PASSMARK™

SOFTWARE

White paper

Using BurnInTest on a system with no Operating System

WinPE

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Overview

Many BurnInTest users can benefit from testing PC hardware when there is no Operating System installed, or the Operating System is inoperable. This can be useful for testing PC hardware:

1. In a production line environment,
2. That is to be shipped with Linux,
3. In a known virus free environment and
4. To try to determine the cause of corruption of an Operating System.

This document aims to assist people in setting up an environment that allows PassMark BurnInTest to be used in these situations.

This paper is applicable to the Windows Professional edition of BurnInTest v6.0. This version of BurnInTest requires Microsoft Windows in order to run. To run BurnInTest on a system without an operating system you need to set up a "Pre-install environment" that allows Microsoft Windows to be booted from a CD/DVD, USB Flash Drive or via PXE (Preboot eXecution Environment). This document describes setting up a Microsoft Window Pre-install environment (WinPE) environment that includes both Windows and BurnInTest V6.0 on a bootable CD/DVD or bootable USB Flash Drive (UFD).

This document does not intend to cover product licensing issues and it is up to the reader to review this. The names of actual companies and products mentioned herein may be the trademarks of their respective owners.

Thanks to one of our many BurnInTest User's, Tripredacus, for his documentation on the WinPE installation process with BurnInTest.

Audience

This paper is targeted at companies and individuals that need to run BurnInTest on a system without a working or installed Operating system. It is aimed at people with technical PC knowledge.

Standard Environment

The standard environment described in this document is:

- WinPE 2.x.
- BurnInTest PRO v6.0.1002 (or higher).
- Hardware including at least 512MB of RAM.

Limitations

This guide is designed to allow BurnInTest to be run from a Windows PE 2.0-2.1 environment. It does not cover the differences of PE v3.0 (Windows 7) or PE v1.x (Windows XP - 2003 / BartPE). There are several limitations for Win PE 2.x, as it does not support .NET Framework (any version), DirectX, VB Runtime libraries, Audio devices or advanced video card functions.

Currently, we plan to support the following BurnInTest tests under the above standard environment:

- CPU;
- Optical disk (read tests);
- RAM;
- Disk (disk volumes only);
- Network (Standard);
- Plugin (BurnInTest plugins).

Currently we do not plan to support the following tests under WinPE (feedback from users with their experience, may influence this list):

- Parallel Port ;
- Serial port;
- Video Playback;
- Sound;
- 2D;
- 3D;
- USB (using the Passmark USB plugs);
- Printer;
- Tape.

Please note that we have intentionally not restricted any of the BurnInTest tests in software, as I am sure there are WinPE users that have or will get these tests working under WinPE. Send us an email.

Some system information normally displayed by BurnInTest will not be available under WinPE, this includes (but may not be limited to) the Graphics card, HDD model and USB controller/device information.

This guide also does not enable networking, and uses the WINPESHL.INI method to launch the program.

Windows PE 2.x can be obtained with the Microsoft Windows Automated Installation Kit (WAIK) or from the Microsoft OEM Preinstall Kit (OPK) Tools. There are differences with the capabilities of the PE in each of these versions, but these differences have no impact on this guide.

This guide is written using the OPK Tools and WAIK. It will also make x86 and x64 versions, and you need to use drivers suitable to your build. It is recommended that you track which drivers you end up putting into your PE. You will only need to install drivers for NIC and non-standard Mass Storage Controllers, such as RAID cards. This guide was prepared and tested on a live Server 2003 Domain Controller and secondly on a Vista workstation.

Note that in our testing the 32-bit version of BurnInTest will not run in a 64-bit WinPE environment – use the 64-bit version of BurnInTest in this scenario.

You will need to run the tools with (elevated) Administrator privileges.

Downloads

Microsoft OEM Preinstall Kit (OPK) can be downloaded here:
http://www.microsoft.com/oem/sblicense/OPK/default.mspx
or
http://oem.microsoft.com/script/contentpage.aspx?PageID=501924

Microsoft Windows Automated Installation Kit (WAIK) downloaded here:
http://www.microsoft.com/downloads/details.aspx?FamilyID=c7d4bc6d-15f3-4284-9123-679830d629f2&displaylang=en

The latest version of the BurnInTest PRO v6.0 can be downloaded here:

http://passmark.com/download/bit_download.htm

Building a Preinstall Environment

This section describes how to build a WinPE 2.x boot CD or DVD with BurnInTest V6.0. Note however that the same process can be for use via PXE.

This is a final walkthrough to create a functional PE image that will automatically load BIT upon opening. You need to install the WAIK/OPK Tools first (as well as BIT) before you should start. Also make sure to have your drivers ready. All commands are done by using the WAIK or OPK *Windows PE Tools Command Prompt*, which is a special paths CMD that will appear in the Start menu after you install that tool.

If you are running Vista, you will need to launch "Windows PE Tools Command Prompt" with elevated administrator privileges.

1. Create the base PE source. The destination folder cannot already exist.
copype x86 c:\bitpe

2. Mount the PE source (extract the base image winpe.wim to a local directory)
imagex /mountrw c:\bitpe\winpe.wim 1 c:\bitpe\mount

Note: Using the peimg /list command you can see which packages are installed and available for installation. For example, peimg /list c:\bitpe\mount

3. Install the packages that are needed.
xcopy "c:\program files\windows opk\tools\servicing" c:\bitpe\mount\windows /s
(or xcopy "c:\Program Files\Windows AIK\tools\servicing" c:\bitpe\mount\windows /s for WAIK)
xcopy "c:\program files\windows opk\tools\x86" c:\bitpe\mount\windows /s /Y
(or xcopy "c:\program files\Windows AIK\tools\x86" c:\bitpe\mount\windows /s /Y for WAIK)
peimg /install=WinPE-HTA-Package c:\bitpe\mount\windows
peimg /install=WinPE-Scripting-Package c:\bitpe\mount\windows
peimg /install=WinPE-XML-Package c:\bitpe\mount\windows
peimg /install=WinPE-WMI-Package c:\bitpe\mount\windows

The packages available are as listed in the Microsoft WinPE documentation. An extract follows:

Package Name	Description
WinPE-FONTSupport-<region>-Packages	Additional font support for ja-jp, ko-kr, zh-cn, zh-hk, and zh-tw.
WinPE-HTA-Package	HTML Application support
WinPE-MDAC-Package	Microsoft Data Access Component support
WinPE-Scripting-Package	Windows Script Host support

WinPE-SRT-Package	Windows Recovery Environment support
WinPE-WMI-Packages	Windows Management Instrumentation (WMI) support
WinPE-XML-Package	Microsoft XML (MSMXL) Parser support

4. Install the NIC and Mass Storage drivers that you need.
peimg /inf:c:\bitpe\drivers\nic*.inf c:\bitpe\mount\windows
peimg /inf:c:\bitpe\drivers\hddc*.inf c:\bitpe\mount\windows

5. Install the BurnInTest software and msvfw32.dll.
After step 2, you can find the directory structure of the PE with Windows Explorer.

First, put the msvfw32.dll (Microsoft Video for Windows, required regardless of whether you use the Video playback test) into mount\windows\system32. This must be the version suitable for your target Operating System. If you use the wrong dll (e.g. 64-bit on 32-bit Windows), BurnInTest will simply not start – and no error message will be displayed.

Second, in BurnInTest, choose the option to Install to USB (File->Install BurnInTest to a USB drive…). Specify the Installation location Directory as mount\program files\BurnInTest, specify the installation type as Licensed and paste your license key into the Username and key section.

If you have a BurnInTest configuration you want to use, place this configuration in the new BurnInTest folder as well. The steps following assume that a configuration, test.bitcfg, has been prepared to test the CPU, Optical Drive, RAM, Network and HDD, and has been copied to the mount\program files\BurnInTest directory.

The following example uses a program called setres to set the resolution to 1024x768. The default resolution for Win PE is 800x600. These files have been installed, but they are optional.

Note: If you want your own image for the WinPE background, replace the default image mount\Windows\System32\winpe.bmp with you own image.

6. Automate the launching of BIT.
There are two methods that you can use to launch BIT. You can either edit \mount\windows\system32\startnet.cmd or create a winpeshl.ini file. For testing purposes, it is recommended you use the startnet.cmd method, because you will have access to the command prompt. If you use winpeshl.ini, you will not be able to use a command prompt, but will stop regular users from having direct access into the PE itself once booted. You should not use both options, if winpeshl.ini is present, it will ignore the startnet.cmd file. If you are going to test the hard disk, it will need to be formatted first. This guide uses the idea that the hard drive is blank, and we will use the PE to format the disk first. You would not want to use this option if you are going to test computers with Windows or other OS installed on them already.

See the full command lines under startnet.cmd to see what the batch files are doing.

Winpeshl.ini
[LaunchApps]
%SYSTEMDRIVE%\Windows\System32\wpeinit.exe

%SYSTEMDRIVE%\Windows\System32\setres.exe, "1024 768 32 1"
%SYSTEMDRIVE%\Windows\System32\diskpart.exe,
"%SYSTEMDRIVE%\Windows\System32\diskpart.txt"
%SYSTEMDRIVE%\Program Files\BurnInTest\bit.exe, "-x -r -c test.bitcfg"

Note:
-x
Skip the DirectX version checks at startup time. This can be useful for users that do not want to install the latest version of DirectX and do not want to use the DirectX tests (eg. 3D tests).
-r
Executes the tests immediately without needing to press the go button. It also skips the pre-test warning message.
-C [configfilename]
Loads the configuration file specified by [configfilename]
test.bitcfg specifies an optional configuration file copied in step 5.

Warning!
Diskpart.exe is only required if your disk is unformatted – this will delete any data on physical drive 0.
If you hard disk is formatted, do not include the disk partitioning tool line shown above.
Ie. The following line should only be used to format a hard disk – it is optional:
%SYSTEMDRIVE%\Windows\System32\diskpart.exe,
"%SYSTEMDRIVE%\Windows\System32\diskpart.txt"

Please note that at the time of writing the BurnInTest Raw disk test is not supported under WinPE.

Startnet.cmd
wpeinit
setres 1024 768 32 1
diskpart /s diskpart.txt
"x:\Program Files\burnintest\bit.exe" -x -r -c test.bitcfg

diskpart.txt
sel disk 0
clean
create part pri
active
assign letter=c
format fs=ntfs quick

Warning!
This is only if your disk is unformatted – this will delete any data on physical drive 0.

7. Prep the PE source (This command will remove any packages and language packs that are not designated for the final image)
peimg /prep c:\bitpe\mount\windows /f

8. Save the changes (create a winpe.wim image from the local directory)
imagex /unmount c:\bitpe\mount /commit

9. Make the boot disk

Now at this point you can *rename the c:\bitpe\winpe.wim to boot.wim and place it in the*

ISO\Sources folder to burn a CD, USB Flash Drive or you can add it to the Boot Images in Windows Deployment Services.

10a. To make a bootable CD/DVD

To make an iso image for buring to CD:
oscdimg -n -h -bc:\winpe_x86\etfsboot.com c:\winpe_x86\iso c:\winpe_x86.iso

Now burn the iso image (c:\winpe_x86.iso) to the CD/DVD. You can get CD/DVD burning software from the Windows 2003 Resource Kit (cdburn and dvdburn) or use third-party software.

10b. To make a bootable USB Flash Drive (UFD)

From the command prompt, partition and format the UFD. Make sure you select the correct disk number, as this will delete everything on the disk (the below example shows a UFD with physical disk number 2 and volume letter G.

```
C:\Users\Administrator>diskpart
DISKPART> select disk 2
DISKPART> list disk
DISKPART> clean
DISKPART> create partition primary
DISKPART> select partition 1
DISKPART> active
DISKPART> format fs=fat32
DISKPART> assign
DISKPART> exit

C:\Users\Administrator>xcopy c:\bitpe\iso\*.* /s /e /f G:\
```

A 64-bit build example:

```
<Open the Windows PE Tools Command Prompt with administrator privileges>
c:
cd "C:\Program Files\Windows AIK\Tools\PETools"
copype.cmd amd64 c:\winpe_x64
imagex /mountrw c:\winpe_x64\winpe.wim 1 c:\winpe_x64\mount
xcopy "c:\Program Files\Windows AIK\tools\servicing" c:\winpe_x64\mount\windows /s
xcopy "c:\program files\Windows AIK\tools\x86" c:\winpe_x64\mount\windows /s /Y
peimg /install=WinPE-HTA-Package c:\winpe_x64\mount\windows
peimg /install=WinPE-Scripting-Package c:\winpe_x64\mount\windows
peimg /install=WinPE-XML-Package c:\winpe_x64\mount\windows
peimg /install=WinPE-WMI-Package c:\winpe_x64\mount\windows
<Install 64-bit BurnInTest and 64-bit msvfw32.dll for your target Operating System)>
peimg /prep c:\winpe_x64\mount\windows /f
imagex /unmount c:\winpe_x64\mount /commit
<Copy winpe.wim to iso\sources\boot.wim>
oscdimg -n -h -bc:\winpe_x64\etfsboot.com c:\winpe_x64\iso c:\winpe_x64.iso
<Burn c:\winpe_x64.iso to a CD.>
```

Please consult the documentation that comes with the WAIK/OPK Tools for further information or configurations.