The Quick Lockdown

Securing Windows Servers

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All checklists and scripts referenced in this presentation are available at:
www.corp-sec.net

The approach presented focuses on both efficiency and effectiveness, without breaking application functionality. The presenter has implemented hardening on several hundred servers across multiple companies.

Why Harden Hosts?

- Hardening: Altering the default configuration of an operating system to move it closer to a “deny all by default” security posture.
- Worms
- Script kiddies
- Cross-platform vulnerability aggregation

Checklist Types

Member Server Hardening Checklist

Domain Controller Hardening Checklist

Web Server Hardening Checklist

Terminal Server Hardening Checklist

Section 1

- Reboot the server to make sure there are no pre-existing issues with it. If you have (easy) physical access to the server, do a complete power-down. Otherwise, do a shutdown and restart.

Go to Indexing Service properties and turn off all directories for the system partition.

Right Click On “My Computer” and choose “Manage”

(start…run…ciadv.msc)

Expand the Services and Applications section on the right side of the window

Click on Indexing Service (below the Services and Applications Item)

Delete all catalogs that appear in the right window

W2K - Select the “Log on Screen Saver” after 15 minutes, require password to unlock
W2K3 – Windows 2003 Screen Saver after 10 minutes, require password to unlock

Change log sizes –

Application:	5120, overwrite as needed
Security:	10240, overwrite as needed
System:	5120, overwrite as needed

For W2K3 set all three to 131072

Rename Administrator to standard and get rid of the default descriptions.

Create a “new” Local User named Administrator, inserting the default descriptions from the real Administrator account – set to user cannot change password, password never expires – make it 14 characters (15+ for W2K3)…strong.

Handling Local Administrator Passwords

- Why rename the Administrator account?
  - Detect automated attacks and worms
- Consider using different naming convention standard for Internet facing vs. Internal domains/forests
- Make passwords for local administrator accounts separate from domain administrator accounts
- Make the passwords 15 character, strong, random – or use a pass phrase
- Do not log on regularly with local administrator accounts
- Script regular password changes for local administrator account passwords or use a commercial product like User Manager Pro
- Use random passwords
- Store local administrator passwords in an encrypted database like the one found at: http://www.schneier.com/passsafe.html

Account Policies:

Password Policy:

Policy	Local Setting
Enforce password history	**24 passwords remembered**
Maximum password age	**45 days**
Minimum password age	**5 days**
Minimum password length	**8 characters**
Passwords must meet complexity requirements	**Enabled*** **
Store password using reversible encryption for all users in the domain	**Disabled**

***At the Domain level, this setting may have to be the same as the weakest link in the chain if you have password synchronization software in your environment. (Some platforms can't enforce alphanumeric passwords with upper and lower characters required.)

Account Lockout Policy:

Policy	Local Setting
Account lockout duration	**60 minutes**
Account lockout threshold	**5 invalid logon attempts**
Reset account lockout counter after	**60 minutes**

Audit Policy: FOR all servers **EXCEPT** Print and Proxy Servers:

Policy	**Local Setting**
Audit account logon events	**Success, Failure**
Audit account management	**Success, Failure**
Audit directory service access	**Failure**
Audit logon events	**Success, Failure**
Audit object access	**Failure**
Audit policy change	**Success, Failure**
Audit privilege use	**Failure**
Audit process tracking	No auditing
Audit system events	**Success, Failure**

Audit Policy: **PRINT SERVERS AND PROXY SERVERS:**

Policy	**Local Setting**
Audit account logon events	**Failure**
Audit account management	**Success, Failure**
Audit directory service access	**Failure**
Audit logon events	**Failure**
Audit object access	**Failure**
Audit policy change	**Success, Failure**
Audit privilege use	**Failure**
Audit process tracking	No auditing
Audit system events	**Success, Failure**

User Rights Assignment:

Policy	Local Setting
Access this computer from the network	**Authenticated Users** **Backup Operators** **Administrators** **IWAM_"Computername"** **IUSR_"Computername"**
Act as part of the operating system	
Add workstations to domain	
Back up files and directories	Backup Operators Administrators
Bypass traverse checking	**Authenticated Users** **Users** **Backup Operators** **Administrators**
Change the system time	**Administrators**
Create a pagefile	Administrators
Create a token object	
Create Global Objects	Administrators, SERVICE
Create permanent shared objects	
Debug programs	Administrators
Deny access to this computer from the network	

Deny logon as a batch job	
Deny logon as a service	
Deny logon locally	
Enable computer and user accounts to be trusted for delegation	
Force shutdown from a remote system	Administrators
Generate security audits	
Impersonate a client after authentication	Administrators, SERVICE
Increase quotas	Administrators
Increase scheduling priority	Administrators
Load and unload device drivers	Administrators
Lock pages in memory	
Log on as a batch job	IWAM_"Computername" IUSR_"Computername"
Log on as a service	
Log on locally	**Administrators** **Backup Operators** **IUSR_"Computername"** **Remove Users** **Remove TsInternetUser**
Manage auditing and security log	Administrators

Modify firmware environment values	Administrators
Profile single process	**Administrators**
Profile system performance	Administrators
Remove computer from docking station	Users Power Users Administrators
Replace a process level token	
Restore files and directories	Backup Operators Administrators
Shut down the system	**Administrators** **Backup Operators**
Synchronize directory service data	
Take ownership of files or other objects	Administrators

Security Options:

Only Change BOLDED Items

Policy	Local Setting
Additional restrictions for anonymous connections	**Do not allow enumeration of SAM accounts and shares**
Allow server operators to schedule tasks (domain controllers only)	Not defined
Allow system to be shut down without having to log on	Disabled
Allowed to eject removable NTFS media	Administrators
Amount of idle time required before disconnecting session	15 minutes
Audit the access of global system objects	Disabled
Audit use of Backup and Restore privilege	Disabled
Automatically log off users when logon time expires (local)	Enabled
Clear virtual memory pagefile when system shuts down	Disabled
Digitally sign client communication (always)	Disabled
Digitally sign client communication (when possible)	Enabled
Digitally sign server communication (always)	Disabled
Digitally sign server communication (when possible)	**Enabled**
Disable CTRL+ALT+DEL requirement for logon	Disabled
Do not display last user name in logon screen	**Enabled**
LAN Manager Authentication Level	**Send LM & NTLM – use NTLMv2 session security if negotiated**
Message text for users attempting to log on	In Legal
Message title for users attempting to log on	WARNING!

Number of previous logons to cache (setting not available for Domain Controllers)	**0 logons**
Prevent system maintenance of computer account password	Disabled
Prevent users from installing printer drivers	Enabled
Prompt user to change password before expiration	14 days
Recovery Console: Allow automatic administrative logon	Disabled
Recovery Console: Allow floppy copy and access to all drives and all folders	Disabled
Rename administrator account	TO Standard
Rename guest account	TO Standard
Restrict CD-ROM access to locally logged-on user only	**Enabled**
Restrict floppy access to locally logged-on user only	**Enabled**
Secure channel: Digitally encrypt or sign secure channel data (always)	Disabled
Secure channel: Digitally encrypt secure channel data (when possible)	Enabled
Secure channel: Digitally sign secure channel data (when possible)	Enabled
Secure channel: Require strong (Windows 2000 or later) session key	Disabled
Send unencrypted password to connect to third-party SMB servers	Disabled
Shut down system immediately if unable to log security audits	Disabled
Smart card removal behavior	**Lock Workstation**
Strengthen default permissions of global system objects (e.g. Symbolic Links)	Enabled
Unsigned driver installation behavior	**Warn**
Unsigned non-driver installation behavior	**Warn**

For More Details on User Rights and Security Settings Sections

- Q823659

  "Client, Service, and Program Incompatibilities That May Occur When You Modify Security Settings and User Rights Assignments"

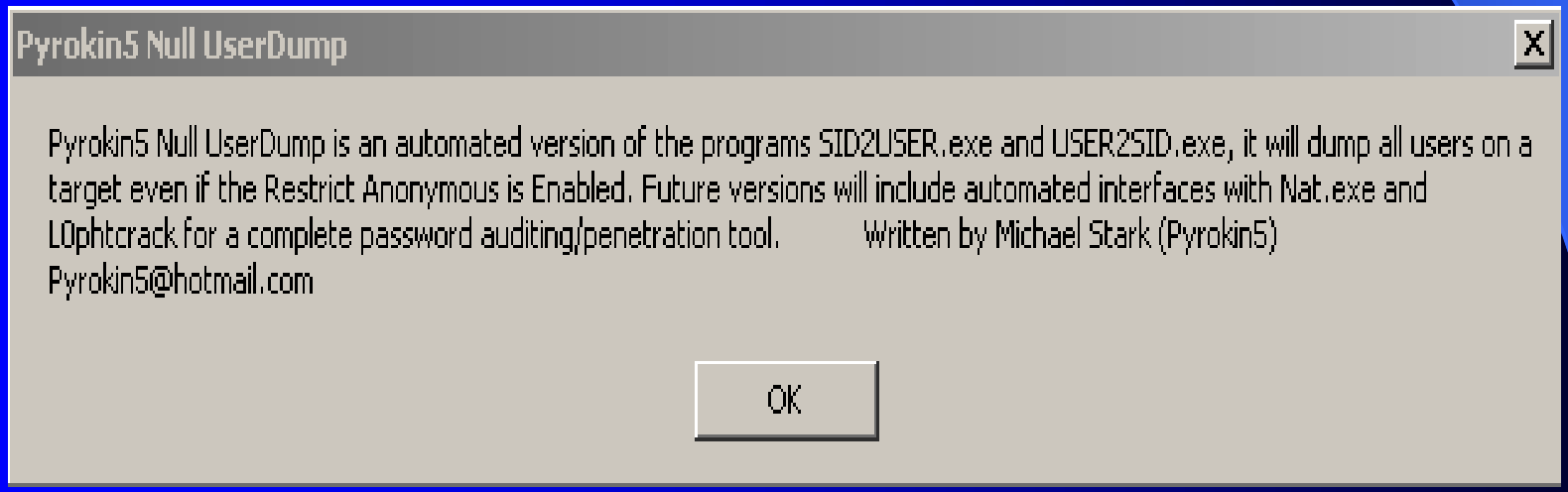
http://support.microsoft.com/default.aspx?scid=kb;en-us;823659

You'll notice that restrict anonymous is set to 1 "Do not allow enumeration of SAM accounts and shares" instead of 2 "No access without explicit anonymous permissions". This is to account for mixed mode environments.

Setting restrict anonymous interferes with printing. Setting restrict anonymous to 2 also causes problems with browsing on server segments that have both NT 4.0 and Windows 2000 servers but no domain controllers. If a Windows 2000 server with restrict anonymous set to 2 wins the election, your browsing will not function properly. Many administrative tools and functions rely on proper browsing. (A necessary evil in larger environments?)

Everyone says setting restrict anonymous to 2 is highly important.

No matter how many times they fix it, someone breaks it. So is having it set to one a big deal in a mixed mode environment? Probably not.



Section 2

Registry Modifications

→ Secure the event logs (application, system, and security) from Guest Access (ADD 3 keys, one for each.)
Hive: HKEY_LOCAL_MACHINE\System
Key: \CurrentControlSet\Services\EventLog\%LOGNAME%
Value Type: REG_DWORD
Value Name: RestrictGuestAccess
Value: 1

→ Disable CD-ROM Autorun (MODIFY this value.) (This can be done via policy under admin templates…system)
Hive: HKEY_LOCAL_MACHINE\System
Key: \CurrentControlSet\Services\CDRom
Value Type: REG_DWORD
Value Name: Autorun
Value: 0

- Disable 8.3 Filename Creation – Modify **Sometimes applications need this value re-enabled for installs or upgrades**

Hive: HKEY_LOCAL_MACHINE\System
Key: \CurrentControlSet\Control\Filesystem
Value Type: REG_DWORD
Value Name: NTFSDisable8dot3NameCreation
Value: 1

→ Enable Syn Attack Protect (Q142641) - Add

Hive: HKEY_LOCAL_MACHINE\SYSTEM
Key: CurrentControlSet\Services\Tcpip\Parameters\
Name: SynAttackProtect
Type: REG_DWORD
Value: 2

NOTE: If the SynAttackProtect key modification proves to be ineffective or a specific resources are being continuously hit by SYN Attacke, see MS Q142641. Also consider changing the TcpMaxPortsExhausted value to 1 and the TcpMaxDataRetransmissions value to 3 (see regentry.chm from the WIN2K resource Kit).

→ Configure Dead Gateway Protection

Hive: HKEY_LOCAL_MACHINE\SYSTEM
Key: CurrentControlSet\Services\Tcpip\Parameters\
Name: EnableDeadGWDetect
Type: REG_DWORD
Value: 0

❑ Disable Router Discovery

Note: Make sure IDRP is not in use in the client's perimeter network.
Hive: HKEY_LOCAL_MACHINE\SYSTEM
Key: CurrentControlSet\Services\Tcpip\Parameters\Interfaces\[*InterfaceName]*
Name: PerformRouterDiscovery
Type: REG_DWORD
Value: 0

→ Disable ICMP Redirects - Change the value…the key is already there. (Q225344)

Hive: HKEY_LOCAL_MACHINE\SYSTEM
Key: CurrentControlSet\Services\Tcpip\Parameters\
Name: EnableICMPRedirect
Type: REG_DWORD
Value: 0

→ Disable IP Source Routing

Hive: HKEY_LOCAL_MACHINE
Key: System\CurrentControlSet\Services\Tcpip\Parameters
Name: DisableIPSourceRouting
Type: REG_DWORD
Value: 2

→ Tune the TCP/IP KeepAlive Time

Note: This setting is most appropriate to web servers, but may apply to other applications.

Hive: HKEY_LOCAL_MACHINE
Key: System\CurrentControlSet\Services\Tcpip\Parameters
Name: KeepAliveTime
Type: REG_DWORD
Value: 300000

→ Disable External Name Release

Hive: HKEY_LOCAL_MACHINE
Key: System\CurrentControlSet\Services\Tcpip\Parameters
Name: NoNameReleaseOnDemand
Type: REG_DWORD
Value: 1

→ Enable PMTU Discovery*

Hive: HKEY_LOCAL_MACHINE
Key: System\CurrentControlSet\Services\Tcpip\Parameters
Name: EnablePMTUDiscovery
Type: REG_DWORD
Value: 0

→ TcpMaxConnectResponseRetransmissions (default)

Hive: HKEY_LOCAL_MACHINE
Key: System\CurrentControlSet\Services\Tcpip\Parameters
Name: TcpMaxConnectResponseRetransmissions
Type: REG_DWORD
Value: 2

→ TcpMaxDataeRetransmissions

Hive: HKEY_LOCAL_MACHINE
Key: System\CurrentControlSet\Services\Tcpip\Parameters
Name: TcpMaxDataRetransmissions
Type: REG_DWORD
Value: 3

Disabling PMTU Discovery

- This setting makes the default MTU size = 576. The default (with PMTU Discovery enabled) is 1500.
- In segmented environments (lots of VLANs), this can triple the amount of packets on your network. It can also adversely affect applications accessed via WAN links.
- Issues:
  - Setting MTU back to 1500 is interface specific
  - Not easily scriptable (if at all)
  - If a NIC is replaced the settings may not be

→ TCPMaxPortsExhausted (default)

Hive: HKEY_LOCAL_MACHINE
Key: System\CurrentControlSet\Services\Tcpip\Parameters
Name: TCPMaxPortsExhausted
Type: REG_DWORD
Value: 5

→ Disable All Autorun

Hive: HKEY_LOCAL_MACHINE
Key: Software\Microsoft\Windows\CurrentVersion\Policies\Explorer
Name: NoDriveTypeAutoRun
Type: REG_DWORD
Value: 0xFF

ADDITIONAL EDIT FOR W2K3

→ Enable Kerberos Logging

Hive: HKEY_LOCAL_MACHINE\System
Key: \CurrentControlSet\Control\LSA\Kerberos\Parameters
Value Type: REG_DWORD
Value Name: LogLevel
Value: 1

For More Details on TCP/IP Stack Hardening

- Q120642

"TCI/IP and NBT Configuration Parameters for Windows 2000 or Windows NT"

http://support.microsoft.com/default.aspx?scid=kb;EN-US;120642

Section 3

Registry Permissions

→ Restrict permissions for the following registry locations: YOU MUST USE REGEDT32!
Be sure to remove “allow inheritance” prior to applying permissions, choose “copy” rather than remove.

The Permissions should all be set to the following:

Administrators	(Full Control)	
SYSTEM	(Full Control)	
Creator Owner	(Full Control)	**[**leave alone on Run, Run Once, Run Once Ex, Uninstall, and AeDebug**]**
ADD: Authenticated Users	(Read)	

Creator Owner (Full Control) leave alone on Run
→ Hive: HKEY_LOCAL_MACHINE\SOFTWARE
Key: \Microsoft\Windows\CurrentVersion\Run

Creator Owner (Full Control) leave alone on Run Once
→ Hive: HKEY_LOCAL_MACHINE\SOFTWARE
Key: \Microsoft\Windows\CurrentVersion\RunOnce

Creator Owner (Full Control) leave alone on Run Once Ex
→ Hive: HKEY_LOCAL_MACHINE\SOFTWARE
Key: \Microsoft\Windows\CurrentVersion\RunOnceEx

Creator Owner (Full Control) leave alone on Uninstall
→ Hive: HKEY_LOCAL_MACHINE\SOFTWARE
Key: \Microsoft\Windows\CurrentVersion\Uninstall

Creator Owner (Full Control) leave alone on AeDebug
→ Hive: HKEY_LOCAL_MACHINE\SOFTWARE
Key: \Microsoft\Windows NT\CurrentVersion\AeDebug

→ Hive: HKEY_LOCAL_MACHINE\SOFTWARE
Key: \Microsoft\Windows NT\CurrentVersion\Winlogon

→ Use REGEDT32 to set permissions on the following registry key.

Permissions should be set to:
Administrator & System = Full Control
Authenticated Users = Read

HKLM\Software\Microsoft\Rpc

ALL OF THESE ARE DONE BY DEFAULT FOR W2K3

Section 4

File System ACLs

(See the SANS WIN2K Step-By-Step Guide. This is a sub-set from that checklist.)

→ Change NTFS permissions for C:\ to Administrators and System: Full control and Authenticated Users with Read & Execute

→ Change NTFS permissions on C:\boot.ini, C:\ntdetect.com, and C:\ntldr

→ Change NTFS permissions on C:\Program Files to Administrators and System: Full control and Authenticated Users with Read & Execute

→ Change NTFS permissions for %systemroot%\repair to only Administrators and System: Full control Also, EXPLICITLY set permissions for the IUSR and IWAM (and any other web site service accounts) to NO ACCESS

→ Change NTFS permissions on directory %systemroot%\security to only Administrators and System with Full Control

→ Change NTFS permissions on directory %systemroot%\system32\config to only Administrators and System with Full Control Also, EXPLICITLY set permissions for the IUSR and IWAM (and any other web site service accounts) to NO ACCESS

→ Change NTFS permissions on directory %systemroot%\system32\dllcache to only Administrators and System with Full Control

→ Change NTFS permissions on directory %systemroot%\system32\logfiles to only Administrators and System with Full Control

ALL OF THESE ARE DONE BY DEFAULT FOR W2K3

Section 5

Utilities, Service Packs/Hot Fixes, and Services

→ Copy passprop.exe to the winnt\system32 directory and run passprop (start, run, passprop /complex /adminlockout

→ Run the Set Version Batch File

The set version batch writes information to the registry:

- compliance reporting via Retina or LANGuard v3.0
- information for troubleshooting

→ Set permissions to the local administrator account for the following command-line utilities. Also, consider EXPLICITLY setting permissions for the IUSR and IWAM users (and any other web site service accounts) to NO ACCESS. (For highly secure environments, consider moving, renaming, or deleting any command-line utilities.)
The following tools are usually found in the Winnt\System32 directory:

append.exe	arp.exe	at.exe
attrib.exe	cacls.exe	change.exe
chcp.com	chglogon.exe	chgport.exe
chguser.exe	chkdsk.exe	chkntfs.exe
cipher.exe	cluster.exe	cmd.exe
compact.exe	command.com	convert.exe
cscript.exe	dcpromo.exe	debug.exe
dfscmd.exe	diskcomp.com	diskcopy.com
doskey.exe	edlin.exe	exe2bin.exe
expand.exe	fc.exe	find.exe
findstr.exe	finger.exe	forcedos.exe
format.com	ftp.exe	hostname.exe
iisreset.exe	ipconfig.exe	ipxroute.exe
label.exe	logoff.exe	makecab.exe

mem.exe
more.exe
nbtstat.exe
netsh.exe
ntbackup.exe
pathping.exe
posix.exe
rcp.exe
regini.exe
replace.exe
route.exe
rsh.exe
secedit.exe
share.exe
subst.exe
telnet.exe
tlntadmin.exe
tracert.exe

mmc.exe
mountvol.exe
net.exe
netstat.exe
ntsd.exe
ping.exe
query.exe
recover.exe
register.exe
reset.exe
routemon.exe
runas.exe
setpwd.exe
snmp.exe
syskey.exe
termsrv.exe
tlntsess.exe
tree.com

mode.exe
msg.exe
net1.exe
nslookup.exe
os2.exe
print.exe
rasdial.exe
regedt32.exe
regsvr32.exe
rexec.exe
router.exe
runonce.exe
shadow.exe
snmptrap.exe
taskmgr.exe
tftp.exe
tlntsrv.exe
tsadmin.exe

tscon.exe
tsprof.exe
winmsd.exe

tsdiscon.exe
tsshutdn.exe
wscript.exe

tskill.exe
usrmgr.com
xcopy.exe

The following tools are usually found in the Winnt directory:
Regedit.exe

W2K3 has more utilities (IIS even more)

Install the latest Service Packs and Hot Fixes

→ Disable unnecessary services and features. The services in bold are stopped and disabled:

Alerter
Automatic Updates
Background Inteligent Transfer Service
ClipBook
Computer Browser
DHCP Client – not yet
Distributed File System
Distributed Link Tracking Client
Distributed Link Tracking Server
Fax Service
File Replication
FTP Publishing Service
Indexing Service
Internet Connection Sharing
Intersite Messaging
Kerberos Key Distribution

Messenger
Net Meeting Remote Sharing
Network DDE
Network DDE DSDM
Print Spooler – done in build
QoS RSVP
Remote Access Auto Connection Manager
Remote Access Connection Manager – not on Compaq Servers
Remote Registry Service (DO NOT DISABLE THIS – Update Software must have this.)
Removable Storage
Routing and Remote Access
RunAs Service
Smart Card
Smart Card Helper
TCP/IP NetBIOS Helper (Bastion only)
Task Scheduler (DO NOT DISABLE THIS – Update Software must have this.)
Telephony – not on Compaq Servers
Telnet

Many of these are disabled by default in W2K3

Section 6

OS/2 and POSIX Subsystems Removal

→ Run the script, “S6.windows2000.OS2POSIX.subsystem.removal.part.1.cmd” is in the \Lockdown\W2K directory.
WAIT for the Windows File Protection pop-up window to appear.
When it appears and prompts to restore those files from the Windows CD, click “Cancel” and click “Yes” to confirm.

→ Reboot the system.

→ Run the script, “S6.windows2000.OS2POSIX.subsystem.removal.part.2.cmd” is in the \Lockdown\W2K directory.
WAIT for the Windows File Protection pop-up window to appear.
When it appears and prompts to restore those files from the Windows CD, click “Cancel” and click “Yes” to confirm.

→ Reboot the system.
SP3 Completely Replaces both subsystems……

Section 7

Resource Kit

- **Remove the following Resource Kit Components:**
- Via Add/Remove Programs:
  - De-select: “Tool Documentation”
  - De-select: “Deployment Tools”
  - De-select: “Computer Management Tools”
  - De-select: “Network Management Tools”
  - De-select: “Diagnostic Tools”
  - De-select: “File and Disk Tools”
  - De-select: “Debug Tools”
  - De-select: “Desktop Tools”
  - De-select: “Remote Administration Scripts” ***VERY DANGEROUS!!!***
  - Scripting Tools
  - De-select: “KiXtart 95”
  - De-select: “POSIX Utilities”
  - De-select: “Active Perl”
  - De-select: “AutoEXNT Service”
  - De-select: “Internet Information Services”
  - De-select: “Security Tools”

Use only the files you need with ACLs in d:\Program Files\reskit

Section 8

- **Other Items to Consider:**
- ❑ Configure TCP/IP Filters, Consider the use of IPSEC Policies
- ❑ Tune your virus protection, scan all inbound files, set exclusions as needed.
- ❑ Scan the server with one or more of the following: MBSA, LANGuard Network Scanner, Nessus

Section 9

- TSE Admin Settings for all servers
- Must be done manually
- Delete the TSInternet user first – SPs add it back?

(Start…run…tscc.msc…double click on the RDP-Tcp Connection)

→ RDP Connection Settings: Modify the following items, leave the rest of the defaults.

→ On the General Tab: Set encryption to high

→ On the Sessions Tab: Check the First "Override user settings" box and set the following values:
  - → End a disconnected session: 30 minutes
  - → Active session limit: Never (no limit)
  - → Idle session limit: 1 day

→ On the Sessions Tab: Check the Second "Override user settings" box and set the following values:
  - → When a session limit is reached or connection is broken: **End session**

→ On the Remote Control Tab, select:
  - → Do not allow remote control

- On the Client Settings Tab, make sure the following options are disabled:
  Disable the following:
  - Windows printer mapping
  - LPT port mapping
  - COM port mapping (default)
  - Clipboard mapping
  - Audio Mapping **W2K3**
- On the Permissions Tab: Click the advanced button , select the auditing tab, and click add
- Set focus to the local machine and select the administrators group
- Select the following options: (select both Successful and Failed for all items below)
  - Remote Control
  - Logon
  - Logoff
  - Connect
  - Disconnect

Section 10

Registry Modifications

IIS Specific

- Enable Logging of SSL Events (errors and warnings)

Hive: HKEY_LOCAL_MACHINE
Key: System\CurrentControlSet\Control\SecurityProviders\SChannel
Name: EventLogging
Type: REG_DWORD
Value: 3

- Disable use of the Command shell with #exec

Hive: HKEY_LOCAL_MACHINE
Key: System\CurrentControlSet\Services\W3SVC\Parameters
Name: SSIEnableCMDDirective
Type: REG_DWORD
Value: 0

Enable settings for Afd.sys (as per the MS Windows 2000 Security Operations Guide)

- Hive: HKEY_LOCAL_MACHINE
  Key: System\CurrentControlSet\Services\AFD\Parameters
  Name: DynamicBacklogGrowthDelta
  Type: REG_DWORD
  Value: 10

- Hive: HKEY_LOCAL_MACHINE
  Key: System\CurrentControlSet\Services\AFD\Parameters
  Name: EnableDynamicBacklog
  Type: REG_DWORD
  Value: 1

- Hive: HKEY_LOCAL_MACHINE
  Key: System\CurrentControlSet\Services\AFD\Parameters
  Name: MinimumDynamicBacklog
  Type: REG_DWORD
  Value: 20

- Hive: HKEY_LOCAL_MACHINE
  Key: System\CurrentControlSet\Services\AFD\Parameters
  Name: MaximumDynamicBacklog
  Type: REG_DWORD
  Value: 20000

Section 11

IIS Settings

- Most scripted in sections.
- Custom for each set of application servers.
- Logging should be enabled on all web servers.

Move the webroot files to a non-system partition

- Stop IIS-related services. If you stop IIS Admin Service, all other IIS-related services stop, too.
- Copy c:\inetpub to d:\ (Use robocopy with the /SEC switch)
- Start the IIS Admin snap-in under MMC
- Redirect all IIS application parameters to d:\inetpub\...(Default Web Site Properties – Home Directory Tab – Change the local path setting)
- Register metautil.dll
- Run MetaEdit
- Find all references to c:\inetpub\... Change to d:\inetpub\...
- **UN_REGISTER metautil.dll**
- **Shift + Delete metautil.dll**
- Restart the server
- Shift + Delete c:\inetpub

Or use ver 2.2 and add/remove programs

Perform the following for all Web Servers: Intranet or Internet (Bastion Host):

- Use the following rule of thumb for NTFS file permissions on the Web Server: Another rule of thumb is to separate these file types into separate directories and apply the permissions to the Directories instead of individual files:

File Type	Permissions
CGI Files, etc. (.EXE, .DLL, .CMD, .PL) Administrators (Full Control) System (Full Control)	Everyone (X)
Script Files (.ASP etc) Administrators (Full Control) System (Full Control)	Everyone (X)
Include Files (.INC, .SHTML, .SHTM) Administrators (Full Control) System (Full Control)	Everyone (X)
Static Content (.HTML) Administrators (Full Control) System (Full Control)	Everyone (R)
Images (.GIF, .JPEG) Administrators (Full Control) System (Full Control)	Everyone (R)

CAUTION: When a folder has both write and execute IIS Permissions, an attacker can upload any executable and run it on the server. If two virtual folders are mapped to the same physical folder, and one virtual folder has Write and the other virtual folder has Execute, attackers can still upload any executable and run it on the server.

→ Set the Web Server Logging to W3C Extended Format and log the following properties:

Leave the New Log Time Period set to Daily

Select: "Use local time for naming and rollover"

Make sure the defaults for logging are enabled and add the ones in bold:

- → Client IP Address
- → User Name
- → **Service Name**
- → **Server Name**
- → Server IP Address
- → Server Port
- → Method
- → URI Stem
- → URI Query
- → Protocol Status
- → User Agent
- → **Cookie**
- → **Referer**
- → **ALL s-events under the Process Accounting Box**

- Follow these steps to disable IP Address in the Content Location header: This secures against providing “Hidden” (internal NAT’ed addresses) in the web page header. The following fix will change the header to display the FQDN instead. See Q218180

- Open a command window.
- Change to the winnt\system32\inetsrv\adminsamples directory
- Type this command: “cscript adsutil set w3svc/UseHostName True”
- Type net stop iisadmin /y
- Type net start w3svc

- Remove all IIS Sample Applications i.e. delete the following directories:
  - \InetPub\AdminScripts
  - \InetPub\iisamples
  - \WINNT\System32\inetsrv\iisadmin (check with server/application owner)
  - \WINNT\System32\inetsrv\iisadminpwd (check with server/application owner)
  - \WINNT\Help\iishelp

- Perform the following removals from within IIS Administrator:
  - Remove the IISamples sub-object of the “Default Web Site”
  - Remove the IISAdmin sub-object of the “Default Web Site”
  - Remove the Printers sub-object of the “Default Web Site”
  - Remove the IIS Help sub-object of the “Default Web Site”

- Disable Internet Printing
  - Delete the Printers Virtual Directory located at: %systemroot%\web\printers

- Perform the following registry edit:

Hive: HKEY_LOCAL_MACHINE
Key: Software\Policies\Microsoft\Windows NT\Printers
Name: DisableWebPrinting
Type: REG_DWORD
Value: 1

NOTE: Internet Printing can be configured via group policy as well as via the Internet Services Manager. If there is a conflict between the GPO and Internet Manager settings, the GPO will take precedence. If you remove Internet Printing via the Internet Services Manager, be sure to verify that it won't be re-enabled by either local or domain GPOs. (The default group policy neither enables nor disables Internet Printing.) In the MMC Group Policy snap-in, check Computer Configuration | Administrative Templates | Printing | Web Based Printing.

- Disable Parent Paths: go to the root of each web site, right click, Properties | Home Directory | Configuration | App Options and uncheck “Enable Parent Paths” Ignore the IIS Help message…do NOT select it.

- Remove unused script mappings from the Internet Services Manager. File extension mappings for script types that are not being used could be exploited by an intruder to gain access to the system.

(Below is an excerpt from the Microsoft IIS 5.0 Security Checklist)

IIS is preconfigured to support common filename extensions such as .ASP and .SHTM. When IIS receives a request for a file of one of these types the call is handled by a DLL. If you don't use some of these extensions or functionality you should remove the mappings by open Internet Services Manager then right-clicking the Web server | Properties | Master Properties | WWW Service | Edit | HomeDirectory | Configuration and remove these references:

If you don't use:	**Remove this entry:**
Web-based password reset	.htr
Internet Database Connector	.idc
Server-side Includes	.stm, .shtm, .shtml
Internet Printing	.printer
Index Server	.htw, .ida, .idq

NOTE: The ISAPI Extension Mappings shown above may reappear whenever ANY Windows Component is added or removed via the Add/Remove Utility in the Control Panel.

- Change Application Protection to “Medium Pooled” on the Home Directory tab for all web sites (this is the default setting…double check it)

- Disable WebDAV, unless needed…Using it is NOT recommended!!! (Q241520)

Hive: HKEY_LOCAL_MACHINE
Key: System\CurrentControlSet\Services\W3SVC\Parameters
Name: DisableWebDAV
Type: REG_DWORD
Value: 1

When possible, install IIS using an unattended install with the following answer file

```
[Components]
    iis_common=on
    iisdbg=off
    iis_doc=off
    iis_ftp=off
    iis_htmla=off
    iis_inetmgr=on
    iis_nntp_docs=off
    iis_pwmgr=off
    iis_smtp=off
    iis_smtp_docs=off
    iis_www=on
    indexsrv_system=off
    iis_www_vdir_msadc=off
    iis_www_vdir_printers=off
    iis_www_vdir_scripts=off
    iis_www_vdir_terminalservices=off

[InternetServer]

    PathWWWRoot=D:\Inetpub\WWW
    Root
```

Section 12

- RDS Keys

- RDS Keys: (Used for direct connections between the client and the database server, rarely used. Recommended against by Microsoft.) Note: Upgrading to MDAC v2.6 or greater should nullify this vulnerability but it is not a good idea to rely solely on patches i.e. the entries should still be deleted. (see Q184375)

Remove MDAC: IF it's not used in the Client's Environment! Consult with the server/application owner prior to implementation.

- Delete the /msadc virtual directory from the default Web site
- Delete the Samples Directory at:
  C:\Program Files\Common Files\System\msadc\Samples
- Remove the following registry keys (if present) from the IIS Server

Hive: HKEY_LOCAL_MACHINE\SYSTEM
Key: CurrentControlSet\Services\W3SVC\Parameters\ADCLaunch\RDSServer.DataFactory

Hive: HKEY_LOCAL_MACHINE\SYSTEM
Key: CurrentControlSet\Services\W3SVC\Parameters\ADCLaunch\AdvancedDataFactory

Hive: HKEY_LOCAL_MACHINE\SYSTEM
Key: CurrentControlSet\Services\W3SVC\Parameters\ADCLaunch\VbBusObj.VbBusObjCls

Section 13

- FTP Setings
- Standards for FTP and SMTP are in progress.

- Dedicate ANY volume accessible by the FTP server explicitly to the FTP Service, if possible.

- Enable Directory Annotation. (You must add this key)

Hive: HKEY_LOCAL_MACHINE
Key: System\CurrentControlSet\Services\MSFTPSvc\Parameters
Name: AnnotateDirectories
Type: REG_DWORD
Value: 1

- Implement a banner that states the company that owns the FTP site and that unauthorized use is prohibited.

- Whenever possible, disable anonymous access, use NTFS and FTP site permissions to restrict access granted for specific users as much as possible.

Troubleshooting

- Restrict Anonymous (Printing)
- File system ACLs

IISLOCKDOWN.exe Usage

- GUI
- Unattended
- URLScan

URLScan Troubleshooting

- Start with the URLScan log

Vulnerability Management

- Regression Testing
- Dev and AQ Implementation
- Exception Handling
- Tools
  - Commercial
  - MS Sec OPS Guide - scripts

References:

Securing Windows NT/2000 Servers for the Internet
Stephan Norberg (ISBN: 1-56592-768-0)

Hacking Exposed Third Edition
Stuart McClure, Joel Scambray, George Kurtz (ISBN: 0072193816)

Hacking Web Applications Exposed – Web Application Secrets and Solutions
Joel Scambray, Mike Shema (ISBN: 007222438X)

Hacking Exposed Windows 2000 (Hacking Exposed)
Joel Scambray, Stewart McClure (ISBN: 0072192623)

Hack Proofing Windows 2000 Server
Chad Todd, Norris L. Johnson Jr. (ISBN: 1931836493)

Hackers Challenge – Test Your Incident Response Skills Using 20 Scenarios
Mike Schiffman (ISBN: 0072193840)

Anti-Hacker Toolkit
Keith J. Jones, Mike Shema, Bradley C. Johnson (ISBN: 0072222824)

Web Hacking Attacks and Defense
Stuart McClure, Savmil Shah, Sheeraj Shah (ISBN: 0201761769)

Incident Response – Investigating Computer Crime
Kevin Mandia, Chris Prosise (ISBN: 0072131829)

Writing Secure Code
Michael Howard, David LeBlanc (ISBN: 0735615888)

Windows NT/2000 Thin Client Solutions: Implementing Terminal Services and Citrix MetaFrame
Todd W. Mathers (ISBN: 1578702399)

Maximum Windows 2000 Security
Anonymous (ISBN: 0672319659)

Counter Hack: A Step-by-Step Guide to Computer Attacks and Effective Defenses"
Ed Skoudis (ISBN: 0130332739)

IIS Security
Marty Jost, Michael Cobb (ISBN: 0072224398)

AeDebug Vulnerability
http://www.wiretrip.net/rfp/p/doc.asp?id=15&iface=2

RDS Attack Defense
http://www.wiretrip.net/rfp/p/doc.asp?id=29&iface=2

Securing Windows 2000 Step by Step (version 1.5)
The SANS Institute

"Hardening Windows 2000 in the Enterprise" series published on www.securityfocus.com
Tim Mullen

Building a Windows NT Bastion Host in Practice
Stefan Norberg, HP Consulting

Windows NT Security Guidelines
Considerations & Guidelines for Securely Configuring Windows NT in Multiple Environments
Trusted Systems Services

Secure Windows NT Installation and Configuration Guide
Windows NT for Navy IT-21…version 1.3

NIST Special Publication 800-44 "Guidelines on Securing Public Web Servers"

All guides @ W2Kguides@nsa.gov

The "Internet Information Server (IIS) Security" module from the SANS 2001 GSEC Course

Module 5.4 "Securing Internet Information Server 5.0" from the Track 5 – Securing Windows 2000 SANS Curriculum

SANS Score Windows 2000 Auditing Document

SANS Score Auditing Web Applications Document

Information Security Forum – Windows 2000 Security Checklist (version 2)

Designing and Planning Windows NT External Security by Tom Dodds, Eric Miyadi, and Tom Fuchs*

Securing Windows NT Installation (White Paper by Microsoft)*

Microsoft Windows NT C2 Configuration Checklist*

Microsoft Internet Information Server 5.0 Security Checklist*

Microsoft IIS 5.0 Baseline Security Checklist*

Q189271 List of Services Needed to Run a Secure IIS Computer*

Microsoft Windows 2000: From Blueprint to Fortress: A Guide to Securing IIS 5.0 by John Davis*

Q186433 Clarification of Winreg Operation in Windows NT*

Q153183 How to Restrict Access to the Registry for a Remote Computer*

* Available from Microsoft's web site

Threats and Countermeasures: Security Settings in Windows Server 2003 and Windows XP*

Windows Server 2003 Security Guide*

QA

- Questions?
- If you have any questions you think of later send an e-mail to:
  - derek.milroy@corp-sec.net
- Best effort for answers, usually within a week

Thank You