Brunswick B SERVICE BULLETIN

Subject: Computer System Low on Virtual Memory

Date: 6/5/13

Bulletin No. SB13-7

Purpose

Some centers may experience a 'Low Virtual Memory' error at any given time on the server and client computers. This is not a fatal error, but a computer that is low on virtual memory will operate slowly or may stop responding for extended periods of time and may require a reboot during peak operating times. To ensure that Windows runs properly, it will be necessary to increase the size of your virtual memory paging file.

Explanation

If your virtual memory isn't configured appropriately to match your workload, you may receive an error from Windows saying that you have too little virtual memory or that your virtual memory is too low. This can result in a blue screen and/or a loss of access to all data on the computer.



Virtual memory is a technique utilized by the Windows operating system to supplement the RAM (physical memory) in which it takes a portion of your hard drive and uses it as temporary memory. The programs you are running don't know the difference between physical memory and virtual memory, so it doesn't really matter that you run out of RAM, so long as you have adequate hard drive storage to create a virtual memory (Paging File) large enough to handle the processing for any software application actively running on the computer. Essentially, you can choose to allocate as much free disk space as you have, to be used for virtual memory. However, a hard drive is much, much slower than physical memory and therefore, not as efficient in running applications as physical memory. But it is a cost effective way to increase your workload without

purchasing additional RAM. You may contact the Brunswick Technical Support for guidance as to what type of RAM and size is needed to accommodate the processing between the computer and Brunswick systems applications.

Memory is used to store data for programs on a temporary basis. The maximum amount of memory that your system can use is actually limited in two ways — not only is there a maximum amount of memory that your computer motherboard can accept, there is also a maximum amount of memory that your operating system (OS) can accept.

You want to maximize the total physical memory and control the settings to maximize your virtual memory. If virtual memory didn't exist, once you filled up the available RAM, your computer would not allow you to open additional programs.

Solution

RAM reset:

RAM is allocated to applications as they are opened and used. This RAM may remain allocated to the application even after it is closed. If a program crashes or does not close properly, then RAM may remain in use for a period of time after the program crashed. However, even then the o/s will eventually detect the problem and free up the memory. Rebooting resets the RAM to its initial state and frees up the RAM for use in applications as needed. The frequency of rebooting depends on the number of applications running on the computer as well as activity levels. If the center is busy, daily rebooting is encouraged. If rebooting does not alleviate the Virtual Memory alerts, you will need to increase the amount of RAM or increase the virtual memory per the following instructions.

Increase the virtual memory on the computer(s) displaying the error:

Please use the following instructions to increase the size of your virtual memory paging file. This can be completed on any Server or Client computer. Brunswick has not seen this error on a scoring computer, but any computer can experience the error.

The following will assist you in finding the location and size of the page file as configured in System Properties for Windows 2003, XP, Windows 2000 and Windows NT.

You must be logged on as an administrator or as a member of the administrator's group to complete this procedure.

For Windows 2003 and XP OS Computers

1. Right click "My Computer" on the desktop, and select "Properties."



2. Select the "Advanced" tab, and click "Settings" within the "Performance" section.

General	Computer Name	Hardware
Advanced	Automatic Updates	Remote
ou must be logged Performance Visual effects, proc	on as an Administrator to make mos essor scheduling, memory usage, ar	t of these changes nd virtual memory
Iser Probles		L. Jennigs
Desktop settings re	lated to your logon	S <u>e</u> ttings
Desktop settings re	lated to your logon	S <u>e</u> ttings
Desktop settings re Startup and Recove System startup, syst	lated to your logon ety tem failure, and debugging informati	Settings on Settings
Desktop settings re Startup and Recove System startup, syst	lated to your logon ety tem failure, and debugging informati Envirogment Variables E	Settings on Settings gror Reporting

3. Select the "Advanced" tab and click the "Change" button. Take note of the "Recommended" size given under the section named "Total paging file size for all drives:"

erformance Options	Performance Options
Visual Effects Advanced Data Execution Prevention	Visual Effects Advanced Data Execution Prevention
Processor scheduling	Processor scheduling
Choose how to allocate processor resources.	Choose how to allocate processor resources.
Adjust for best performance of:	Adjust for best performance of:
Programs Background gervices	C Programs C Background services
Memory usage	Memory usage
Choose how to allocate outton memory	Choose how to allocate curtain memory.
Adjust for best performance of:	Adjust for best performance of:
C Programs	C Programs C System cache
Virtual memory	Virtual memory
A paging file is an area on the hard disk that Windows uses as	A paging file is an area on the hard disk that Windows uses as
if it were RAM.	if it were RAM.
Total paging file size for all drives: 576 MB	Total paging file size for all drives:
	576 MB
OK Cancel Apply	OK Cancel Apply

4. Enter the recommended size amount into the "Initial size (MB)" and "Maximum size (MB)" and click "Set." If the recommended size is larger than 4095 MB, just enter 4095 for "Initial size (MB)" and "Maximum size (MB)." (This limit is imposed by the page mapping that we use on x86 processors. These processors cannot handle more pages per page file.) Another way to consider the Initial and Maximum size is to use 1.5 times the physical RAM in the terminal. For example, 1 GB of RAM = 1024 MB. If you have 2 GB of RAM, take 2048 X 1.5 = 3072 MB. This would be your Initial size and Maximum size in MB.

Virtual Memory		<u>?</u> ×
Drive (Volume Label) C:	Paging File Size (MB) 576 - 1152	
D: [New Volume]		
Paging file size for sel	ected drive	_
Drive:	C:	
Space available:	7620 MB	
Gustom size:		-
Initial size (MB):	576	1
Maximum size (MB):	1152	
C System managed	size	
C No paging file	24	et
Total paging file size f	or all drives	
Minimum allowed:	16 MB	
Recommended:	574 MB	
Currently allocated:	576 MB	
	ок	ancel

5. Click "OK" all the way out until the windows associated with this task are gone. A manual reboot of the computer is needed to apply changes.

	/irtual Memory	? ×	
System Properties	Drive [Volume Label] Paging	File Size (MB)	<u>? ×</u>
General Computer Na Advanced Automatic U You must be logged on as an Administrator	IC: D: [New Volume]	576 - 1152	Data Execution Prevention
Performance Visual effects, processor scheduling, men	Paging file size for selected drive Drive: C: Space available: 7620 MB C Qustom size:		ince of: Background gervices
User Profiles Desktop settings related to your logon	Initial size (MB): 576 Maximum size (MB): 1152 C System managed size C No paging file	Şet	system memory. Ince of: If System cache
Startup and Recovery System startup, system failure, and debug	Total paging file size for all drives Minimum allowed: 16 MB Recommended: 574 MB Currently allocated: 576 MB	Ţ	n the hard disk that Windows uses as all drives: 576 MB
Envirogment Variab		OK Cancel	
ок	Cancel Apply		
1 1			OK Cancel Apply

For Windows 2000 OS Computer:

1. Right click "My Computer" on the desktop, and select "Properties."



2. Click on the "Advanced" tab, and select "Performances."



3. Click the "Change" button and take note of the "Recommended:" size given under the section named "Total paging files for all drives."

Performance Options	Virtual Memory	? ×
Application response Optimize performance for: C Applications C Background services	Drive [Volume Label] Paging File Size (MB) C: 768 - 1536 D: [New Volume]	
Virtual memory Total paging file size for all drives: 768 MB Change OK Cancel	Paging file size for selected drive Drive: C: Space available: 2367 MB Initial size (MB): 768 Maximum size (MB): 1536	
	Total paging file size for all drives Minimum allowed: 2 MB Recommended: 766 MB Currently allocated: 768 MB Registry size 24 MB Current registry size: 24 MB Maximum registry size (MB): 88	
	OK Cancel	

4. Enter the recommended size amount into the "Initial size (MB)" and "Maximum size (MB)." If the recommended size is larger than 4095 MB, just enter 4095 for "Initial size (MB)" and "Maximum size (MB)." (This limit is imposed by the page mapping that we use on x86 processors. These processors cannot handle more pages per page file.) Another way to consider the Initial and Maximum size is to use 1.5 times the physical RAM in the terminal. For example, 1 GB of RAM = 1024 MB. If you have 2 GB of RAM, take 2048 X 1.5 = 3072 MB. This would be your Initial size and Maximum size in MB.

<u>?</u> ×
Paging File Size (MB)
768 - 1536
ve
В
Set
es
24 MB
88
OK Cancel

5. Click the "Set" button to set and accept the amount.

/irtual Memory		? ×
Drive [Volume Label]	Paging File Size (MB)	
C:	768 - 1536	
D: [New Volume]		
Paging file size for sel	ected drive	
Drive: Space available:	C: 2367 MB	
Initial size (MB):	768	
Maximum size (MB):	1536	Set
Total paging file size f	or all drives	
Minimum allowed:	2 MB	
Recommended:	766 MB	
Currently allocated:	768 MB	
Registry size		
Current registry size:	24 MB	
Maximum registry size	e (MB): 88	
	OK	Cancel

6. Click "OK" all the way out until the windows associated with this task are gone. A manual reboot is required to apply the changes.

ts BTM-2013 MBD Manager Brunswick VPOp	/irtual Memory	<u>? ×</u>]
System Properties	Drive [Volume Label] Paging File Size (MB)		<u>?</u> ×
General Computer Name Advanced Automatic Updates	C: 576 - 1152 D: [New Volume]		ata Execution Prevention
You must be logged on as an Administrator to mal			pcessor resources.
Performance Visual effects, processor scheduling, memory us	Paging file size for selected drive Drive: C: Space available: 7718 MB • <u>C</u> ustom size: Initial size (MB):		ce of: Background <u>s</u> ervices
User Protiles Desktop settings related to your logon	Maximum size (MB): 1152 C System managed size C No paging file Set		stem memory. te of: • Sys <u>t</u> em cache
Startup and Recovery System startup, system failure, and debugging in	Total paging file size for all drives Minimum allowed: 16 MB Recommended: 574 MB Currently allocated: 576 MB		the hard disk that Windows uses as drives: 576 MB
Environment Variables			
	Cancel Apply		
			K Cancel Apply

For Windows 2000 OS Computer:

1. Right click "My Computer" on the desktop, and select "Properties."



2. Select "Performance" and click on "Change."

em Properti	25		?
Startup/Shu General	tdown	Hardware Profiles Performance	User Profiles Environment
Application P	erformance		-
Select the pr	arformance b	cost for the foreground	application.
Boost	None		-7 Maximum
Virtual Memo	ny file size for a	all disk volumes: 384 M	4B Qhange
Virtual Memo Total paging	iy file size for a	all disk volumes: 384 N	4B Qhange
Virtual Memo	ny file size for a	all disk volumes: 384 h	4B <u>C</u> hange
Virtual Memo	ny file size for a	all disk volumes: 384 h	4B <u>Change</u>
Virtual Memo	ny file size for a	all disk volumes: 384 M	ИВ <u>Qhange</u>
Virtual Memo	ny file size for a	all disk volumes: 384 h	4B <u>C</u> hange

3. Enter the "Recommended" "Total Paging File Size for All Drives" in the "Initial Size" and "Maximum Size" of selected drive. Click "Set" to save your settings. Another way to consider the Initial and Maximum size is to use 1.5 times the physical RAM in the terminal. For example, 1 GB of RAM = 1024 MB. If you have 2 GB of RAM, take 2048 X 1.5 = 3072 MB. This would be your initial size and maximum size in MB.

tual Memory		
rive [Volume Label]	Paging File Size (MB)	OK
C: [Scaring]	384 - 384	Cancel
		Lance
		Help
Paging File Size for S	elected Drive	
Drive:	C: [Scoring]	
Space Available:	2252 MB	
Initial Size (MB):	384	
Magimum Size (MB):	384 <u>S</u> et	-
Total Paging File Size	for All Drives	
Minimum Allowed:	2 MB	
Recommended	367 MB	
Currently Allocated:	384 MB	
Registry Size		
Current Registry Size	7 MB	
Maximum Registry Si	ze (MB): 48	

4. Click "OK" to close all open boxes. A manual reboot of the computer is required to apply the changes.

My Computer	DeleteRg.reg	System Properties	firtual Memoru	
Network Neighborhood	KeyPad.reg	Startup/Shutdov General Application Perfor Select the perfor	Drive [Volume Label] Paging File Size (MB) [C: [Scoring] 384 - 384	OK Cancel Help
Internet Explorer	Shortcut to ComTV.exe	Boost:	Paging File Size for Selected Drive Drive: C: [Scoring]	1
Recycle Bin AlsRack Dbgview		Virtual Memory Total paging file	Space Available: 2252 MB Initial Size (MB): 384 Maginum Size (MB): 384 Space Available: 384 Total Paging File Size for All Drives Minimum Allowed: 2 MB Recommended: 367 MB Currently Allocated: 384 MB Registry Size 7 MB Current Registry Size: 7 MB	
Loadcom			OK Cancel Apply	1
Scorel Init3				<u>-</u>

If you have questions regarding the information contained in this Service Bulletin, please contact Brunswick Technical Support at 1-800-937-2695 or 231-725-4966, FAX 231-725-4667, or Email techsupport@brunbowl.com Visit http://www.brunswickbowling.com/service-support/tech-support/ for electronic files of this and other Service Bulletins.

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