

Citrix Tuning

October 2009

Created for

Danish Citrix Usergroup  
&  
The Citrix Community

Maintained By

[Christian Fenneberg](#)

With special help from:  
Rick Dehlinger, who was the mastermind behind all this.

Thanks to :  
Jacob Berg, Jacob Høpfner, Jacob Hjenner,  
Carsten Thue Pedersen, Arne Høi, Rene Vester, Tobias Nawrocki.

Updated by	Version	Date
Christian Fenneberg	1.0	10/10/2009

Document summary .....	3
Use at Own Risk .....	3
Description on document information .....	4
Priority .....	4
Hardware Tuning .....	5
Operating System tuning.....	6
Common Operation System tuning for all platforms.....	6
Windows 2003 .....	7
Windows Server 2008.....	8
XenApp Tuning.....	9
Common XenApp Tuning.....	9
XenApp Client Tuning.....	9
XenApp 4.5 Tuning.....	10
XenApp 5.0 Tuning.....	10
Print Tuning .....	11
Profile Tuning .....	12
Group Policy tuning.....	13
Logon Process tuning.....	13
Logoff Process tuning .....	14
Novell Tuning .....	15
Application tuning.....	16
Web Interface tuning.....	17
Citrix Access Gateway tuning.....	18
Citrix Secure Gateway tuning .....	19
Citrix Provisioning Services tuning .....	20
Additional Resources .....	21

## Document summary

This document details the process of tuning any installation where Citrix XenApp is to be used.

It is intended to assist with getting the Citrix XenApp platform up and running in a manner that is as close to Best Practices, described in various communities across the web, as possible.

The document is an updated version of Rick Dehlinger's document: "Citrix MetaFrame for Windows Servers- Installation and Tuning Tips" from 2001.

The current document has been provided to the Danish Citrix User Group, on their Website [HTTP://WWW.DKBUG.DK](http://www.dkbug.dk) where any updates will be posted first. Any updates and recommendations can be sent to [Chr\\_Fenneberg@hotmail.com](mailto:Chr_Fenneberg@hotmail.com) and will be treated as time permits.

This document is worthless without the contributions of the people who use it. Thanks in advance for your contribution!

## Use at Own Risk

The information in this publication is subject to change without notice.

THIS PUBLICATION IS PROVIDED "AS IS" WITHOUT WARRANTIES OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT.

These installation and tuning tips are a collection of practices and information gathered from many different sources in the Server-Based Computing world. They are provided for informational purposes only. The authors assume no responsibility for their usage. Use common sense in applying these concepts and tips. Always verify correctness and applicability in a test environment first, then deploy to your production environment(s). Many of these tips require manually editing the registry of a Windows Server. Use appropriate caution before editing the registry, including having a backup of your system and registry. Using Registry Editor incorrectly can cause serious, system-wide problems that may require you to reinstall Windows to correct them. Microsoft cannot guarantee that any problems resulting from the use of Registry Editor can be solved.

**Use this tool and these tips at your own risk.**

## Description on document information

### ***Priority***

This is the priority for the tuning setting,

1. Highest, should be set in all systems,
2. High, should be considered in all installations and set in most
3. Medium, should be considered in all installations, and set in some.
4. lowest. Little or no effect, but in design and fine tuning.

## Hardware Tuning

Item	Priority	Description	Detail	Note
A 1	1	Use server class hardware.	For performance, reliability, and supportability, do yourself a favour, buy server class hardware.	
A 2	1	Use best possible disk system.	Use fastest possible disk in a Raid 1 configuration, all data that should be backed up, should all be stored away from the XenApp servers.	
A 3	1	Use best possible Network components	Use Network components with highest possible speed, avoid multi NIC servers, and avoid network components with outdated drivers/firmware.	
A 4	1	Assign 1 vCPU in Virtual Environments	Ensure that the multi HAL kernel is NOT used on single CPU servers.	
A 5	1	Update BIOS / Firmware on all hardware components	A fully patched system has a higher utilization than a non patched one this applies to hardware as well.	
A 6	1	Use latest drivers for any hardware device in the server	Using older drivers might not utilize the hardware to its full potential.	

# Operating System tuning

## Common Operation System tuning for all platforms

Item	Priority	Description	Detail	Note
B 1	1	Block alignment / Cluster size	Use block alignment to minimize the numbers of I/O per second. <a href="http://technet.microsoft.com/en-us/library/aa998219.aspx">http://technet.microsoft.com/en-us/library/aa998219.aspx</a> Needs to be implemented at Installation time. Use vendor tools to create proper alignment NTFS default cluster size is 4KB from 2GB – 2 TB <a href="http://support.microsoft.com/kb/140365">http://support.microsoft.com/kb/140365</a> The larger the cluster size the faster a larger chunk of data is sent to ram, instead of having multiple smaller reads.	Any platform
B 2	1	Tune SCSI controller for optimal Performance	<b>NEED HELP think you should enable write-back cache, but unsure</b>	
B 3	1	Allocate 3.6 gb ram pr server (I know this is a strange one, but Citrix is using this number in internal testing as described by Peter Bats)	Due to “hidden” PAE settings taking effect, use ONLY 3.6 gb ram for both virtual and physical memory for optimal performance <a href="http://technet.microsoft.com/en-us/library/cc784574%28WS.10%29.aspx">http://technet.microsoft.com/en-us/library/cc784574%28WS.10%29.aspx</a>	
B 4	1	Use NTFS on any partition	Use this in conjunction with Folder restriction policy’s to ensure security in a simple fashion	
B 5	1	Use XenApp servers for XenApp Only.	Do not install IIS, Printers directly on server, Share Files/Folders and other non Citrix related tasks on the server. Install as Stand Alone member servers	
B 6	1	Install only required network components and protocols.	Keep as simple as possible, review settings after server is completely done to discover unwanted settings	
B 7	2	Install only required Additional Components	Again keep as simple as possible. Remove unwanted components	
B 8	1	Install latest OS + Hotfix combination	Keep Servicepack level equal across farms, deploy in automated fashion	
B 9	1	Set pagefile properties up early in the install.	Total pagefile space should be 1.5 - 2.5 times physical memory Set Initial and Maximum size to the same number for all pagefiles. <a href="http://support.microsoft.com/kb/889654">http://support.microsoft.com/kb/889654</a>	
B 10	2	Set Event Log parameters	In Event Viewer, set the properties on all logs to ‘Overwrite as Needed’,and increase the size from 512 to something like 2048. Use GPO to control the setting.	
B 11	1	Hard code NIC Speed settings.	Due to duplex mismatch it is advised to set both NIC and Switch port to the same speed. Autosense has no standard and can cause slowdowns. <a href="http://en.wikipedia.org/wiki/Duplex_mismatch">http://en.wikipedia.org/wiki/Duplex_mismatch</a>	
B 12	1	Stop unnecessary services from running	<b>I need a bit of help on this one as I would like to know what services can be disabled without issues.</b>	
B 13	1	Stop unnecessary processes from running in each session.	Examine HKLM\Software\Microsoft\Windows\Current Version\Run	

			HKLM\Software\Microsoft\Windows\Current Version\RunOnce HKCU\Software\Microsoft\Windows\Current Version\Run HKCU\Software\Microsoft\Windows\Current Version\RunOnce Delete unwanted processes or control by GPO <a href="http://support.microsoft.com/kb/314488">http://support.microsoft.com/kb/314488</a>	
B 14	1	Defrag disk drives.	Run defrag at reboot time to optimize disk performance. <a href="http://support.microsoft.com/kb/283080">http://support.microsoft.com/kb/283080</a> Consider 3rd party tools like : <a href="http://www.perfectdisk.com/">http://www.perfectdisk.com/</a>	
B 15	2	Prevent last access time stamp	Turn of this default setting to gain a minor performance increase. <a href="http://technet.microsoft.com/en-us/library/cc758569(WS.10).aspx">http://technet.microsoft.com/en-us/library/cc758569(WS.10).aspx</a>	
B 16	2	Create automated reboot	To clear memory and secure a stable environment consider doing a automated reboot. If using provisioning services reboot as often as possible to ensure the stability and consistency of the system	

## Windows 2003

Item	Priority	Description	Detail	Note
C 1	2	Disable paging of the Windows NT Executive	<a href="http://technet.microsoft.com/en-us/library/cc757875(WS.10).aspx">http://technet.microsoft.com/en-us/library/cc757875(WS.10).aspx</a>	
C 2	2	Tune or disable Dr. Watson.	<a href="http://support.microsoft.com/kb/188296">http://support.microsoft.com/kb/188296</a>	
C 3	1	Set advanced Server Performance Options	Ensure that the servers Performance Options is set to optimize for "BackGround Services" <a href="http://support.microsoft.com/kb/308417/en-us">http://support.microsoft.com/kb/308417/en-us</a>	
C 4	1	Set "File and Printer sharing For Microsoft networks" correctly	Set this to "Maximize Data throughput for network applications" <a href="http://technet.microsoft.com/en-us/library/cc728171(WS.10).aspx">http://technet.microsoft.com/en-us/library/cc728171(WS.10).aspx</a>	
C 5	2	Disable "Active Desktop"	Yes it is still there, prevent in GPO <a href="http://msdn.microsoft.com/en-us/library/ms811634.aspx">http://msdn.microsoft.com/en-us/library/ms811634.aspx</a>	
C 6	3	Set Licensing server settings hardcoded	Control by GPO <a href="http://technet.microsoft.com/en-us/library/cc737644(WS.10).aspx">http://technet.microsoft.com/en-us/library/cc737644(WS.10).aspx</a>	
C 7	1	Tune Lanmanserver and lanmanworkstation parameters to avoid pause when logging on and off	As described in last part of this article. <a href="http://support.microsoft.com/kb/324446">http://support.microsoft.com/kb/324446</a>	
C 8	1	Enable "Enable Advanced Performance"	By setting the "Enable write cache on disk" as described in: <a href="http://support.microsoft.com/kb/324446">http://support.microsoft.com/kb/324446</a>	
C 9	1	Prevent hangs of server for 10-30 seconds	By setting "RegistryLazyFlushInterval" as described in this article: <a href="http://support.microsoft.com/kb/317357">http://support.microsoft.com/kb/317357</a>	
C 10	3	Increase SizRegBuf	Increasing the SizRegBuf will consume more memory but increase network performance <a href="http://support.microsoft.com/kb/320829">http://support.microsoft.com/kb/320829</a>	
C 11	1	Increase AdditionalCriticalWorkerThreads and AdditionalDelayedWorkerThreads and	Setting the values at 16 as described here: <a href="http://msdn.microsoft.com/en-">http://msdn.microsoft.com/en-</a>	

		DefaultNumberOfWorkerThreads	<a href="http://technet.microsoft.com/en-us/library/ee377058(BTS.10).aspx">us/library/ee377058(BTS.10).aspx</a>	
C 12		Set applications to auto end in case of logoff	Set: WaitToKillAppTimeout <a href="http://technet.microsoft.com/en-us/library/cc737288(WS.10).aspx">http://technet.microsoft.com/en-us/library/cc737288(WS.10).aspx</a> Set: AutoEndTasks <a href="http://technet.microsoft.com/en-us/library/cc736867(WS.10).aspx">http://technet.microsoft.com/en-us/library/cc736867(WS.10).aspx</a> Set: HungAppTimeout <a href="http://technet.microsoft.com/en-us/library/cc784400(WS.10).aspx">http://technet.microsoft.com/en-us/library/cc784400(WS.10).aspx</a>	

### **Windows Server 2008**

<b>Item</b>	<b>Priority</b>	<b>Description</b>	<b>Detail</b>	<b>Note</b>
D 1		Follow the Microsoft guidelines in tuning your server	This is a big doc, and so many topics are covered: <a href="http://www.microsoft.com/whdc/system/sysperf/Perf_tun_srv.mspx">http://www.microsoft.com/whdc/system/sysperf/Perf_tun_srv.mspx</a>	

# XenApp Tuning

## Common XenApp Tuning

Item	Priority	Description	Detail	Note
E 1		Use Provisioning/unattended installs to manage changes		
E 2		Do NOT change drive letters at installation time	Keep system drive as C: and always go for simplicity	
E 3		Install XenApp with Hotfix combination	Keep the same XenApp and Hotfix level consistent across farm. Examine each Citrix Hotfix to see if it applies to your system	
E 4		Install XML service with same port on all servers	This is a requirement. Keep Port 80 for simplicity	
E 5		Use XenApp servers for XenApp Only.	Do not install IIS, Printers directly on server, Share Files/Folders and other non Citrix related tasks on the server. Install as Stand Alone member servers	
E 6		Use SQL as database server, and create the DSN file using a DNS record that points to the SQL server(s)	Or any of the supported database servers. Set up SQL replication if more sites are used. Use the DNS record to point to different SQL servers based on sites	
E 7		Implement a backup strategy on the SQL server		
E 8		Separate the Citrix Licensing server on separate server, use DNS record to point to the server	Do not use the server name on the Citrix Licens server, but point to a DNS record. Makes upgrades easy to handle	
E 9		Return and allocate the licenses	To be able to utilize newer functionality a return of the licenses are required in some instances. Use a single license file if possible,	
E 10		Avoid using license log files	These files tend to grow and due to the design of the Citrix license server a lot of errors are reported.	
E 11		Set Citrix Licens service to restart	Use the Windows Services paramaters to set the Citrix licens server service to start in case of a service crash	
E 12		Set Data Collector Election rules	Set the rules and duplicate in Web Interface to secure that communication is send back and forth as quickly as possible.	

## XenApp Client Tuning

Item	Priority	Description	Detail	Note
F 1		Use latest version of the XenApp client	Only the current and next to current version is supportet by Citrix. Newer clients have better performance in file transfer and print	
F 2		Use Edgesight 5.2 to create Client version report	Citrix states that the client implementation is some 30% of a XenApp installation. Therefore it is vital to know what client versions are connecting. Upgrade the clients with older	

			version to the newest.	
F 3		Use admin packages created from the msi	Use the msi parameter “-a” to create an admin install with the settings required in the installation. Distribute this with management tools and use it on the Web Interface sites.	
F 4		Enable passthrough authentication on XenApp Web Client	Add the Web Interface DNS to trusted sites Create the client package with pass through enabled. Add GPO settings as described here: <a href="http://support.citrix.com/article/CTX113004">http://support.citrix.com/article/CTX113004</a> .	
F 5		Disable ICA Channels not used on server side	If not needed then disable COM and LPT mappings	

### ***XenApp 4.5 Tuning***

<b>Item</b>	<b>Priority</b>	<b>Description</b>	<b>Detail</b>	<b>Note</b>
G 1				
G 2				
G 3				
G 4				

### ***XenApp 5.0 Tuning***

<b>Item</b>	<b>Priority</b>	<b>Description</b>	<b>Detail</b>	<b>Note</b>
H 1				
H 2				
H 3				
H 4				

## Print Tuning

Item	Priority	Description	Detail	Note
I 1	1	Use WHQL drivers from the vendor only	As the drivers increase in capabilities so does the chance of something breaking. Therefore a most current WHQL driver from the Printer vendor is recommended	
I 2	1	Use Universal Print Driver where ever possible	Print is vital in any installation. Use universal print driver only reduces the amount of time spent on managing the Print drivers and corruption of the spooler process.	
I 3	1	Prevent installation of printer drivers part1	Disable print mapping in the RDP session, this is the most common case where drivers gets installed by chance. Do this by GPO or: Computer Configuration\ Policies\Administrative Templates\ Windows Components\Terminal Services\ Terminal Server\Printer Redirection	
I 4	1	Prevent installation of printer drivers part2	Use a EMPTY trusted drivers path and point all XenApp servers to this path. This prevents driver installations from the OEM library <a href="http://support.microsoft.com/kb/239536">http://support.microsoft.com/kb/239536</a>	
I 5	1	Prevent installation of printer drivers part3	Block Kernel mode drivers. <a href="http://technet.microsoft.com/en-us/library/cc737451(Ws.10).aspx">http://technet.microsoft.com/en-us/library/cc737451(Ws.10).aspx</a>	
I 6	1	Use PCL 6 drivers where possible	PCL 6 has a smaller footprint than PCL 5 along with more features. <a href="http://h20000.www2.hp.com/bizsupport/TechSupport/Document.jsp?objectID=bp103010">http://h20000.www2.hp.com/bizsupport/TechSupport/Document.jsp?objectID=bp103010</a>	
I 7	1	Use Print Server of same OS as the XenApp servers	Since drivers need to be compatible a Print Server requires the same OS as the XenApp servers. So a W2K3 XenApp communicates with a W2K3 Printer server and a W2K8 XenApp communicates with a W2K8 server.	
I 8	1	Do not use Print Driver Replication Between XenApp servers	Do not use this function as there is no fallback, no status report and no security in the success of a replication.	
I 9	1	Disable printer Properties retention.	To increase performance on logons disable the printer Properties as described here: <a href="http://support.citrix.com/article/CTX120621">http://support.citrix.com/article/CTX120621</a>	
I 10	2	Use Print detective to detect unstable drivers	<a href="http://support.citrix.com/article/CTX116474">http://support.citrix.com/article/CTX116474</a>	
I 11				
I 1X		Additional Citrix tips for printing	<a href="http://support.citrix.com/product/xa/v5.0_2003/topic/printing/">http://support.citrix.com/product/xa/v5.0_2003/topic/printing/</a>	

## Profile Tuning

Item	Priority	Description	Detail	Note
J 1	1	Use W2K8 as backend file server for profiles	SMB 2.0 provides better transfer rates. Good login times should be below 10 seconds.	
J 2	1	Utilize Roaming profile, Citrix Profile Manager og Appsense Environment manager or any other profile management solution		
J 3	1	Keep as few files in the Roaming Profile	A number of 30 files or less should be roamed	
J 4	1	Use Folder redirection where ever possible	Cookies, My Documents, Desktop, ect can all be controlled by GPO.	
J 5	1	Do not use Folder redirection on %APPDATA%	Certificates, temp files ect should be local on the XenApp servers disc.	
J 6	1	Use UPHclean from Microsoft	UPHclean will remove locks in registry only and let the user profile be unloaded. There is a beta that also handles file locks. <a href="http://blogs.technet.com/uphclean/archive/2008/02/28/uphclean-v2-0-beta.aspx">http://blogs.technet.com/uphclean/archive/2008/02/28/uphclean-v2-0-beta.aspx</a>	
J 7	2	Use Siloed profiles if 3. party tools are not used,	Put roaming profiles on a hidden share on a reliable file server. To help stabilize the profile mechanism: -Set ErrorMode=2 (see more details in C16, from Q124873) -Set AutoEndTasks=1 (see more details above) -Disable roaming profile cache: [HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft \Windows NT\CurrentVersion\Winlogon] "DeleteRoamingCache"=dword:00000001 -Control profile hogs like Temporary Internet Files, Application Data, and Temp by keeping them out of the profile with registry modifications where appropriate.	
J 8	2	Use OWN directoy vs. HOMEDIRECTORY. If using siloed profiles, consider using siloed HOMEDIRECTORY	Assign a personel directory (OWN) to each user in the login script and use the HOMEDIRECTORY as a location where application settings and settings that are important for the administrators are stored. The OWN directory should be a location where users have full access and can create or delete files as they wish. Net use P: \\Server\OWNSHARE%\username%	
J 9	2	Use EdgeSight to capture profile load problems	With multiple servers in a farm it might not be easy to get an idea as to what profile problems that exist. Use EdgeSight to capture the following events from the system even log:	

## Group Policy tuning

Item	Priority	Description	Detail	Note
K 1	2	Turn off or disable all unnecessary sounds.	There is no need to send sounds across the network. This will release resources to other processes. Set by GPO or modify: HKEY_CURRENT_USER\AppData\Scheme s\	
K 2	2	Remove Scheduled Tasks and others from Windows Explorer	Remove unwanted entries under: HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Explorer\MyComputer\NameSpace\	
K 3	1	Use “folder restriction policy” and NTFS rights on files	To prevent a user from starting an application that the user do not have right to. This is the essayist way of controlling access to programs. Take no time to setup, and works flawlessly. <a href="http://support.microsoft.com/kb/324036">http://support.microsoft.com/kb/324036</a>	

## Logon Process tuning

Item	Priority	Description	Detail	Note
L 1		Use central location for the login script	Do not distribute the script to each server as maintenance will have a big impact on stability. Use GPO on each OU to control this setting	
L 2		Create as simple a loginscript structure as possible, and try to create multiple threads instead of one single one	Instead of first mapping printers, then drivers, then import registry keys, try to do it all at once to speed up the process. Watch <a href="http://www.dkug.dk">www.dkug.dk</a> for examples.	
L 3		Avoid using ROOTDRIVE	Rootdrive should be avoided at all costs, implement the OWNDRIVE / HOMEDRIVE structure described else where in this document, Delete USRLOGON.CMD or remove from registry key HKEY_LOCAL_MACHINE\Software\Microsoft\Windows NT\CurrentVersion\Winlogon\AppSetup	

## Logoff Process tuning

Item	Priority	Description	Detail	Note
M 1		Use a logoff script to delete unnecessary files in the profile that would normally roam	Keeping the number of files to a bare minimum will produce the fastest logoff and logons. Set the logoff script in GPO <a href="http://technet.microsoft.com/en-us/library/cc739591(WS.10).aspx">http://technet.microsoft.com/en-us/library/cc739591(WS.10).aspx</a>	
M 2		Use ForFiles to delete "Older Than" files from the profiles	Can be used on Cookies, temp files ect. Forfiles.exe" -p "%USERPROFILE%\Cookies" -m *.txt -d -60 -c cmd.exe /c If @isdir==FALSE Del @file /a/f /a-S" <a href="http://www.petri.co.il/forums/showthread.php?=&amp;=21736">http://www.petri.co.il/forums/showthread.php?=&amp;=21736</a>	
M 3		Ignore process when a logoff is initiated	Use LogoffCheckSysModules as described in this article: <a href="http://support.citrix.com/article/CTX891671">http://support.citrix.com/article/CTX891671</a>	

# Novell Tuning

<b>Item</b>	<b>Priority</b>	<b>Description</b>	<b>Detail</b>	<b>Note</b>
N 1	1	Integrate the novell client correctly	Follow the guidelines in this document:	

## Application tuning

Item	Priority	Description	Detail	Note
O 1		Office 2000,2003 & 2007	Implement changes using appropriate GPO file, control "Save As" and other settings to point to users OWN directory (not HOME directory)	
O 2		In general turn of all autoupdates of an application	Prevent popup messages instructing the user to update the app	
O 3		Disable background process, like grammar checks	This will SERIOUSLY degrade performance	
O 4		Exclude temp files for antivirus scan on XenApp servers	Investigate if Antivirus is needed at all!	

## Web Interface tuning

Item	Priority	Description	Detail	Note
P 1	1	Fix long loading of first login	Modify the ASPNET.Config file as described here: <a href="http://support.citrix.com/article/CTX117273">http://support.citrix.com/article/CTX117273</a>	
P 2	1	Use DNS name for Web Interface server	Setting a DNS record, simplifies any upgrades that needs to be done, as the DNS record can be pointed to a new server	
P 3	1	Change session timeout values to suit the users	Setting the internal WI site to 8 hours and the External to 1 has been a best practice for long. <a href="http://support.citrix.com/article/CTX103672">http://support.citrix.com/article/CTX103672</a>	
P 4	1	Set the XenApp Farm servers in proper order	In the farm settings, put the Data Collector first, then according to election rules set the other servers. Do not use load balancing put direct all request to the first server.	
P 5	2	Disable Socket pooling	Socket pooling is nice when it works, sometimes it don't, so disable as default. <a href="http://support.citrix.com/article/CTX111057">http://support.citrix.com/article/CTX111057</a>	
P 6	2	Update Client versions to latest release	Time flies and any Web Interface version is overtaken by the XenApp client versions. Download and post newest version. Including the Java version.	

## Citrix Access Gateway tuning

Item	Priority	Description	Detail	Note
Q 1		Applying SSL certificates can be tricky	See the following CTX articles for solutions to common certificate problems. <a href="http://support.citrix.com/article/CTX111872">http://support.citrix.com/article/CTX111872</a> <a href="http://support.citrix.com/article/CTX106028">http://support.citrix.com/article/CTX106028</a>  Most certificate publishers also have how-tos on CAG specifically.	
Q 2		Apply settings when moving from tab to tab (CAG)	Many settings are required to be saved on the tab where they are configured. If the Access Gateway is restarted these settings will be lost if not saved within the specific tab first.	
Q 3		Applying firmware updates (CAG)	Always use latest firmware ! (there is one exception: if you require the 'share desktop feature' of CAG, you will need to stay on firmware 4.5.8 or LOWER). Although not required do remember to make a configuration backup before updating firmware. Use the web admin page <a href="https://fqdn_of_cag:9001">https://fqdn_of_cag:9001</a> for firmware updates as they will not always apply if performed from the CAG admin tool.	
Q 4		Plan-On-Paper (AAC and CAGEE)	Prepare your planning on paper first. The structure of the policies, filters, EPA scans and other factors can quickly become very complex.	
Q 5		Rebooting options (CAG and AAC)	In general reboot CAG after applying any changes – even when the CAG does not state it as a requirement. Also reboot the CAG after applying customizations to the logonpoints in AAC (e.g. company logos etc).	
Q 6		Backup (CAG and AAC)	Make configuration backups ! For AAC back up the SQL db on a regular basis. Experience shows that the AAC db can become corrupted.	

## Citrix Secure Gateway tuning

Item	Priority	Description	Detail	Note
R 1		Use latest Secure gateway software		
R 2		Patch with latest hotfix		
R 3		Use DNS record to point to CSG server	Setting a DNS record, simplifies any upgrades that needs to be done, as the DNS record can be pointed to a new server	
R 4		Prevent access through the CSG service to other sites	The service lets you access other sites on the Web Interface server, so prevent that in firewall or IIS on Web Interface	
R 5		Consider the use of CSG to other services	By modifying the HTTPD.Conf file access to OWA is possible. <a href="http://support.citrix.com/article/CTX107581">http://support.citrix.com/article/CTX107581</a>	
R 6		Set the CSG service to restart on failure		

## Citrix Provisioning Services tuning

<b>Item</b>	<b>Priority</b>	<b>Description</b>	<b>Detail</b>	<b>Note</b>
S 1		Use W2K8 64 bit as Provisioning server	W2K8 provides much better file transfer	
S 2		Use local storage	Use local storage for VHD files	

## AntiVirus tuning

Item	Priority	Description	Detail	Note
T 1		Follow the recommended tuning information from Citrix	<a href="http://support.citrix.com/article/CTX114522">http://support.citrix.com/article/CTX114522</a>	
S 2		Antivirus needs to be configured for EdgeSight	<a href="http://support.citrix.com/article/CTX111062">http://support.citrix.com/article/CTX111062</a>	

# Additional Resources

Resource Type	Link
Documentation	
Support	