HSW Programmability - LotusScript Debugger - Fixed an issue where the LotusScript debugger would fail to show variable values in the Variables tab of the...

PSHECMAHQL Designer - LotusScript Debugger - Fixed an issue where expanding array or global variables for a second time would not show any...

ASHECQ5HBG Designer - LotusScript Debugger - Fixed an issue where user was unable to change the value of variables in the LotusScript Debugger. This regression...

JJARCR8J4X Designer - LotusScript Debugger - Fixed an issue with the LotusScript Debugger where lists were shown incorrectly. This regression was introduced in...

ASHECR3JXE Programmability - LotusScript Debugger - Fixed an issue where the Globals section and variables within it were not visible when using the LotusScript...

XYGUCUZFF9 Designer - LotusScript Debugger - Fixed an issue with the LotusScript debugger where variables would stop displaying their contents in the Variable...

JJARCWNC5D Notes - LotusScript Debugger - Fixed a crash that could occur when using the LotusScript Debugger. This regression was introduced in...

Platform-Specific Code

- **Code with NotesSession.Platform or IsDefined() needs to be reviewed**
  - Recommendation: use **NotesSession.Platform = “Windows/64”** for 64-bit code
  - **NotesSession.Platform = “Windows/32”**
    - WILL NOT RECOGNIZE 64-BIT
    - 64-bit client is “Windows/64”
  - **Left(NotesSession.Platform, 3) = “Win”**
    - THINKS 32- AND 64-BIT ARE THE SAME
  - **IsDefined(“WIN32”)**
    - THINKS 32- AND 64-BIT ARE THE SAME
    - IsDefined(“WIN64”) always False even on 64-bit client

C-API Calls

- **If a parameter or return value is data, same as 32-bit**
  - STATUS, WORD, DWORD, int, long, etc.
- **If a parameter is a LotusScript String, same as 32-bit**
- **If a parameter or return value is a Notes C-API HANDLE, same as 32-bit**
  - Still uses 32-bit sizes for backwards compatibility
- **If a parameter or return value is a Windows HANDLE or a pointer…**
  - Use **Long** on 32-bit clients, **Double** on 64-bit clients
  - Call **session.UseDoubleAsPointer = True** before you make the calls on 64-bit
  - Call **session.UseDoubleAsPointer = False** after you make the calls on 64-bit

NotesSession.UseDoubleAsPointer

- **NotesSession.UseDoubleAsPointer on 64-bit platforms**
  - Only required for API calls returning or using **pointers/handles** on a **64-bit client**
  - Set to **True before** the API code runs, **False after** it's done
  - https://help.hcltechsw.com/dom_designer/12.0.2/basic/H_USEDOUBLEASPOINTER_METHOD_SESSION.html
  - https://ds-infolib.hcltechsw.com/ldd/ddwiki.nsf/dx/C-Callouts_on_non-32-bit_Platforms

- **NotesSession is shared by all code triggered from the client UI**
  - Buttons, actions, agents…
  - Persistent setting across databases while the client is open
  - If you set UseDoubleAsPointer in one place, **you are setting it everywhere**
    - Does not seem to include code triggered by NotesAgent.Run

NotesSession.UseDoubleAsPointer

- **Doesn't work on Forms in 12.0.2 FP1/2**
  - E.g. buttons, actions, events…
  - Error 156: "Property is not available on this object"
  - Fixed in 12.0.2 FP3 and 14.0.0

- **What if you might have to compile the code on a pre-12.0.1 client?**
  - **UseDoubleAsPointer didn't exist before 12.0.1**, won't compile
  - Use an Execute statement… but make sure it only runs on 64-bit clients
  - All 64-bit clients are guaranteed to recognize this property

```
If (session.Platform = "Windows/64") Then
    Execute |Dim session As New NotesSession
             session.UseDoubleAsPointer = True|
```

Test All Your C-API Calls

- **Avoid using “Any” as a parameter type for pointers when possible**
  - Can work, but won’t autobox numerical values to the correct type/size
  - Use a strict parameter type (Long or Double) whenever possible to avoid surprises

- **Some things that worked on 64-bit 12.0.2 require changes for Notes 14!**
  - Also some things that worked on 12.0.2 FP1 require changes for 12.0.2 FP2/3
  - 12.0.2 FP1 silently converted some handles to Long, FP2/Notes 14 does not
  - Notes 14 is more strict about NotesSession.UseDoubleAsPointer

- **Some things that worked on Notes 14 Beta require changes for GA!**
  - Same situation as 12.0.2
  - You just have to test all the API calls and modify as needed

4:30

Notes C-API Example

```
Declare Function StatQueryTime Lib "nnotes.dll" (_
    ByVal facility As String, _
    ByVal statName As String, _
    ByVal headerString As String, _
    ByVal namePrefix As String, _
    ByVal valuePrefix As String, _
    ByVal lineSuffix As String, _
    dhStats As Long, _                '** DHANDLE to a text buffer
    dwStatsLength As Long) As Integer '** returns a STATUS

Declare Function OSLockObject Lib "nnotes.dll" (_
    ByVal dHandle As Long) As Long                 '** takes a DHANDLE, returns a pointer
Declare Function OSUnlockObject Lib "nnotes.dll" (_
    ByVal dHandle As Long) As Long                 '** takes a DHANDLE, returns a BOOL
Declare Function OSMemFree Lib "nnotes.dll" (_
    ByVal dHandle As Long) As Integer              '** takes a DHANDLE, returns a STATUS

Declare Sub CopyBufferToString Lib "nnotes.dll" Alias "Cmovmem" (_
    ByVal lpSrc As Long, _      '** pointer to a source buffer
    ByVal lpDest As String, _   '** destination string
    ByVal lSize As Long)        '** size of destination string
```

Notes C-API Example

```
Declare Function StatQueryTime Lib "nnotes.dll" (_
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    ByVal statName As String, _
    ByVal headerString As String, _
    ByVal namePrefix As String, _
    ByVal valuePrefix As String, _
    ByVal lineSuffix As String, _
    dhStats As Long, _                 '** DHANDLE to a text buffer
    dwStatsLength As Long) As Integer '** returns a STATUS

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    ByVal dHandle As Long) As Long             '** takes a DHANDLE, returns a pointer
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    ByVal dHandle As Long) As Long             '** takes a DHANDLE, returns a BOOL
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    ByVal dHandle As Long) As Integer          '** takes a DHANDLE, returns a STATUS

Declare Sub CopyBufferToString Lib "nnotes.dll" Alias "Cmovmem" (_
    ByVal lpSrc As Long, _       '** pointer to a source buffer
    ByVal lpDest As String, _    '** destination string
    ByVal lSize As Long)         '** size of destination string
```

String, DHANDLE, STATUS, and BOOL are fine

Notes C-API Example

```
Declare Function StatQueryTime Lib "nnotes.dll" (_
    ByVal facility As String, _
    ByVal statName As String, _
    ByVal headerString As String, _
    ByVal namePrefix As String, _
    ByVal valuePrefix As String, _
    ByVal lineSuffix As String, _
    dhStats As Long, _                '** DHANDLE to a text buffer
    dwStatsLength As Long) As Integer '** returns a STATUS

Declare Function OSLockObject Lib "nnotes.dll" (_
    ByVal dHandle As Long) As Long             '** takes a DHANDLE, returns a pointer
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    ByVal dHandle As Long) As Long             '** takes a DHANDLE, returns a BOOL
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    ByVal dHandle As Long) As Integer          '** takes a DHANDLE, returns a STATUS

Declare Sub CopyBufferToString Lib "nnotes.dll" Alias "Cmovmem" (_
    ByVal lpSrc As Long, _      '** pointer to a source buffer
    ByVal lpDest As String, _   '** destination string
    ByVal lSize As Long)        '** size of destination string
```

Pointers need to change from Long to Double

Notes C-API Example

```
Declare Function OSLockObject Lib "nnotes.dll" (_
    ByVal dHandle As Long) As Long                 '** takes a DHANDLE, returns a pointer

Declare Function OSLockObject_64 Lib "nnotes.dll" Alias "OSLockObject" (_
    ByVal dHandle As Long) As Double               '** takes a DHANDLE, returns a pointer



Declare Sub CopyBufferToString Lib "nnotes.dll" Alias "Cmovmem" (_
    ByVal lpSrc As Long, _        '** pointer to a source buffer
    ByVal lpDest As String, _     '** destination string
    ByVal lSize As Long)          '** size of destination string

Declare Sub CopyBufferToString_64 Lib "nnotes.dll" Alias "Cmovmem" (_
    ByVal lpSrc As Double, _      '** pointer to a source buffer
    ByVal lpDest As String, _     '** destination string
    ByVal lSize As Long)          '** size of destination string
```

Make a copy of each Declare (use the Alias keyword) with a modified name

Notes C-API Example

```
Declare Function OSLockObject Lib "nnotes.dll" (_
    ByVal dHandle As Long) As Long                 '** takes a DHANDLE, returns a pointer

Declare Function OSLockObject_64 Lib "nnotes.dll" Alias "OSLockObject" (_
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```

```
Declare Sub CopyBufferToString Lib "nnotes.dll" Alias "Cmovmem" (_
    ByVal lpSrc As Long, _      '** pointer to a source buffer
    ByVal lpDest As String, _   '** destination string
    ByVal lSize As Long)        '** size of destination string

Declare Sub CopyBufferToString_64 Lib "nnotes.dll" Alias "Cmovmem" (_
    ByVal lpSrc As Double, _    '** pointer to a source buffer
    ByVal lpDest As String, _   '** destination string
    ByVal lSize As Long)        '** size of destination string
```

Pointers need to change from Long to Double

Notes C-API Example

```
Dim session As New NotesSession
Dim buffer As Long
Dim bufferLen As Long
Dim bufferText As String
Dim pointer As Long

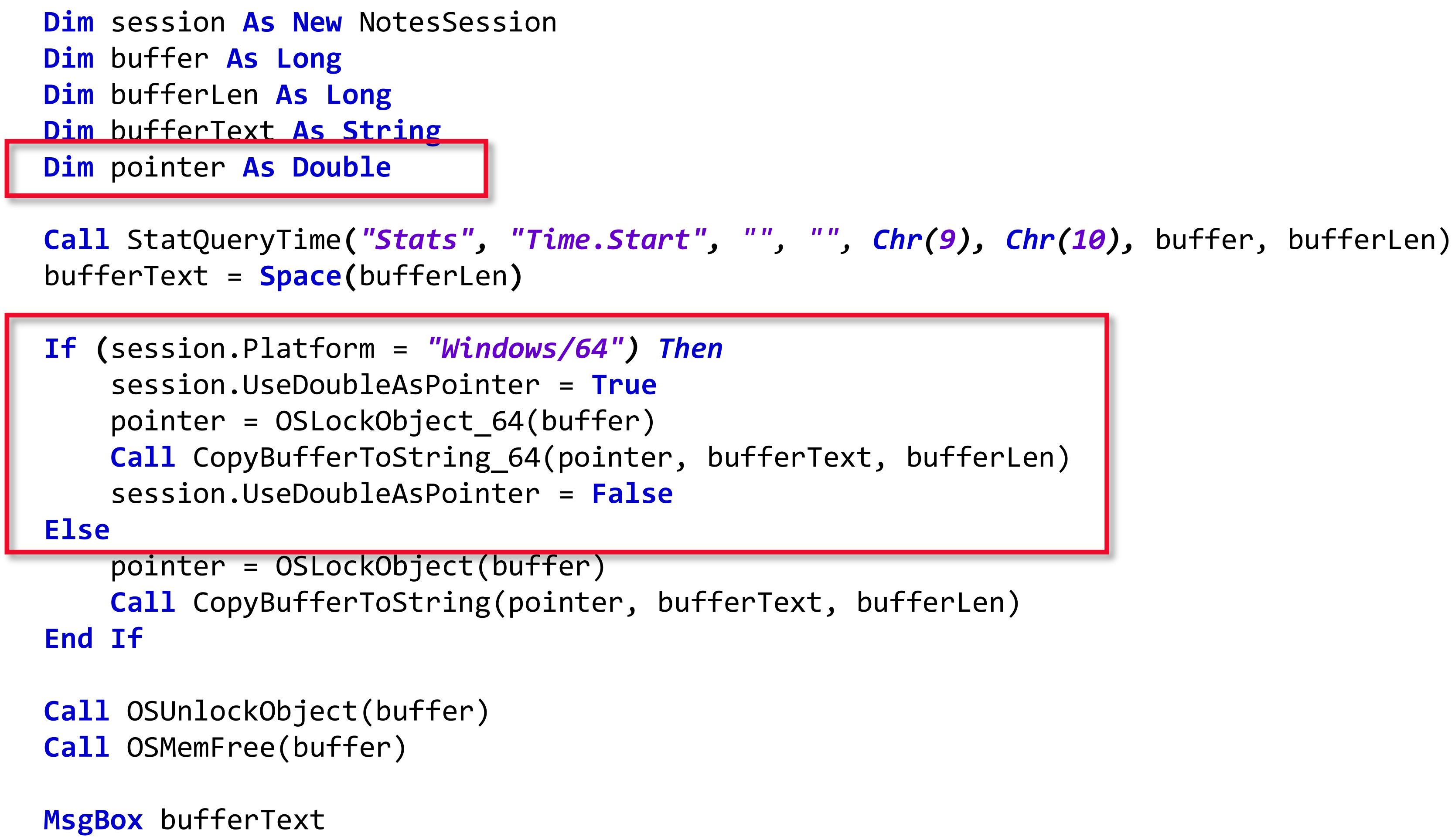
Call StatQueryTime("Stats", "Time.Start", "", "", Chr(9), Chr(10), buffer, bufferLen)
bufferText = Space(bufferLen)

pointer = OSLockObject(buffer)
Call CopyBufferToString(pointer, bufferText, bufferLen)

Call OSUnlockObject(buffer)
Call OSMemFree(buffer)

MsgBox bufferText
```

Notes C-API Example



```
Dim session As New NotesSession
Dim buffer As Long
Dim bufferLen As Long
Dim bufferText As String
Dim pointer As Double

Call StatQueryTime("Stats", "Time.Start", "", "", Chr(9), Chr(10), buffer, bufferLen)
bufferText = Space(bufferLen)

If (session.Platform = "Windows/64") Then
    session.UseDoubleAsPointer = True
    pointer = OSLockObject_64(buffer)
    Call CopyBufferToString_64(pointer, bufferText, bufferLen)
    session.UseDoubleAsPointer = False
Else
    pointer = OSLockObject(buffer)
    Call CopyBufferToString(pointer, bufferText, bufferLen)
End If

Call OSUnlockObject(buffer)
Call OSMemFree(buffer)

MsgBox bufferText
```

Windows API Example (get clipboard text)

```
Const CF_UNICODETEXT = 13
Const OS_TRANSLATE_UNICODE_TO_LMBCS = 23

'** 32-bit API calls
Declare Function OpenClipboard Lib "user32.dll" (ByVal hwnd As Long) As Long
Declare Function CloseClipboard Lib "user32.dll" () As Long
Declare Function GetClipboardData Lib "user32.dll" (ByVal wFormat As Long) As Long

Declare Function GlobalLock Lib "kernel32" (ByVal hMem As Long) As Long
Declare Function GlobalUnlock Lib "kernel32" (ByVal hMem As Long) As Long
Declare Function GlobalSize Lib "kernel32" (ByVal hMem As Long) As Long

Declare Function OSTranslateFromPtr Lib "nnotes.dll" Alias "OSTranslate" ( _
    ByVal mode As Integer, _
    ByVal strIn As Long, _
    ByVal lenIn As Integer, _
    ByVal strOut As LMBCS String, _
    ByVal lenOut As Integer ) As Integer
```

Windows API Example (get clipboard text)

```
'** 64-bit API calls
Declare Function OpenClipboard_64 Lib "user32.dll" Alias "OpenClipboard" (_
    ByVal hwnd As Double) As Long               '** hwnd is a window handle
Declare Function GetClipboardData_64 Lib "user32.dll" Alias "GetClipboardData" (_
    ByVal wFormat As Long) As Double            '** returns a memory handle
Declare Function CloseClipboard_64 Lib "user32.dll" Alias "CloseClipboard" () As Long

Declare Function GlobalLock_64 Lib "kernel32.dll" Alias "GlobalLock" (_
    ByVal hMem As Double) As Double             '** hMem is a memory handle, returns a pointer
Declare Function GlobalUnlock_64 Lib "kernel32.dll" Alias "GlobalUnlock" (_
    ByVal hMem As Double) As Long               '** hMem is a memory handle, returns a BOOL
Declare Function GlobalSize_64 Lib "kernel32.dll" Alias "GlobalSize" (_
    ByVal hMem As Double) As Long               '** hMem is a memory handle, returns a size

Declare Function OSTranslateFromPtr_64 Lib "nnotes.dll" Alias "OSTranslate" ( _
    ByVal mode As Integer, _
    ByVal strIn As Double, _                    '** strIn is a string pointer
    ByVal lenIn As Integer, _
    ByVal strOut As LMBCS String, _
    ByVal lenOut As Integer ) As Integer
```

Same as before, but the window HANDLE and memory HANDLEs all became Doubles too

Windows API Example (get clipboard text)

```
Function GetClipboard() As String
    Dim session As New NotesSession
    If (session.Platform = "Windows/64") Then
        GetClipboard = GetClipboard64()
        Exit Function
    End If

    Dim glbHandle As Long
    Dim cbPointer As Long
    Dim cbPointerLen As Long
    Dim cbString As String

    If OpenClipboard(0) Then
        glbHandle = GetClipboardData(CF_UNICODETEXT)
        cbPointer = GlobalLock(glbHandle)
        cbPointerLen = GlobalSize(glbHandle)

        cbString = Space(cbPointerLen)
        Call OSTranslateFromPtr( OS_TRANSLATE_UNICODE_TO_LMBCS, _
            cbPointer, cbPointerLen, cbString, cbPointerLen )
        cbString = StrLeft(cbString, Chr(0))

        Call GlobalUnlock(glbHandle)
        Call CloseClipboard()
    End If

    GetClipboard = cbString
End Function
```

Windows API Example (get clipboard text)

```
Function GetClipboard64() As String
    Dim session As New NotesSession
    session.UseDoubleAsPointer = True

    Dim glbHandle_64 As Double
    Dim cbPointer_64 As Double
    Dim cbPointerLen As Long
    Dim cbString As String

    If OpenClipboard_64(0) Then
        glbHandle_64 = GetClipboardData_64(CF_UNICODETEXT)
        cbPointer_64 = GlobalLock_64(glbHandle_64)
        cbPointerLen = GlobalSize_64(glbHandle_64)

        cbString = Space(cbPointerLen)
        Call OSTranslateFromPtr_64( OS_TRANSLATE_UNICODE_TO_LMBCS, _
            cbPointer_64, cbPointerLen, cbString, cbPointerLen )
        cbString = StrLeft(cbString, Chr(0))

        Call GlobalUnlock_64(glbHandle_64)
        Call CloseClipboard_64()
    End If

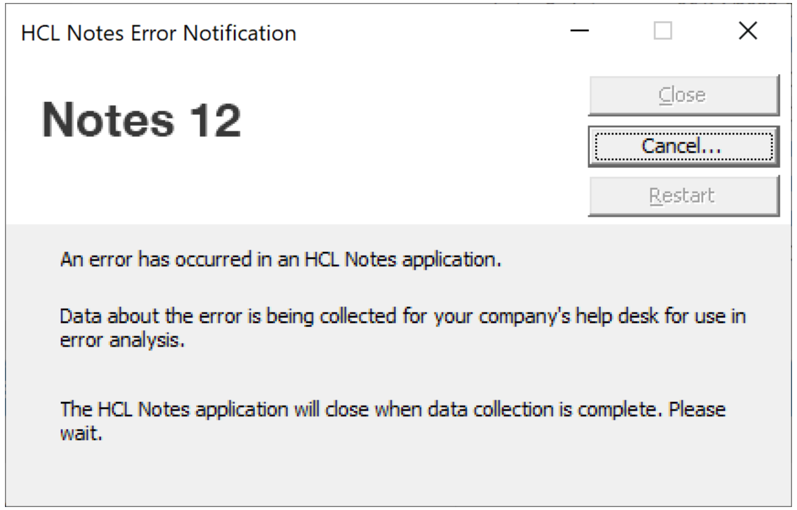
    GetClipboard64 = cbString
    session.UseDoubleAsPointer = False
End Function
```

How Do You Know?

- **How do you know what's a handle and what's a pointer and what's something else?**

- **API Documentation!**
  - https://opensource.hcltechsw.com/domino-c-api-docs
  - https://learn.microsoft.com/en-us/windows/win32/apiindex/windows-api-list
  - https://learn.microsoft.com/en-us/windows/win32/winprog/windows-data-types

- **Also, either the code doesn't work or it crashes your client**



HCL Notes Error Notification

Notes 12

An error has occurred in an HCL Notes application.

Data about the error is being collected for your company's help desk for use in error analysis.

The HCL Notes application will close when data collection is complete. Please wait.

Some Common Calls to Check for

Notes API

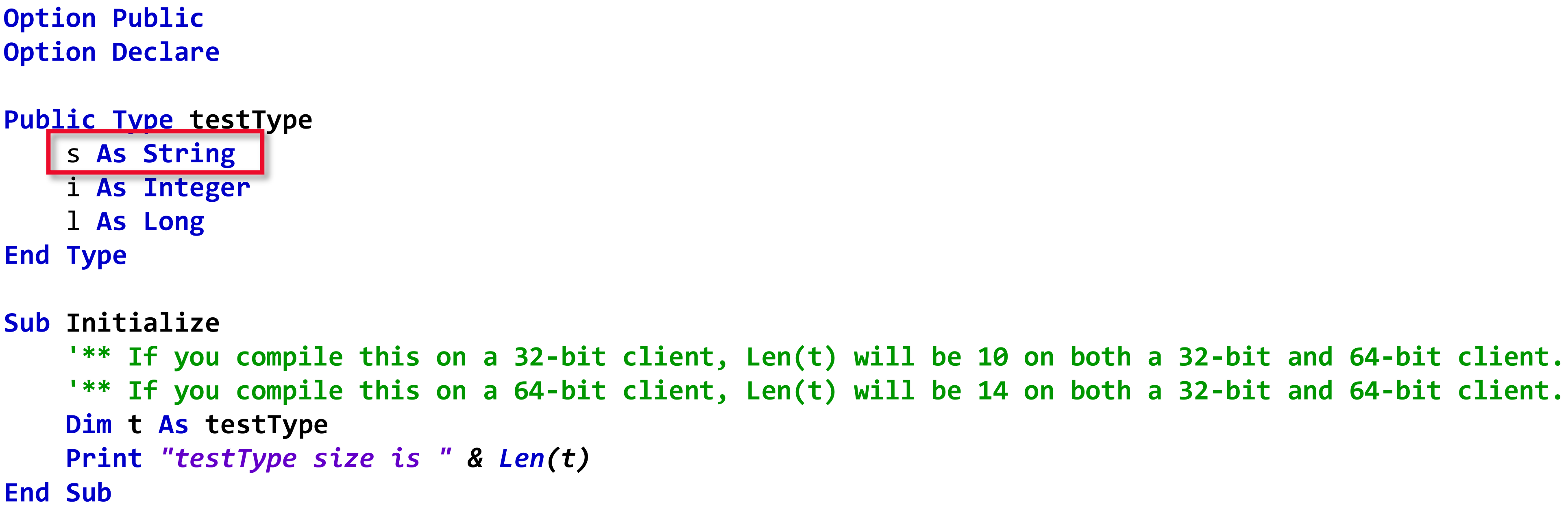
- NSPingServer
- ODSReadMemory
- OSLock
- OSLockBlock
- OSLockObject
- OSMemoryLock
- OSTranslate (if using pointers)

Windows API

- lstrcpyA / lstrcpyW
- RtlMoveMemory
- GetActiveWindow
- Get/SetClipboardData
- Anything with “Handle”
  - GetModuleHandle, CloseHandle…
- Anything with “Process”
  - OpenProcess, GetCurrentProcess…
- Anything with “Service”
  - OpenService, QueryServiceStatus…

Special Handling: Types/Structs with Strings

- **Be careful if you use custom Types that have Strings**
  - Types map to **structs** in C/C++
  - String parameters in function calls are fine, it’s just Strings inside Types here



```
Option Public
Option Declare

Public Type testType
    s As String
    i As Integer
    l As Long
End Type

Sub Initialize
    '** If you compile this on a 32-bit client, Len(t) will be 10 on both a 32-bit and 64-bit client.
    '** If you compile this on a 64-bit client, Len(t) will be 14 on both a 32-bit and 64-bit client.
    Dim t As testType
    Print "testType size is " & Len(t)
End Sub
```

Special Handling: Types/Structs with Strings

- **Size of the Type will depend on which client you compile on**
  - If you compile on 32-bit client, the String params will be 4 bytes
  - If you compile on 64-bit client, the String params will be 8 bytes
- **Can cause alignment problems with C-API calls**
- **Can cause problems if you have to pass the size of the struct**
  - Windows API sometimes does this as a struct versioning technique
- **Kind of an edge case, not very common to have Strings in C-API Types**
  - Usually Strings are parameters, or structs contain pointers

Special Handling: Types/Structs with Strings

- **Option 1: use pointers (Long/Double) instead of Strings**
  - Only works for Strings being **returned**, not Strings being passed
  - Use OSTranslate or lstrcpy to convert between pointers and Strings

```
Declare Function pointerToString_64 Lib "kernel32" Alias "lstrcpyA" (_
    ByVal toString As String, _
    ByVal fromPointer As Double) As Long

Type testType_64
    ptr As Double    '** String pointer, use Long for 32-bit
End Type

Declare Sub MyFunction_64 Lib "mydll" Alias “MyFunction" (tt As testType_64)

Sub Initialize
    Dim tt As testType_64
    Dim s As String*256

    '** don't forget NotesSession.UseDoubleAsPointer before and after
    Call MyFunction_64(tt)
    Call pointerToString_64(s, tt.ptr)

    Print "s = " & s
End Sub
```

Special Handling: Types /Structs with Strings

- **Option 2: use Execute to dynamically compile and run**
  - Pass data to/from Execute block using public global variables

```
Public stringToPass As String
Public functionResult As Integer

Sub Initialize
    stringToPass = "a beautiful string"

    Execute |
Type testType
    s As String
End Type

Declare Function SendTypeValue Lib "mydll" (tt As testType) As Integer

Sub Initialize
    Dim tt As testType
    tt.s = stringToPass
    functionResult = SendTypeValue(tt)
End Sub |

    Print "Result = " & functionResult
End Sub
```

Java

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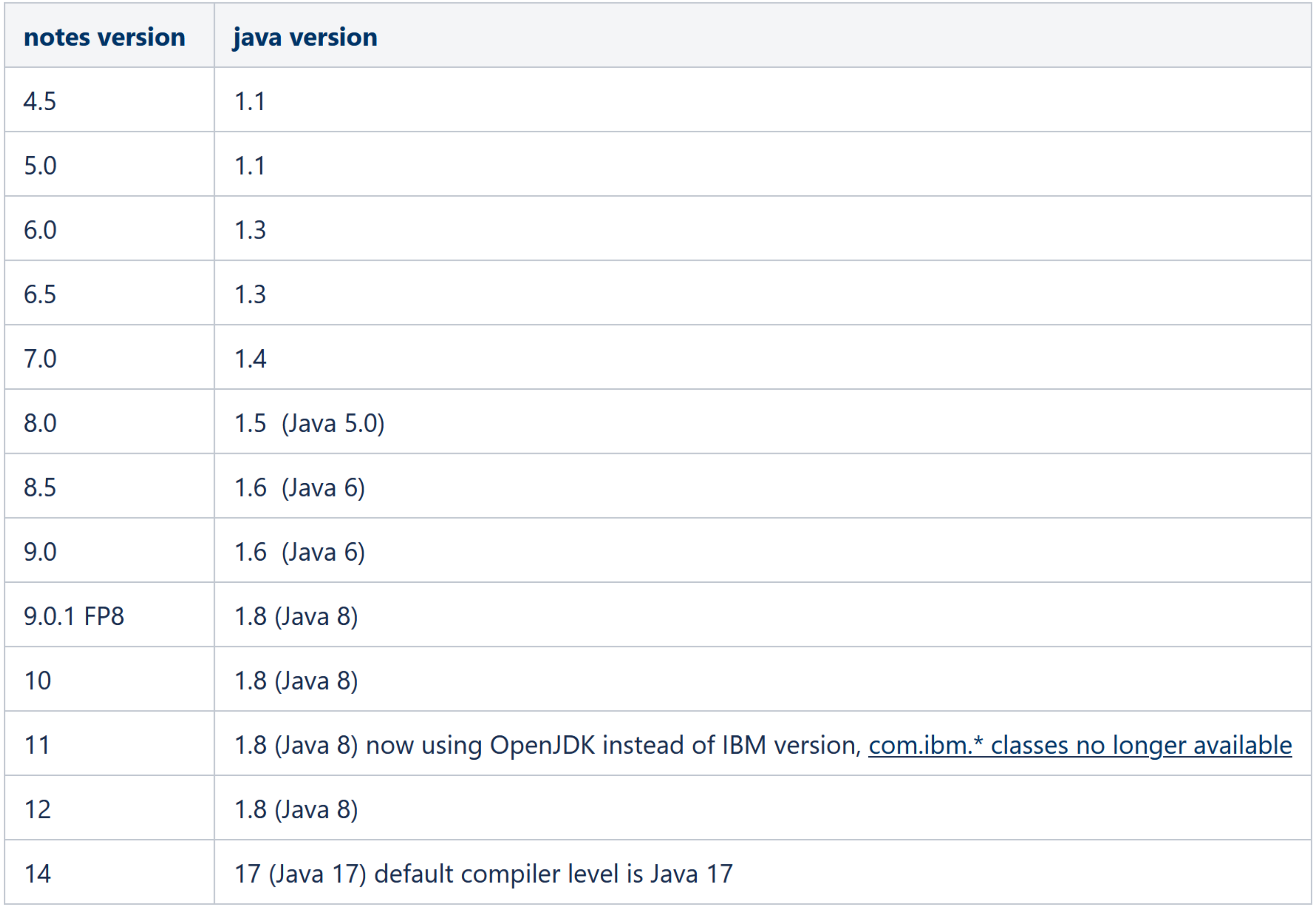
32-bit vs 64-bit Java

- **In general, Java code that ran on 32-bit should work on 64-bit**
  - The JVM handles all the core language/platform things
  - Be careful if you use JNI
  - Search your code for **System.loadLibrary** calls
- **Don’t forget to test your external/attached JAR files!**
  - They might make loadLibrary/DLL calls too

A History of Java in Notes/Domino



notes version	java version
4.5	1.1
5.0	1.1
6.0	1.3
6.5	1.3
7.0	1.4
8.0	1.5 (Java 5.0)
8.5	1.6 (Java 6)
9.0	1.6 (Java 6)
9.0.1 FP8	1.8 (Java 8)
10	1.8 (Java 8)
11	1.8 (Java 8) now using OpenJDK instead of IBM version, com.ibm.* classes no longer available
12	1.8 (Java 8)
14	17 (Java 17) default compiler level is Java 17

New in Notes 14: Java 17

- **Notes had Java 8 since 9.0.1 FP8**
  - Lambdas, streams, most “modern” Java language features
  - Still supported through at least November 2026, but getting old
  - https://adoptium.net/support

- **Notes 14 has Java 17**
  - A few new language features
  - Many third party JAR files now require at least Java 11, if not 17
  - Mostly backwards compatible, with a few exceptions…

Missing in Java 17

- **Java EE classes: javax.xml.ws, javax.xml.soap, javax.xml.bind, and more**
  - **DatatypeConverter** often used for hex <-> binary and base64 conversions
- **sun.misc.BASE64Encoder / Decoder**
  - Also, com.ibm.misc.BASE64Encoder/Decoder has been gone since Notes 11
  - Use **java.util.Base64** classes instead (available since Java 8)
- **com.sun.image.codec.jpeg.***
  - Use **javax.ImageIO** (available since Java 1.4)
- **Nashorn (or any) JavaScript engine**
  - e.g. ScriptEngineManager mgr = new ScriptEngineManager(); …
  - No native replacement, maybe use GraalVM?

New going from Java 8 -> 17

- **Awesome new NullPointerException messages!**
  - They actually tell you what’s null
- **Interesting language enhancements**
  - Switch statement pattern matching
  - Record data type
  - “var” keyword
  - Text blocks (easy multi-line text)
  - HttpClient class
- **Java Migration Guide**
  - https://docs.oracle.com/en/java/javase/17/migrate/getting-started.html

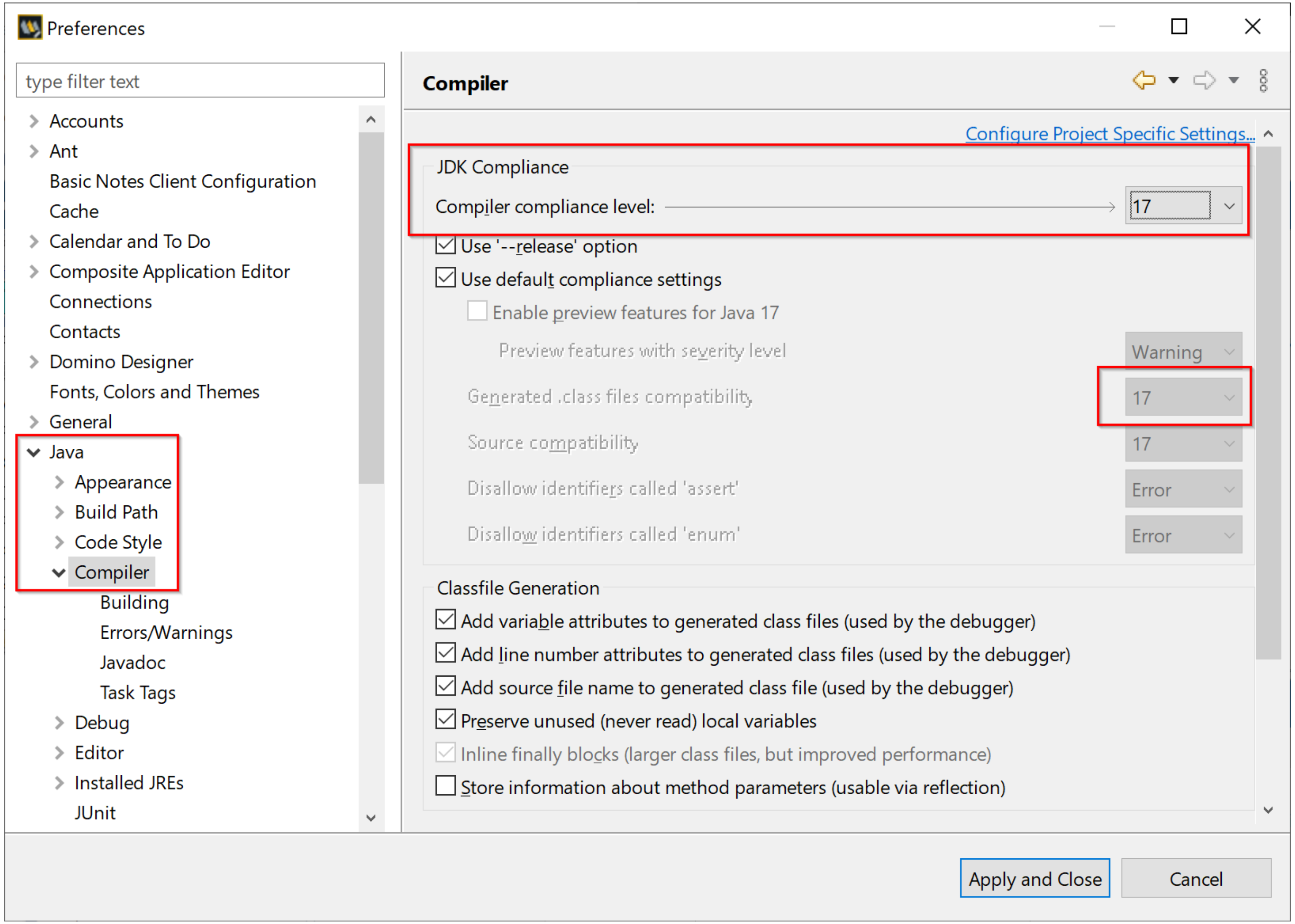
Java 17 jvm Folder

- **Files in the jvm folder are different**
  - No more **rt.jar** and **tools.jar**
  - Now just one big **modules** file

- **Notes/jvm/lib/ext folder is now Notes/ndext**
  - Where external JAR files live
  - **notes.jar** is there now too

- **java.policy and java.security moved**
  - Used to be notes/jvm/lib/security
  - Now in **notes/jvm/conf/security**
  - **cacerts** is still in notes/jvm/lib/security though

JAVA COMPILER SETTINGS



Compiler

JDK Compliance

Compiler compliance level: 17

☑ Use '--release' option

☑ Use default compliance settings

□ Enable preview features for Java 17

Preview features with severity level: Warning

Generated .class files compatibility: 17

Source compatibility: 17

Disallow identifiers called 'assert': Error

Disallow identifiers called 'enum': Error

Classfile Generation

☑ Add variable attributes to generated class files (used by the debugger)

☑ Add line number attributes to generated class files (used by the debugger)

☑ Add source file name to generated class file (used by the debugger)

☑ Preserve unused (never read) local variables

☑ Inline finally blocks (larger class files, but improved performance)

□ Store information about method parameters (usable via reflection)

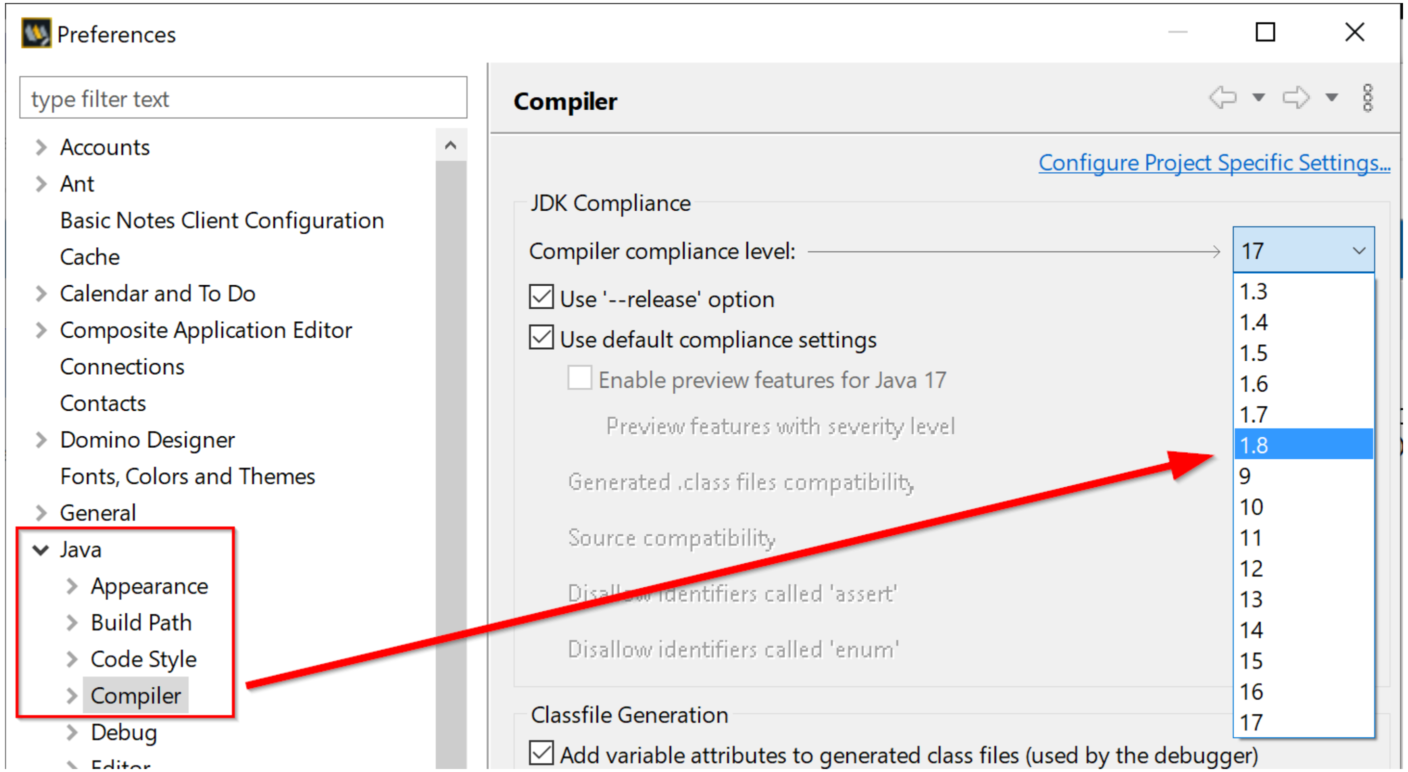
JAVA COMPILER SETTINGS

- **In Domino Designer**
  - File – Preferences – Java – Compiler
- **Default in Notes 14 is Java 17**
- **XPages compiled as Java 17 WILL NOT WORK on older versions of Notes client or Domino server**
  - **Error 500** HTTP Web Server: Command Not Handled Exception
  - domino\data\domino\workspace\logs\trace-log-0.xml :
    - java.lang.**UnsupportedClassVersionError**: JVMCFRE199E bad major version 61.0 of class=xsp/MyXPage, the maximum supported major version is 52.0;

JAVA COMPILER SETTINGS

- **If you have pre-Notes 14 clients or servers using XPages, ALL DEVELOPERS should change compliance level to 1.8**

- **Not specifically a 64-bit thing, a Notes 14 thing**



Preferences

type filter text

- Accounts
- Ant
- Basic Notes Client Configuration
- Cache
- Calendar and To Do
- Composite Application Editor
- Connections
- Contacts
- Domino Designer
- Fonts, Colors and Themes
- General
- Java
  - Appearance
  - Build Path
  - Code Style
  - Compiler
  - Debug
  - Editor

Compiler

Configure Project Specific Settings...

JDK Compliance

Compiler compliance level: 17

☑ Use '--release' option

☑ Use default compliance settings

□ Enable preview features for Java 17

Preview features with severity level

Generated .class files compatibility

Source compatibility

Disallow identifiers called 'assert'

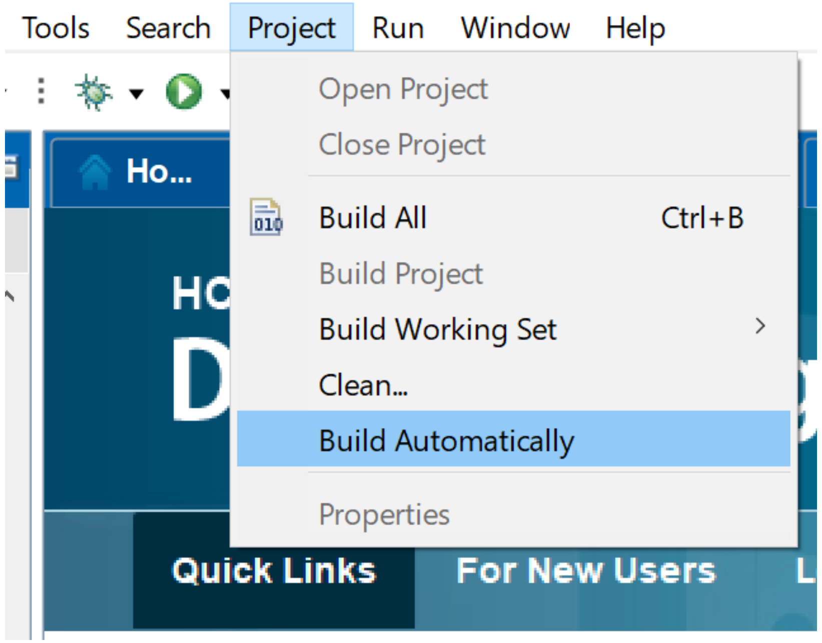
Disallow identifiers called 'enum'

Classfile Generation

☑ Add variable attributes to generated class files (used by the debugger)

XPages Build Settings

- **If you're extra paranoid, turn Project – Build Automatically OFF**
  - So you don't accidentally recompile XPages
  - Sometimes all XPages in a database will recompile **just by opening the database in Domino Designer** if this setting is on
  - https://support.hcltechsw.com/csm?id=kb_article&sysparm_article=KB0107841

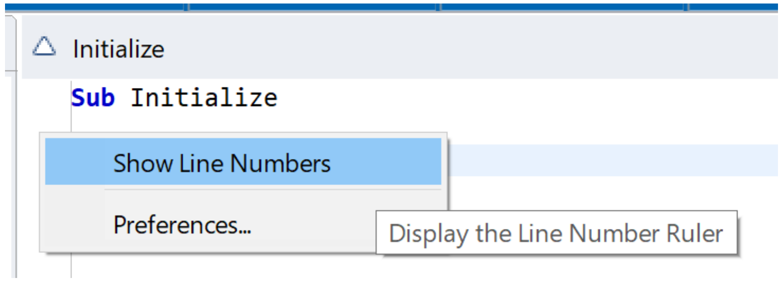


BONUS: Common Domino Designer Problems

- **Java code editor doesn't find Java classes with content assist (control-space), and you have to enter import statements by hand**
  - FIX: right-click database in Designer and choose "Remove...“
  - Then reopen the database in Designer

- **Design element properties panel gets stuck to the right sidebar instead of below the agent code**
  - FIX: Window - Reset Perspective

- **Code doesn’t have line numbers**
  - FIX: right-click the left “gutter” in the code window and choose “Show line numbers”
  - Java and LotusScript



```
Sub Initialize
```

Eclipse Plugins

:42

64-bit Notes Client Has 64-bit Eclipse

- **Obviously**

- **In general, you shouldn’t notice a difference**

- **Third-party plugins only a problem if they specifically target x86**
  - **Eclipse-PlatformFilter** or **Bundle-NativeCode** in MANIFEST.MF of plugin
  - “**arch**” setting for <plugin> entry in feature.xml

- **Unusual for plugins to specify x86**
  - Usually only if they make native/DLL calls and use JNI
  - Could be the case with VoIP plugins, for example

x86 Plugins

- **How can I tell?**
  - No easy way using standard Eclipse tricks
  - Look for “x86” in **MANIFEST.MF** in plugin.jar and **feature.xml** in feature.jar
  - Import into Update Site database and look at plugin and feature docs
- **What if I use/install an x86 plugin on a 64-bit client?**
  - Eclipse won’t even load it
  - After install there might be a message in the trace log, but often nothing
- **How do I make it work?**
  - Ask the vendor for an x64 version

PowerShell Script To Search for x86 (rough cut)

```
function SearchInFiles ([string]$Path) {
    Add-Type -AssemblyName System.IO.Compression.FileSystem

    # search in jar files (which are really zip files)
    Get-ChildItem -Path $Path -Filter "*.jar" | ForEach-Object {
        $zipFile = $_.FullName
        $zipArchive = [System.IO.Compression.ZipFile]::OpenRead($zipFile)
        $zipArchive.Entries | Where-Object {($_.Name -eq "feature.xml") -or ($_.Name -eq "MANIFEST.MF")} | ForEach-Object {
            $stream = $_.Open()
            $reader = New-Object System.IO.StreamReader($stream)
            while ($line = $reader.ReadLine()) {
                if (($line -like "*arch=x86*") -or ($line -like "*arch=?x86*")) {
                    Write-Host "$zipFile\($_):$line"
                }
            }
            $reader.Dispose()
            $stream.Dispose()
        }
        $zipArchive.Dispose()
    }

    # search uncompressed features and plugins
    ls -r -path $Path -filter feature.xml | select-string arch=`"x86`"
    ls -r -path $Path -filter MANIFEST.MF | select-string arch=x86
}

# you could search in Notes\framework too, but ignore the Notes client plugins
SearchInFiles("C:\HCL\Notes\Data\workspace\applications\eclipse\plugins")
SearchInFiles("C:\HCL\Notes\Data\workspace\applications\eclipse\features")
```

SHA-1 Signatures No Longer Supported in Notes 14

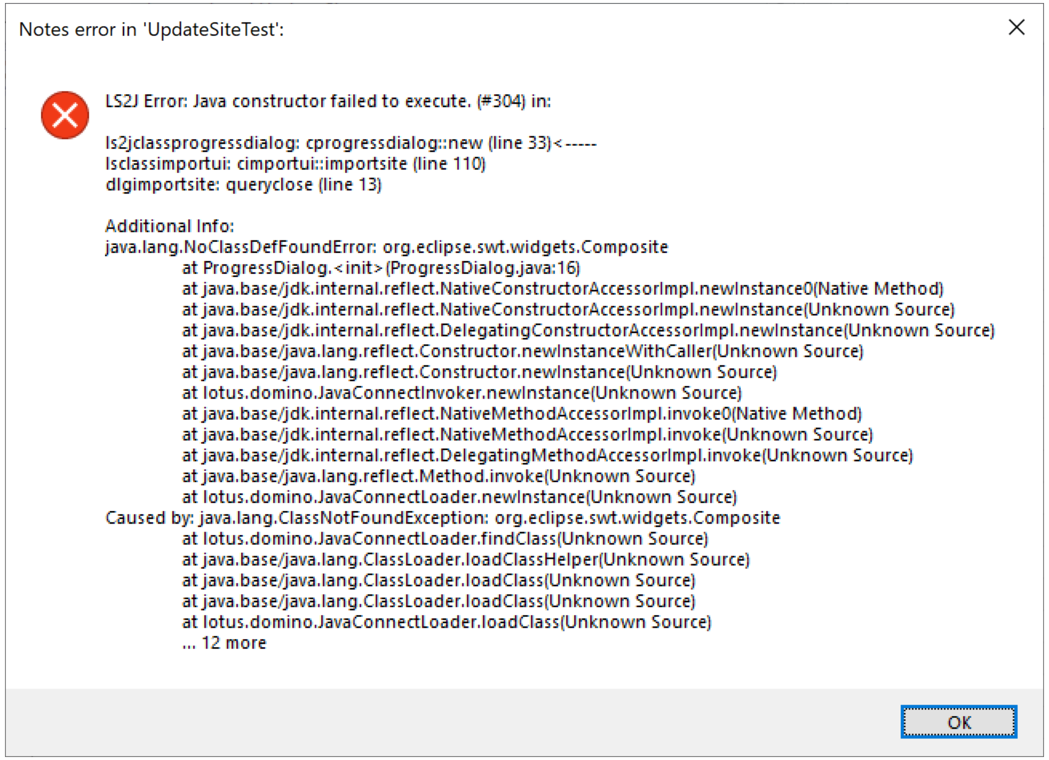
- **Plugins with SHA-1 signatures are "unsigned" in Notes 14**
  - Not specifically a 64-bit thing, a new Java restriction
  - https://support.hcltechsw.com/csm?id=kb_article&sysparm_article=KB0109288
  - Can still install plugins with old SHA-1 signatures if "Unsigned Plugin" is allowed
  - Currently installed plugins with old signatures continue to work

- **Re-sign your plugins with SHA-256 certificates if you need to**

- **Check META-INF/MANIFEST.MF in your old plugins if you're curious**
  - Search for "`SHA1-Digest`"
  - If you use the Update Site database, MANIFEST.MF is in the plugin and feature documents

UpdateSite Database On 12.0.2 FP1/2 64-bit

- **Can’t import plugins to Notes UpdateSite database using 12.0.2 FP1/2 64-bit client**
  - Problem on 64-bit Mac client for years, **fixed in Notes 12.0.2 FP3 and 14.0.0**
  - For 12.0.2 FP1/2: use a 32-bit client or the OpenNTF version of the template at https://www.openntf.org/main.nsf/project.xsp?r=project/Open%20Eclipse%20Update%20Site



Notes error in 'UpdateSiteTest':

```
LS2J Error: Java constructor failed to execute. (#304) in:

ls2jclassprogressdialog: cprogressdialog::new (line 33)<-----
lsclassimportui: cimportui::importsite (line 110)
dlgimportsite: queryclose (line 13)

Additional Info:
java.lang.NoClassDefFoundError: org.eclipse.swt.widgets.Composite
	at ProgressDialog.<init>(ProgressDialog.java:16)
	at java.base/jdk.internal.reflect.NativeConstructorAccessorImpl.newInstance0(Native Method)
	at java.base/jdk.internal.reflect.NativeConstructorAccessorImpl.newInstance(Unknown Source)
	at java.base/jdk.internal.reflect.DelegatingConstructorAccessorImpl.newInstance(Unknown Source)
	at java.base/java.lang.reflect.Constructor.newInstanceWithCaller(Unknown Source)
	at java.base/java.lang.reflect.Constructor.newInstance(Unknown Source)
	at lotus.domino.JavaConnectInvoker.newInstance(Unknown Source)
	at java.base/jdk.internal.reflect.NativeMethodAccessorImpl.invoke0(Native Method)
	at java.base/jdk.internal.reflect.NativeMethodAccessorImpl.invoke(Unknown Source)
	at java.base/jdk.internal.reflect.DelegatingMethodAccessorImpl.invoke(Unknown Source)
	at java.base/java.lang.reflect.Method.invoke(Unknown Source)
	at lotus.domino.JavaConnectLoader.newInstance(Unknown Source)
Caused by: java.lang.ClassNotFoundException: org.eclipse.swt.widgets.Composite
	at lotus.domino.JavaConnectLoader.findClass(Unknown Source)
	at java.base/java.lang.ClassLoader.loadClassHelper(Unknown Source)
	at java.base/java.lang.ClassLoader.loadClass(Unknown Source)
	at java.base/java.lang.ClassLoader.loadClass(Unknown Source)
	at lotus.domino.JavaConnectLoader.loadClass(Unknown Source)
	... 12 more
```

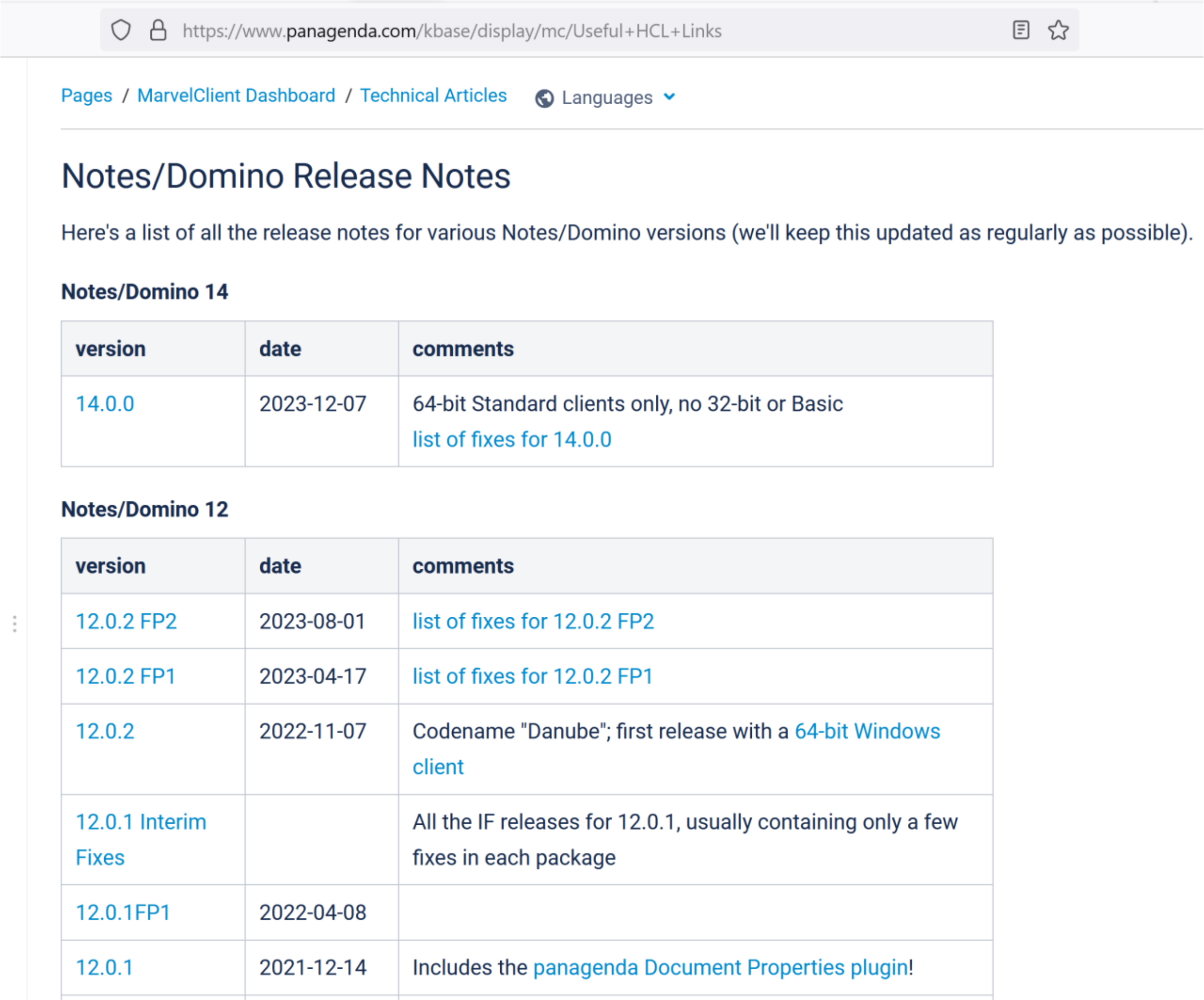
A Few Recommendations

A Few Recommendations

- **If you’re upgrading to 64-bit, prefer Notes 14 to 12.0.2**
  - Many things got fixed, longer term support
  - https://www.panagenda.com/webinars/how-to-perform-hcl-notes-14-upgrades-smoothly
- **Be very careful compiling LotusScript in mixed 32/64 environments**
  - GetAllEntriesByKey and Replace bugs are not obvious!
- **Be very careful compiling XPages using Notes 14**
  - Unless you change the Java compiler option to Java 1.8, or all your servers are v14
- **Test and re-test your Notes API code**
- **Use the new HCL Download Portal for software downloads**
  - So much better than FlexNet -> https://my.hcltechsw.com

A Collection of Links

https://www.panagenda.com/kbase/display/mc/Useful+HCL+Links



https://www.panagenda.com/kbase/display/mc/Useful+HCL+Links

Pages / MarvelClient Dashboard / Technical Articles

Languages

Notes/Domino Release Notes

Here's a list of all the release notes for various Notes/Domino versions (we'll keep this updated as regularly as possible).

Notes/Domino 14

version	date	comments
14.0.0	2023-12-07	64-bit Standard clients only, no 32-bit or Basic list of fixes for 14.0.0

Notes/Domino 12

version	date	comments
12.0.2 FP2	2023-08-01	list of fixes for 12.0.2 FP2
12.0.2 FP1	2023-04-17	list of fixes for 12.0.2 FP1
12.0.2	2022-11-07	Codename "Danube"; first release with a 64-bit Windows client
12.0.1 Interim Fixes		All the IF releases for 12.0.1, usually containing only a few fixes in each package
12.0.1FP1	2022-04-08	
12.0.1	2021-12-14	Includes the panagenda Document Properties plugin!

Q & A

THANK YOU!

Your Feedback Matters to Us

SCAN ME