

Terminal Services in een 64-bits omgeving

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64-bits Terminal Services

Waarom 64-bits toepassen in een Terminal Server omgeving ?

- Geen beperking van het 32-bit Windows memory architecture
- 32-bit memory address $2^{32} = 4,294,967,296$ or 4GB), 2GB of shared kernel space
- PAE (Physical Address Extensions) / AWE (Address Windowing Extensions) voegt 4 bits toe aan het memory address. Hierdoor 64Gb memory te gebruiken. Kernel en User memory space is beperkt tot 2Gb

Architectural Component	x86-based Windows Server 2003 (Terminal Server optimized)	x64-based Windows Server 2003
Kernel virtual address space	2 GB	8 TB
Virtual memory	4 GB	16 TB
Paged pool	260-480 MB ¹	128 GB
Non-paged pool	256 MB	128 GB
System cache	1 GB	1 TB
System PTEs	~900 MB	128 GB





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Windows Server 2003 Family

Windows Server 2003 Version	32-Bit x86	64-Bit x64	64-Bit Itanium
 Microsoft Windows Server 2003 Datacenter Edition	Up to 32-way, 64 GB RAM	Up to 64-way, 1 TB RAM	Up to 64-way, 1 TB RAM
 Microsoft Windows Server 2003 Enterprise Edition	Up to 8-way, 32 GB RAM	Up to 8-way, 1 TB RAM	Up to 8-way, 1 TB RAM
 Microsoft Windows Server 2003 Standard Edition	Up to 4-way, 4 GB RAM	Up to 4-way, 32 GB RAM	n/a
 Microsoft Windows Server 2003 Web Edition	Up to 2-way, 2 GB RAM	n/a	n/a

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- WOW (Windows on Windows) zorgt ervoor dat 32 bits applicaties op een x64 OS uitgevoerd kunnen worden. Vergelijkbaar met WOW32 for 16-bit apps on Win32
- WOW64 houdt 32-bit applicaties voor de gek
- WOW64 alleen voor usermode applicaties
- File System Redirection
 - \Program Files → 64-bit apps
 - \system32 → 64-bit system files
 - \Program Files (x86) → 32-bit apps
 - \syswow64 → 32-bit system files
- x64 Windows Registry
 - 64-bit: HKLM\Software
 - 32-bit: HKLM\Software\WOW6432node
- 64- en 32-bits applicaties hebben eigen registry view

64-bit apps + x64 Windows = Logische locaties
 32-bit apps + x64 Windows = Vreemde locaties

Process (Working Set)	32-bit	64-bit
Explorer.exe (per session)	11.0 MB	18.2 MB
IExplore.exe	8.7 MB	11.7 MB
Notepad.exe	2.5 MB	4.8 MB
Csrss.exe (per session)	1.0 – 1.5 MB	3.5 – 4.5 MB
Winlogon.exe (per session)	2.5 – 11.0 MB	3.5 – 16.0 MB
Rdpclip.exe (per session)	4.0 MB	5.8 MB
Wfshell.exe (per session)	3.3 MB	5.0 MB (*32)
lmasrv.exe	36 MB	37 MB (*32)
Mfcom.exe	5.8 MB	7.1 (*32)
Cdmsvc.exe	2.4 MB	3.6 MB (*32)
Xte.exe	8.5 – 9.5 MB	10 – 14 MB
Cdfsvc.exe	3.1 MB	3.6 MB
Ctxmlss.exe	2.4 MB	3.5 MB

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64-bits Terminal Services

- x64 Citrix Presentation Server : 32-bits componenten
 - IMA Service
 - XTE Service
 - XML Service
 - Command-line tools (querydc, dsmaint, etc.)
- x64 Citrix Presentation Server : 64-bits componenten
 - All kernel-mode components: ICA Protocol Driver, Print Drivers, Citrix GINA
 - MMC snap in, Access Suite Console (ASC):
- CPS 4.0 x64 biedt geen ondersteuning voor:
 - Novell NDS;
 - Smart cards;
 - Philips speechmike;
 - IM plugins;
 - SecureICA;
 - TWAIN redirection;

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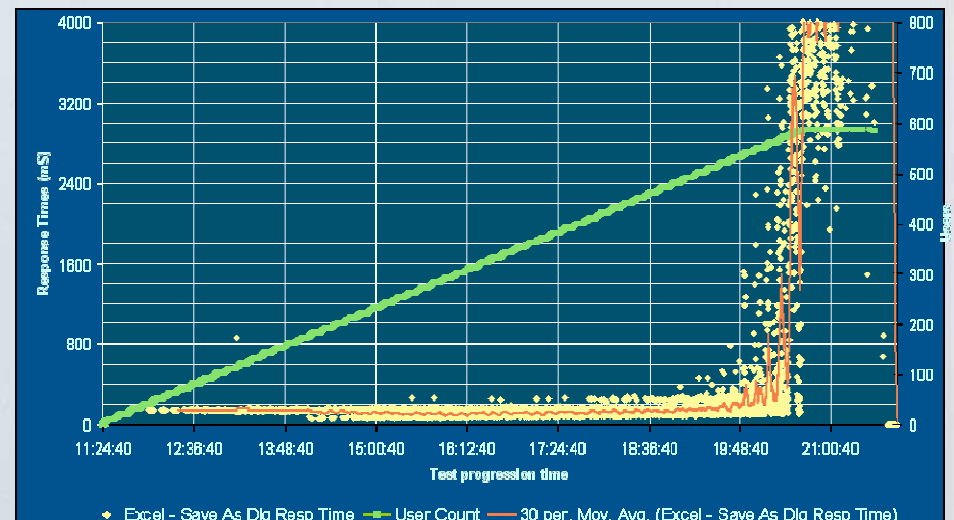


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64-bits Terminal Services

64-bits Terminal Services aandachtspunten

- DOS/Win16 applicaties of componenten kunnen niet meer worden gebruikt.
- Kernel componenten in Win32 applicaties kunnen niet gebruikt worden.
- 32 bits applicaties gebruiken 50% meer geheugen op het 64-bits platform
- Drivers zoals antivirus, printers, agents, application management moeten 64-bits zijn.
- Management software, tools, scripts etc. moeten ook geschikt zijn voor 64-bits platform.
- Disk subsysteem kan bij grotere aantallen gelijktijdige gebruikers bottle-neck vormen. Goed ontwerp nodig is nodig.
- Schaalbaarheid vanuit Microsoft/Citrix/HP marketing geven een incorrect beeld van het aantal cc-users



MS, 8CPU's 40 Gb RAM

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Schaalbaarheid test resultaten (intel)

32-bit, 2 Cores, 4 GB

- 200 active sessions
- 1,400 processes
- 43,000 context switches
- 125 x Command shell
- 123 x Notepad
- 118 x Acrobat Reader
- 112 x WinWord
- 6.8 GB working set

64-bit, 2 Cores, 4 GB

- 159 active sessions
- 1,100 processes
- 35,000 context switches
- 102 x Command shell
- 99 x Notepad
- 98 x Acrobat Reader
- 86 x WinWord
- 5.6 GB working set

64-bit, 4 Cores, 16 GB

- 270 active sessions
- 2,500 processes
- 64,000 context switches
- 228 x Command shell
- 223 x Notepad
- 222 x Acrobat Reader
- 214 x WinWord

64-bit, 4 Cores HT, 16 GB

- 341 active sessions
- 2,900 processes
- 60,000 context switches per second
- 252 x Command shell
- 241 x Notepad
- 238 x Acrobat Reader
- 231 x WinWord

Maximum load gegenereerd door *synthetic benchmark* test resultaat:

32-bit: 200 active sessions

64-bit: 159 active sessions

Maar, in een reële productie omgeving kunnen ongeveer 20-25 gebruikers gelijktijdig op de zelfde hardware werken.

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Schaalbaarheid test resultaten (AMD)

32-bit, 4 Cores, 16 GB

- 319 active sessions
- 2,800 processes
- 70,000 context switches per second
- 243 x Command shell
- 243 x Notepad
- 243 x Acrobat Reader
- 237 x WinWord

64-bit, 4 Cores, 16 GB

- 322 active sessions
- 2,900 processes
- 70,000 context switches per second
- 264 x Command shell
- 261 x Notepad
- 256 x Acrobat Reader
- 252 x WinWord

64-bit, 4 Cores, 8 GB

- 171 active sessions
- 1,700 processes
- 45,000 context switches per second
- 165 x Command shell
- 164 x Notepad
- 158 x Acrobat Reader
- 149 x WinWord

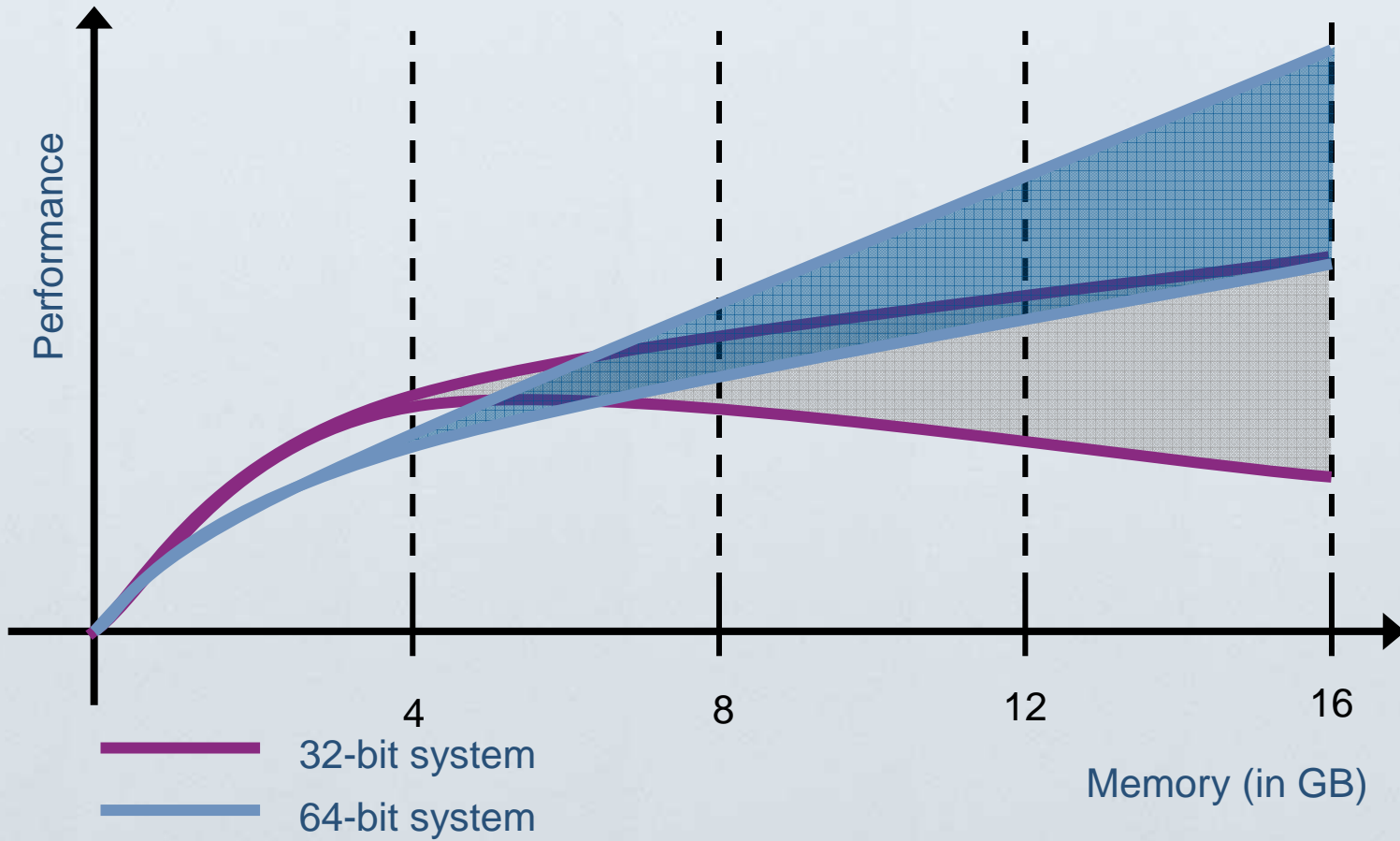
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Scalability Patterns Observed



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Knowledge Center

- <http://support.citrix.com/article/CTX107787&searchID=15830711>
- <http://support.microsoft.com/kb/282423/en-us>
- http://download.microsoft.com/download/9/e/9e9b9c02-4e68-46d5-83e3-86258e9e780c/Benefits_of_Windows_x64.doc
- <http://www.microsoft.com/downloads/details.aspx?familyid=9B1A8518-D693-4BBB-9AF8-B91BBC0D2D55&displaylang=en>
- Tim Mangan on 64-bit Terminal Server - Do you want/need 64-bit apps, or are 32-bit really okay?
<http://www.brianmadden.com/content/content.asp?ID=560>
- Microsoft White Paper: 64-bit Terminal Services Scaling and Performance:
<http://www.brianmadden.com/content/content.asp?ID=548>
- Technical Details of 64-bit Citrix Presentation Server:
<http://www.brianmadden.com/content/content.asp?ID=518>
- Terminal Server and Citrix on AMD 64-bit Opteron Hardware:
<http://www.brianmadden.com/content/content.asp?ID=186>
- Comparing 32-bit and 64-bit Memory Architectures:
<http://www.brianmadden.com/content/content.asp?ID=143>
- Citrix Presentation Server for Microsoft Windows Server 2003 x64 Edition Performance and Scalabilities:
http://www.citrix.com/site/resources/dynamic/salesdocs/CPS4_x64_Performance_and_Scaling_Capabilities.pdf
- The 4GB Windows Memory Limit: What does it really mean?
<http://www.brianmadden.com/content/content.asp?ID=69>
- Citrix shows off Presentation Server on 64-bit Windows
- <http://www.brianmadden.com/content/content.asp?ID=472>
- <http://www.microsoft.com/WindowsServer2003/64bit/x64/faqs.mspx>
- http://news.com.com/Microsoft+launches+64-bit+Windows/2100-1016_3-5681639.html
- <http://www.intel.com/technology/64bitextensions/>

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Vragen ?

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