Customizing the Windows Preinstallation Environment for PGP Whole Disk Encryption

Technical Note
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Introduction to the Preinstallation Environment

The Microsoft Windows Preinstallation Environment (PE) is widely used by IT professionals in Windows environments for installation tasks, deployment, maintenance, troubleshooting, diagnosis, recovery, and so on. For example, use Windows PE to:

- Integrate PGP WDE recovery with your existing IT recovery tools
- Create secure PE-based backup and recovery
- Upgrade a PGP WDE-encrypted system from Windows XP to Windows Vista

Windows PE will not work in situations where the PGP Whole Disk Encryption (PGP WDE) is installed on a system and the entire disk is encrypted. For Windows PE to work on a system where PGP Whole Disk Encryption is installed the PGP WDE driver must be pre-installed and the administrator must have authorized access to the hard disk.

You must have PGP Desktop for Windows version 9.7 or later installed in order to use Windows PE or BartPE.

**Note:** This document provides instructions for creating a 32-bit Windows Preinstallation Environment. While you can use the 32-bit Windows PE disk on a 64-bit system, you cannot create a 64-bit Windows PE disk.

You can add the PGP WDE drivers in two ways so you can authenticate and perform recovery tasks on computers with PGP WDE encrypted disks:

- To the system image, to be able to select the PE option at boot.
- To the CD/DVD/USB bootable recovery tool, to boot a PGP WDE-encrypted computer.

There are two issues to be resolved here:

1. Pre-install the PGP WDE driver into Windows PE.
2. Authenticate the passphrase that is entered via the command line and provide access to the encrypted disk.

You can also customize the Windows Vista Installation Package to upgrade computers encrypted with PGP Whole Disk Encryption.

**Note:** To authenticate users using Windows PE or BartPE, you must use passphrase users. Token or TPM users are not supported.

See the command line description in *Using the Customized Windows PE CD/UFD* (see "*Using the Customized Windows PE CD/UFD to Obtain the Authentication Passphrase*" on page 9) D.

For information on using BartPE, see *Using BartPE* (on page 25).
Supported Versions of Windows PE

Currently, the following versions of Windows PE are supported:

- **Windows XP**: Windows PE version 1.0
- **Windows XP Service Pack 1 (SP1)**: Windows PE version 1.1
- **Windows Server 2003**: Windows PE version 1.2
- **Windows XP Service Pack 2 (SP2)**: Windows PE Version 2004
- **Windows Server 2003 Service Pack 1 (SP2)**: Windows PE version 2005 (1.6)
- **Windows Vista**: Windows PE version 2.0
- **Windows 7**: Windows PE version 2.0

The structure of Windows PE versions prior to versions 2.0 is somewhat similar. In this document, for simplification purposes, versions earlier than Windows PE 2.0 are referred to as Windows PE 1.x.

Keep in mind that:

- The structure of Windows PE 2.0 is quite different from the Windows PE 1.x.
- The files for Windows PE are contained in a Windows Image file (.wim).
- To customize Windows PE 2.0, the tools or API for Windows Image Format is required. These can be found in Windows Automated Installation Kit (AIK).

How to Obtain Windows PE

To use Windows PE, you need Windows PE (from Microsoft) and the PGP Whole Disk Encryption drivers and tools.

To obtain the PGP WDE drivers and tools, see Knowledgebase Article TECH149060 at http://www.symantec.com/business/support/index?page=content&id=TECH149060.

Also included in this KB article is a technical note you can download that contains all of the instructions in this section.

You can obtain Windows PE from:
Introduction to the Preinstallation Environment

How to Obtain Windows PE

- Windows OEM Preinstallation Kit (OPK) – the package is available from Universal MSDN and MSFT partners.


For more information about Windows PE and Windows Image Format, see:


Customizable Windows PE Types

The following types of Windows PE can be customized:

- A Windows PE prepared for customization.
  
  You can create a Windows PE in a Windows folder and prepare it for customization. To do so, follow the instructions in Windows Pre-installation Kit User’s Guide.

- A Windows PE installed on a hard disk.
  
  You can customize the Windows PE that is installed on a hard disk partition or a folder such as a hard disk with diagnostic or recovery capabilities.
Creating a customized Windows PE CD/UFD (USB Flash Drive) provides a bootable recovery tool that can be used for rescue purposes. For example, you can use the DOS commands to copy, edit, backup, and delete files.

To create a bootable Windows PE CD/UFD (USB Flash Drive) with PGP WDE driver and Tools pre-installed

- To boot from a CD/UFD, you do not need access to the encrypted hard disk. However, you must do the following:
  - pre-install the PGP WDE driver for decrypting the hard disk.
  - pre-install the PGP WDE tools for authentication.

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Creating a WinPE Image

Creating a WinPE image is a simple process, if the following software has been installed.

- Windows Automated Installation Kit
- PGP Desktop (same version as production)
- C:\WDE Folder

Creating the WinPE Image

To create the image

1. Make sure the Windows Automated Installation Kit is installed.
2 Select **Start > Programs > Microsoft Windows AIK > Windows PE Tools**. A command prompt displays with the correct path variables.

3 Enter `copy.cmd x86 C:\winpe_x86`
The WinPE image is created at `C:\winpe_x86`

---

**Customizing Windows PE 1.x**

Ensure that the Windows PE 1.x is located in the c: drive in the folder `c:\winpe_x86`, and is ready for customization.

**Note:** Follow the instructions provided in the Windows Preinstallation Environment User’s Guide to prepare a drive or folder for customization. The Windows PE User’s Guide is included with the Windows OEM Preinstallation Kit (OPK).

To customize Windows PE 1.x, you must:
- Install the PGP WDE Tools
- Create the bootable ISO file or CD

To install the PGP WDE Tools

1 Copy the following files into the Windows folder `c:\wde`.

   These files are either provided in the a zip file or a disc, or they can be copied from the PGP WDE installation directory (from a system that has PGP Desktop installed).
   - `C:\Program Files\PGP Corporation\PGP Desktop\pgpbootb.bin`
   - `C:\Program Files\PGP Corporation\PGP Desktop\pgpbootg.bin`
   - `%SYSTEMROOT%\system32\PGPsdk.dll`
   - `%SYSTEMROOT%\system32\pgpsdknl.dll`
   - `%SYSTEMROOT%\system32\PGPwd.dll`
   - `%SYSTEMROOT%\system32\PGPcl.dll`
   - `%SYSTEMROOT%\system32\PGPiconv.dll`
   - `%SYSTEMROOT%\system32\PGPwdesdk.dll`
   - `%SYSTEMROOT%\system32\SHFOLDER.dll`

   **Note:** You must obtain this driver from a Windows 32-bit system.

   - `C:\Program Files\PGP Corporation\PGP Desktop\PGPwde.exe`
   - `%SYSTEMROOT%\system32\drivers\PGPwded.sys`
Creating a Windows PE CD

Customizing Windows PE 2.0

- %SYSTEMROOT%\system32\drivers\PGPsdk.sys
  - C:\Program Files\PGP Corporation\PGP Desktop\Stage1

- PGPPE.exe (located in the zip file at http://www.symantec.com/business/support/index?page=content&id=TECH149060)

- PGPStart.exe (located in the zip file at http://www.symantec.com/business/support/index?page=content&id=TECH149060)

2 Run the command:
   - Pgppe /winpe c:\wimpe_x86 c:\wde

To create the bootable .iso file or CD

The next step is to make the customized winpe into a bootable .iso file and CD/UFD.

- Use the tool oscdimg.exe that is included with the OPK to create an .iso file as follows:
  - oscdimg -bc:\build_x86\etfsboot.com -n c:\winpe_x86 c:\winpex86.iso

- Use the CD-record software to burn the CD image file of winpex86.iso.

Customizing Windows PE 2.0

Ensure that the Windows PE 2.0 is already in the Windows folder c:\winpe_x86, and is ready for customization.

**Note:** Follow the instructions provided in the *Windows Preinstallation Environment User’s Guide* to prepare a drive or folder for customization. The Windows PE User’s Guide is included with the Windows Automated Installation Kit (AIK).

To customize Windows PE 2.0, you must:

- Install the PGP WDE Tools
- Create the bootable ISO file or CD

To install the PGP WDE Tools

1 Copy the following files into the Windows folder c:\wde.
   - These files are either provided in a zip file or a disc, or they can be copied from the PGP WDE installation directory (from a system that has PGP Desktop installed).
   - C:\Program Files\PGP Corporation\PGP Desktop\pgpbootb.bin
Creating a Windows PE CD
Customizing Windows PE 2.0

- C:\Program Files\PGP Corporation\PGP Desktop\pgpbootg.bin
- %SYSTEMROOT%\system32\PGPdk.dll
- %SYSTEMROOT%\system32\pgpsdknl.dll
- %SYSTEMROOT%\system32\PGPwd.dll
- %SYSTEMROOT%\system32\PGPcl.dll
- %SYSTEMROOT%\system32\PGPiconv.dll
- %SYSTEMROOT%\system32\PGPdkUI.dll
- %SYSTEMROOT%\system32\SHFOLDER.dll

Note: You must obtain this driver from a Windows 32-bit system.

- C:\Program Files\PGP Corporation\PGP Desktop\PGPwde.exe
- %SYSTEMROOT%\system32\drivers\PGPwde.sys
- %SYSTEMROOT%\system32\drivers\PGPsdksysC:\Program Files\PGP Corporation\PGP Desktop\Stage1
- PGPPE.exe (located in the zip file at http://www.symantec.com/business/support/index?page=content&id=TECH149060)
- PGPStart.exe (located in the zip file at http://www.symantec.com/business/support/index?page=content&id=TECH149060)

2 Run the command:
   Pgppe /winpe c:\winpe_x86 c:\wde

3 Copy the file c:\winpe_x86\winpe.wim to c:\winpe_x86\ISO\source\boot.wim and overwrite the old boot.wim file.

To create the bootable .iso file or CD

The next step is to make the customized winpe as a bootable .iso file and CD/UFD.

- Use the file oscdimg.exe that is included with the OPK/AIK to create an .iso file:
  oscdimg -n -bc:\build_x86\etfsboot.com c:\winpe_x86\ISO c:\winpe_x86\winpe_x86.iso.

- Use the CD-record software to burn the CD image file of winpex86.iso file.

Note: For Windows 7 you must run the commands listed above as an administrator.
Creating a bootable UFD

- Use the file `diskpart.exe` in Windows to format the UFD. The following sample commands assume that disk 1 is the UFD:

  ```
  diskpart
  select disk 1
  clean
  create a partition primary
  select partition 1
  active
  format fs=fat32
  assign
  exit
  ```

- Copy all the files under `C:\winpe_x86\ISO` onto the UFD device. The following sample assumes that `f:` is the UFD device.

  ```
  xcopy C:\winpe_x86\iso\*.* /s /e f: 
  ```

Customizing Windows PE 3.0

Support for WinPE 3.0 will be available in a future release.

Customizing Windows RD

Using the Customized Windows PE CD/UFD to Obtain the Authentication Passphrase

In this step, you have to enter the passphrase for authentication, and if it is successful, you will be able to access the encrypted hard disk.

1. Boot from the customized Windows PE CD/UFD.
2. From the DOS console, use the `pgpwde` command line. For example:

   ```
   Pgpwde --enum
   Pgpwde --disk 0 --status
   Pgpwde --disk 0 --auth -p xxxx
   ```

   **Note:** You can get more help on this topic using the `Pgpwde --help` command.
Customizing the Windows 7 Installation Package to Upgrade Encrypted Operating Systems to Windows 7
Customizing the Vista Installation Package to Upgrade Encrypted Operating Systems to Windows Vista

Before you upgrade an encrypted computer to Windows Vista, the PGP Whole Disk Encryption driver must be preinstalled on the Windows PE and Vista installation package. Without this step, the upgrade will fail.

After customizing the installation package, you can upgrade a disk encrypted with PGP Whole Disk Encryption to Windows Vista in one of two ways:

- From a network shared folder containing the upgrade
- By using a customized Vista installation DVD.

You must have access to the encrypted hard disk for upgrade.

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Creating a Customized Installation Package

Follow these steps to create a customized installation package:

1. Install the necessary drivers from the Microsoft Windows Automated Installation Kit (AIK).
2. Copy the Windows Vista Installation DVD to your desktop.
3. Copy the PGP Desktop files and PGP Corporation Windows PE tools to your desktop.
4. Add the driver to the installation package.

Installing the Microsoft Windows AIK drivers

1. Download the Microsoft Windows AIK from the Microsoft website.
2. From the Windows AIK installation directory, locate the wimfltr.sys and wimfltr.inf files for your platform.
3. Copy the platform-appropriate wimfltr.sys and wimfltr.inf to a new folder.
4. Select and install the file winfltr.inf to install the drivers.
Copying the Windows Vista Installation DVD

Copy the entire contents of the Windows Vista Installation DVD into a new folder on your desktop. Name the folder \c:\vista.

Copying the PGP Desktop and Windows PE Tool Files

1. Download the Windows PE tool from the PGP Corporation website. To obtain the drivers and tools, go to http://www.symantec.com/business/support/index?page=content&id=TECH149060 (http://www.symantec.com/business/support/index?page=content&id=TECH149060). Also included in this KB article is a technical note you can download that contains all of the instructions in this section.

2. Extract the contents of the PGP Windows PE package to a new folder on your desktop. Name the folder \c:\WDE\PE.

3. Create a subfolder in your \c:\WDE\PE folder called \c:\WDE\PE\pe.

4. Locate a computer with PGP Desktop installed. From that computer, copy the following files to the folder on your computer called \c:\WDE\PE\pe.

   - C:\Program Files\PGP Corporation\PGP Desktop\pgpbootb.bin
   - C:\Program Files\PGP Corporation\PGP Desktop\pgpbootg.bin
   - %SYSTEMROOT%\system32\PGPsdk.dll
   - %SYSTEMROOT%\system32\pgpsdknl.dll
   - %SYSTEMROOT%\system32\PGPwd.dll
   - %SYSTEMROOT%\system32\PGPcl.dll
   - %SYSTEMROOT%\system32\PGPiconv.dll
   - %SYSTEMROOT%\system32\PGPwdesdk.dll
   - %SYSTEMROOT%\system32\SHFOLDER.dll

   **Note:** You must obtain this driver from a Windows 32-bit system.

   - C:\Program Files\PGP Corporation\PGP Desktop\PGPwde.exe
   - c:\Windows\System32\Drivers\pgpwded.sys
   - c:\Windows\System32\Drivers\PGPsdk.sys
Adding the Driver to the Installation Package

To customize the installation package, run the following command in the `c:\WDE_PE\pe` directory.

**For Vista use:**

```bash
pgppe.exe /vista c:\vista
```

**For Windows XP use:**

```bash
pgppe.exe /winxp c:\winxp_sp2
```

The driver is added to the installation package.

Upgrading with the Customized Installation Package

Start the upgrade from the computer’s operating system. You cannot upgrade the system if you boot the computer from the Vista DVD.

There are two ways to upgrade an encrypted hard disk using the customized installation package:

- **Upgrade to Vista from a network shared folder:**
  
  Place the folder containing the customized installation (for example, `c:\vista`) onto a shared network.
  
  From the Windows XP computer to be upgraded, navigate to the shared folder. Start `setup.exe` to upgrade.

- **Upgrade to Vista from a DVD:**
  
  1. To create a DVD installation package, run the following command in the directory `c:\Program Files\Windows AIK\Tools\PETools`.
     ```bash
     oscdimg.exe -n -m -bx86\boot\etfsboot.com c:\Vista C:\WDE_Vista.iso
     ```
  2. Burn the file `c:\WDE_Vista.iso` to a DVD.
  3. Insert the DVD into the Windows XP computer to be upgraded.
  4. The installation starts automatically.
  5. Select the option to install Windows Vista.
  6. Select the option to upgrade the computer.
  7. Continue the upgrade by following the installation process screens.

**Note:** During the upgrade, Windows will reboot the machine several times. When the boot guard appears, type in the passphrase and the Windows upgrade process will continue. Do not select the reboot option.
Customizing the Vista Installation Package to Upgrade Encrypted Operating Systems to Windows Vista
Upgrading with the Customized Installation Package
Using PGP Whole Disk Encryption

This section describes how to use PGP Whole Disk Encryption with the IBM Lenovo Rescue and Recovery feature, as well as with the Windows XP Recovery Console.

**Note:** To authenticate users using Windows PE or BartPE, you must use passphrase users. Token or TPM users are not supported.

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Using PGP Whole Disk Encryption with IBM Lenovo ThinkPad Systems

Use the Windows Preinstallation Environment (PE) to pre-install the PGP WDE driver into IBM Lenovo ThinkPad Rescue and Recovery and automatically detect the Lenovo Rescue and Recovery feature.

This option is available only for IBM Lenovo systems running Rescue and Recovery version 3.0 and later. This option pre-installs the PGP WDE driver into Lenovo Rescue and Recovery and automatically detects the Lenovo Rescue and Recovery support. It picks up the PGP WDE driver from the `\windows\system32\drivers` directory. The two files installed into the IBM Lenovo Rescue and Recovery are the PGP WDE driver (`pgpwded.sys`) and the `PGPstart.exe` file (for more information on this file, see the following procedure).

The files that are required to install PGP Whole Disk Encryption into IBM Lenovo Rescue and Recovery are:

- Files from `pgppe` tool: `pgppe.exe`, `pgpstart.exe`
- Files from PGP Desktop installation: `pgpwded.sys`, `pgpbootb.bin`, `pgpbootg.bin`, `pgpsdk.dll`, `pgpsdknl.dll`, `pgpwd.dll`, `pgpwde.exe`
- Files for Windows Vista only: `wimfltr` drivers need to be installed (this is part of the Windows Automated Installation Kit)

**Caution:** Use this option only after PGP Desktop is installed on the system.
To enable Lenovo Rescue and Recovery

1. Install PGP Desktop.
2. Obtain and install the Windows Preinstallation Environment tools from the .
3. Copy the PGPstart.exe and PGPpe.exe files from the zipped file into your PGP Desktop installation directory (usually, c:\Program Files\PGP Corporation\PGP Desktop).
4. Start a command prompt and change to your PGP Desktop directory.
5. Run the pgppe command as follows:
   
   pgppe /recovery

To remove Lenovo Rescue and Recovery support

Run the pgppe command as follows: pgppe /recovery /remove

To upgrade Lenovo Rescue and Recovery

**Note:** If your system is currently PGP Whole Disk Encrypted, it may be necessary to reinstall the PGP WDE drivers after upgrading your version of Lenovo Rescue and Recovery software.

1. Upgrade your version of Lenovo Rescue and Recovery (refer to the Lenovo/IBM documentation for more information).
2. Reinstall the PGP WDE drivers by running the pgppe command as follows:
   
   pgppe /recovery

Enabling Automatic installation and upgrade of Lenovo Rescue and Recovery

To enable automatic installation and upgrade of Lenovo Rescue and Recovery the following registry value must be set.

HKEY_LOCAL_MACHINE\Software\PGP Corporation\PGPAutoInstallRR(DWORD)=1.

For Windows Vista, the following device and system drivers are required.

- wimapi.dll
- wimfltr.sys
Using PGP Whole Disk Encryption with the Microsoft Windows XP Recovery Console

If you use the Windows XP Recovery Console for administration purposes, you must install the PGP WDE drivers to the Microsoft Windows Recovery Console when the disk is encrypted otherwise the Recovery Console can not be used.

**Note:** To authenticate users using Windows PE or BartPE, you must use passphrase users. Token or TPM users are not supported.

**Caution:** Install these drivers after PGP Desktop is installed and the disk encrypted with PGP WDE.

To install PGP WDE drivers to the Windows XP Recovery Console

1. Install PGP Whole Disk Encryption.


3. Copy the PGPstart.exe and PGPpe.exe files from the zipped file into your PGP Desktop installation directory (usually, `c:\Program Files\PGP Corporation\PGP Desktop`).

4. Start a command prompt and change to your PGP Desktop installation directory.

5. Run the pgppe command as follows:
   ```
   pgppe /cmdcons
   ```

To remove drivers from the Windows XP Recovery Console

Run the pgppe command as follows: `pgppe /cmdcons /remove`
The pgppe command line tool is used for customizing Window PE. It can be used to:

- pre-install the PGP WDE driver and tools on Windows PE and create a bootable CD/UFD.
- pre-install the PGP WDE driver and tools on Windows PE that is installed on a hard disk folder or partition.

Files in the pgppe Tool

The following files are included in the pgppe tool:

- pgppe.exe
- wimgapi.dll and wimfltr.sys are required to customize Windows PE 2.0. These tools are provided by Microsoft in Windows AIK.

**Note:** The wimfltr driver has to be installed before using the wimgapi.dll. If Windows AIK is installed on the system, the driver wimfltr.sys is also installed. If not, you must install the wimfltr driver. Windows AIK also provides wimfltr.inf which is used to install wimfltr.sys.

The PGP WDE Driver Files

- Pgpwded.sys
- PGPsdk.sys

The PGP WDE Tools Files

- pgpbootb.bin
- pgpbootg.bin
- PGPsdk.dll
- pgpsdknl.dll
- PGPwd.dll
- PGPwde.exe
Files in the pgppe Tool

- PGPcd.dll
- PGPiconv.dll
- SHFOLDER.DLL

**Note:** You must obtain this driver from a Windows 32-bit system.

- PGPsdkUI.dll
- PGPwdesdk.dll

Store the PGP WDE driver and tools in a single folder for use with pgppe.exe. The path that contains the PGP WDE driver and tools file is the wde_path. If the PGP WDE driver and tools are present in the same folder as pgppe.exe, you do not need to specify the wde_path in the command line.

The pgppe Command Line Format

```plaintext
pgppe /option [Parameter List] [/remove]
```

**Note:** If `/remove` is not used, the `pgppe.exe` tool will customize the Windows PE, otherwise, it will remove the customization from the Windows PE.

/Option [Parameter List]:

```plaintext
/winpe winpe_path [wde_path] [/remove]
```

This option pre-installs the PGP WDE driver and the tools into Windows PE.

winpe_path = the path that contains winpe for customization or the path that already has the winpe installed on a hard disk.

Examples for winpe_path:

- **Windows PE 1.x** for creating a bootable CD/UFD or hard disk.
  C:\
  |___winpe_x86
  |___I386
  The winpe_path is c:\winpe_x86

- **Windows PE 2.0** for creating a bootable CD/UFD or hard disk.
  C:\
  |___winpe_x86
  |___ISO
  The winpe_path is c:\winpe_x86

- **Windows PE 1.x** is installed on a folder or a partition.
  C:\
  |___Minint
The `winpe_path` is c:
/recovery [/remove]

This option is available only for IBM Lenovo systems running Rescue and Recovery version 3.0 and later. This option pre-installs the PGP WDE driver into Lenovo Rescue and Recovery and automatically detects the Lenovo Rescue and Recovery support. It picks up the PGP WDE driver from the `\windows\system32\drivers` directory. The two files installed into the IBM Lenovo Rescue and Recovery are the PGP WDE driver (`pgpwded.sys`) and the `PGPstart.exe` file.

**Caution:** Use this option only after PGP Desktop is installed on the system.

`/cmdcons` [/remove]

This option pre-installs the PGP WDE driver into the Microsoft Recovery Console. This option automatically detects the Recovery Console and installs the PGP WDE driver. It picks up the PGP WDE driver from `System32\drivers`.

**Caution:** Use this option only after PGP Desktop is installed on the system.

`/vista vista_path [wde_path] [/remove]`

This option pre-installs the PGP WDE driver into the Vista installation package.

`vista_path` = the path that contains the whole Vista installation package. Usually, to customize a Vista installation package, you need to create a folder on a hard disk and then copy all the files into that folder from the Windows Vista DVD. The path of the folder is the `vista_path`.

**Caution:** Use this option only after PGP Desktop is installed on the system.

**WIMMount Errors**

During the customization process for Windows PE 2.0 you may experience errors while creating the bootable ISO file or CD, similar to the example below:

```
c:\wde>pgppe /winpe c:\winpe_x86 c:\wde
WIMMountImage failed. Error:0xc1420127
```

When WIMMount errors occurs, you must perform a first clean up of any extraneous files that might have been left on your system during the previous CD creation failure before attempting the process again.

To clean up WIMMount errors, complete the following steps.

1. To remount the drive, enter `dism /remount-wim /mountdir:<PATH>`.
2. To dismount the drive cleanly, enter `dism /umount-wim /mountdir:<PATH> /commit`.

**Note:** The `dism /clean-up-wim` command also helps clean up resources associated with mounted WIM images that are corrupted.
BartPE (Bart’s Preinstalled Environment) is similar to Microsoft’s Windows PE tool. This section describes how to use BartPE to create a preinstallation environment.

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Customizing the BartPE or BartPE-based Tools

The core of the BartPE and WinPE are the same, therefore customization of BartPE is the same as for WinPE. The steps to manually customize and use the pgppe command line tool to customize WinPE are also applied to BartPE.

Note: To use Bart PE, you need to obtain the PGP WDE drivers and tools, see http://www.symantec.com/business/support/index?page=content&id=TECH149060 (http://www.symantec.com/business/support/index?page=content&id=TECH149060). Also included in this KB article is a technical note you can download that contains all of the instructions in this section.

To manually customize the BartPE, see Customizing Windows PE 1.x (on page 6).

To use the pgppe command line tool to customize the BartPE, see /Option [Parameter List]: (on page 22) for information on the command /winpe winpe_path [wde_path] [/remove].

You can also develop your own config file/script or tool to customize your specific BartPE based tools.

Note: To authenticate users using Windows PE or BartPE, you must use passphrase users. Token or TPM users are not supported.

Sample steps to customize BartPE

1. Create a BartPE to a Windows folder using PE builder (for example, d:\pebuilder3110a\BartPE).
2. Copy following files into a Windows folder (for example, d:\wde).
   - pgpbootb.bin
   - pgpbootg.bin
Decrypting a Disk Using BartPE

The following steps provide detailed information on how to decrypt a disk using BartPE.

To decrypt a PGP WDE-encrypted disk

1. Download the following files:
   - BartPE (current version is 3.1.10a) from http://www.nu2.nu/pebuilder/
   - Windows XP SP2 ISO from MSDN
   - Windows AIK from MSDN (contains the oscdimg utility)

2. Install BartPE.

3. Build a basic PE output based on the Windows XP SP2 build files.

Tip: The Microsoft Windows Automated Installation Kit (AIK) for Windows Vista (http://www.microsoft.com/downloads/details.aspx?familyid=c7d4bc6d-15f3-4284-9123-679830d629f2&displaylang=en), freely available from Microsoft, includes both the oscdimg.exe and etfsboot.com utilities. After you install the AIK, you can view the included documentation on how to use the oscdimg.exe utility.

5 Create c:\WDE folder containing the required files, as described in Copying the PGP Desktop and Windows PE Tool Files (on page 14).

6 Run the following command:
   `pgppe.exe /winpe c:\pebuilder3110a\BartPE c:\wde`

7 Run the following command:
   `oscdimg -bc:\pebuilder3110a\bartPE\bootsect.bin -n c:\pebuilder3110a\bartPE bartpe.iso`

8 Mount the bartpe.iso and boot to the .iso.

9 From within the BartPE environment, launch a command prompt and enter the following command:
   `pgpwde --decrypt --disk 0 --passphrase diskpassword`
   The system responds with "Start decrypt disk completed".

10 During the process, about midway through, enter the following command:
    `pgpwde --disk 0 --status`
    The system responds with "Encryption removal process is running in the background".

Once the decryption process has completed, you can then boot the Windows XP system without PGP BootGuard.