Creating a Windows PE CD for IBM eServer x Series and System x Servers with Integrated ServeRAID and\or SAS Driver support

Version 1.03

1 Purpose

The purpose of this document is to provide a procedure to create a customized Windows Preinstallation Environment (WinPE) CD with IBM's ServeRAID Drivers integrated into it. The resulting CD will enable xSeries Servers to boot off a WinPE CD and will provide access to the ServeRAID controllers and disks (for preparation of the drives for OS deployment or recovery).

2 Requirements

The following are the requirements to successfully create a custom Windows PE image with ServeRAID controller drivers:

1. Window PE CD Version 1.6.
2. The corresponding Windows Server 2003 with Service Pack 1 CD
3. Working/Installed version of Windows 2003 Server with SP1
4. Depending on your hardware either the SAS Driver OR ServeRAID Driver/Application packages from:
http://www-307.ibm.com/pc/support/site.wss/document.do?lndocid=MIGR-4JTS2T
5. CD burning software capable of burning ISO images

Minimum Supported ServeRAID Manager version 8.30, IBM ServeRAID-8i firmware and BIOS versions 5.1-0 (9234), and device driver version 5.1-0(9206).

3. Creating a WinPE Build Image on your Harddrive

1. Create your WinPE images as detailed in the winpe.chm: "Creating a Customizable Windows PE Image", subsection: "To create a customizable Windows

    PE image", such that a Windows PE image will now reside in the **c:\Winpe** directory.

    Note: Where < c: > below is the drive letter of the Hard Disk Drive
    Where < e: > below is the drive letter of the CD ROM Drive

    Create a directory on your hard disk to store the Windows PE build tools, denoted as *build_location*. For example, type:

    md c:\ build_x86

2. Place the Windows PE CD in the CD-ROM drive, denoted as *cd_drive.*

3. Copy the contents of *cd_drive*\Winpe and all subdirectories to *build_location*. For example, type:

    xcopy e:\winpe c:\build_x86 /s

4. Remove the Windows PE CD from the CD-ROM drive.

5. Place the Windows 2003 Enterprise Edition with SP1 in the CD-ROM drive.

6. Navigate to *build_location*. For example, type:

    cd c:\ build_x86

7. Create a Windows PE image directory. Run the mkimg.cmd command with as below:

    mkimg.cmd e:\ c:\Winpe /pnp

    In this example, Mkimg uses the files from the Windows product CD in drive E to create a Windows PE image in the c:\Winpe directory.

4. Integrating Drivers into the WinPE Image

The directory structure is now ready to proceed with customizing the image. To add SAS Drivers see section below, to add ServeRAID Driver proceed directly to section 4.4.2

4.1 Prerequisites:

IBM ServeRAID Support for Microsoft Windows Server 2003 Server Diskette image must be created

IBM ServeRAID Application CD must be created/installed on a supported **Windows Server 2003 SP1** system to enable User access to files needed for use with Windows PE.

4.2 Adding SAS Driver Support

1. From the IBM Driver Diskette for Microsoft Windows Server 2003 Server copy the ".inf" file to c:\winpe\i386\inf
2. Similarly copy the ".sys" file to c:\winpe\i386\system32\drivers
3. Modify the c:\winpe\i386\system32\winpeoem.sif file

> [massstoragedrivers.append]
> <IBM SAS> = <IBM SAS>**.**SYS
>
> For example:
> ADP94XX = adp94xx.sys

4.3 Adding ServeRAID Driver Support

1. Follow winpe.chm: "Adding or Removing Mass-storage Drivers" (subsection: To add support for mass-storage controllers using Windows PE).
2. Create a new folder.*(<IBMServeRAID>)* on c:\Winpe\i386\system32, which will contain the IBM xSeries Windows Server 2003 ServeRAID Device Driver.
3. Copy the ServeRAID Driver package to this folder. (These files can be found on the ServeRAID Support CD at the following location: <e:> \windows\win2003\sas\driver.
4. Copy the driver files *(<IBMServeRAID>***.**SYS) from the driver package into the C:\Winpe\i386\system32\drivers directory.
5. Edit the file c:\Winpe\i386\system32\winpeoem.sif, go to the bottom of the file and locate the following section:
   ;[OemDriverParams]
   ;OemDriverRoot=""
   ;OemDriverDirs=

6. Remove the prefix semicolons, and add the corresponding directory into which you copied your driver package in step 1. This section should now be:

> [OemDriverParams]
> OemDriverRoot=""
> OemDriverDirs= *\<IBMServeRAID\>*
>
> For example:
> [OemDriverParams]
> OemDriverRoot=""
> OemDriverDirs= IBMServeRAID8i

In the same file locate the following section:

> ; [massstoragedrivers.append]
>
> ; mydriver = mydriver.sys

Remove semicolons and add to this section the .SYS ServeRAID Driver name.. This section should now be:

> [massstoragedrivers.append]
> \<IBM ServeRAID\> = \<IBM ServeRAID\>**.**SYS
>
> For example:
> [massstoragedrivers.append]
> IBMServeRAID8i=arcsas.sys

4.2.2 Adding ServeRAID Software Configuration Support to WinPE

One can create subdirectories on the WinPE image to include the ServeRAID configuration tools

4.2.2.2.1 "ipssend.exe" Support

ipsend.exe is part of a standalone utility used to configure ServeRAID 7k,6m, 6i+, and 4H Adapters.
It can be obtained from the ServeRAID Support CD version 7.12

4.2.2.2.2 "arcconf.exe" Support for the 8i

1. Update the c:\Winpe\i386\system32\drivers\setupdd.sys driver based on the Microsoft KB903085 (http://support.microsoft.com/?kbid=903085) Hotfix
2. Copy the following files from your WinPE\i386\system32\drivers folder/directory
3. Copy "WinPE\i386\system32\drivers\disk.sys" to "WinPE\i386\"
4. Copy "WinPE\i386\system32\drivers\ partmgr.sys" to "WinPE\i386\"

NOTE: This is necessary to circumvent a WinPE bug. If the disk stack gets unloaded it does not get loaded properly because the wrong directory gets searched. Copying the drivers to the "\i386" directory ensures the stack is reloaded. If omitted this can result in not being able to modify or delete logical drives.

5, Copy **arcconf.exe** and **config.ini** from the ServeRAID Application CD 8.30 into c:\Winpe\i386\system32\

6. Copy the following files :
> **Afaapi.dll,**
> **Afaappse.dll**
> **Storfsa.dll**

from a Windows Server 2003 system with IBM ServeRAID Application installed (these files would be located in the following folder : \Program Files\ibm\ServeRAID Manager) to **c:\Winpe\i386\system32**

7. Copy **Rpcns4.dll** from an installed Windows Server 2003 SP1 to **c:\Winpe\i386\system32**

8. Create a new folder <AACMgt> on c:\Winpe\i386\system32

9.Copy the entire contents of AACMgt driver diskette to: c:\Winpe\i386\system32\<AACMgt>. AACMgt.sys can be found on the Windows system with ServeRAID manager installed in the \Windows\system32\drivers directory.

10. Copy AACMgt.sys to the c:\Winpe\i386\system32\drivers subdirectory.

11. Navigate to the bottom of the file c:\Winpe\i386\system32\winpeoem.sif and locate the following sections, which from Section 3.2.2 (steps 1. to 5. above) should look like:

```
[OemDriverParams]
OemDriverRoot=""
OemDriverDirs= <IBMServeRAID  8i>

[massstoragedrivers.append]
< IBMServeRAID 8i > = arcsas.sys
```

12. Now edit this file by adding the *<AACMgt>* to the OemDriverDirs entry, under the [OemDriverParams] heading, as well as adding the *<AACMgt>* driver support to the [massstoragedrivers.append] heading. So we have:

```
[OemDriverParams]
OemDriverRoot=""
OemDriverDirs= <IBM ServeRAID 8i>, <AACMgt>
```

Note: **the AACMgt entry must be at the end of the OEM drivers list to ensure that it loads in the correct order.**

> [massstoragedrivers.append]
> *< IBM ServeRAID 8i >* = arcsas.sys
> *<AACMgt >* = aacmgt.sys

13. To override the WinPE Embdded driver support, the "txtsetup.sif" file must be edited. Comment out any devices natively supported, by adding a semicolon (";") to the beginning of the line, so that the Adaptec driver can manage them. The lines to comment out will look like:
;PCI\VEN_9005&DEV_0285&SUBSYS_02859005 = "arc"
;PCI\VEN_9005&DEV_0285&SUBSYS_02879005 = "arc"
;PCI\VEN_9005&DEV_0285&SUBSYS_02869005 = "arc"
;PCI\VEN_9005&DEV_0285&SUBSYS_028A9005 = "arc"
;PCI\VEN_9005&DEV_0285&SUBSYS_028B9005 = "arc"
;PCI\VEN_9005&DEV_0285&SUBSYS_02909005 = "arc"
;PCI\VEN_9005&DEV_0285&SUBSYS_02929005 = "arc"
;PCI\VEN_9005&DEV_0285&SUBSYS_02939005 = "arc"
;PCI\VEN_9005&DEV_0285&SUBSYS_028E9005 = "arc"
;PCI\VEN_9005&DEV_0285&SUBSYS_028F9005 = "arc"

14. Run Regedit.exe
   - Click on the 'HKEY_LOCAL_MACHINE' key.
   - Click 'File'->'Load Hive…'.
   - Locate the "*setupreg.hiv*" file under "*c:\winpe\i386\system32*"
   - A Window titled, "Load Hive" will appear. Type in "adaptec" under 'Key Name:'.
   - Under 'HKEY_LOCAL_MACHINE', look for "adaptec"
   - Work your way to the following Registry Key:
   - ***HKEY_LOCAL_MACHINE\adaptec\ControlSet001\Control\Class\{4D36E967-E325-11CE-BFC1-08002BE10318}***
   - Look for a REG_MULTI_SZ value named 'UpperFilters'. Add the "AACMgt" service name at the front of the list before the "PartMgr" service.

Name	*Type*	*Data*
UpperFilters	*REG_MULTI_SZ*	*AACMgt*
		▪ *PartMgr*

   - Click on "adaptec" and click 'File'->'Unload Hive…'
   - Exit Regedit.exe

15. Next, the SOFTWARE hive of the WinPE registry must be modified. Edit the registry hive to load the filter driver with the following steps:

   - Once again run 'regedit.exe'

- Click on the 'HKEY_LOCAL_MACHINE' key.
- From the overhead menu bar click 'File'->'Load Hive…'.
- Locate the *"SOFTWARE"* file under "c:*WinPE\\i386\\system32\\Config*"
- A Window titled, "Load Hive" will appear. Type in '**ServeRAID**" under 'Key Name:'.
- Under 'HKEY_LOCAL_MACHINE', look for "**ServeRAID**" and select this entry.
- From the overhead menu bar click on Edit, select New, Key, type in **Adaptec**.
- Highlight the newly created "Adaptec" key, and once again from the overhead menu bar click on Edit, select New, Key, type in **RAIDController**.
- Proceed to highlight the newly created "**RAIDController**" key, and once again from the overhead menu bar click on Edit, select New, Key, type in **AAC**
- Highlight the newly created "**AAC**" key, and once again from the overhead menu bar click on Edit, select New, Key, type in **UserPermissions**
- Go back up to ServeRAID (created in step E.), and highlight
- Proceed to overhead menu, selecting Unload Hive, and confirm.
- Exit from Regedit

5. Creating a CD with the Windows PE customized image

1. Lastly, create a bootable WinPE image with all the customization that has been done in the above steps. Create your WinPE CD as detailed in the winpe.chm: "Creating a Customizable Windows PE Image", sub-section: "Creating a Custom Windows PE CD".
2. Run the OSCDIMG command as below:
   oscdimg –bc:\build_x86\etfsboot.com -n c:\winpe c:\winpex86.iso
3. The above command will create an ISO image (winpex86**.**iso) in the root directory of the c: drive.
4. Use CD recording software to burn the .iso image file to a blank CD.