



# WinPE Paragon System Recovery Solution

**Workshop**

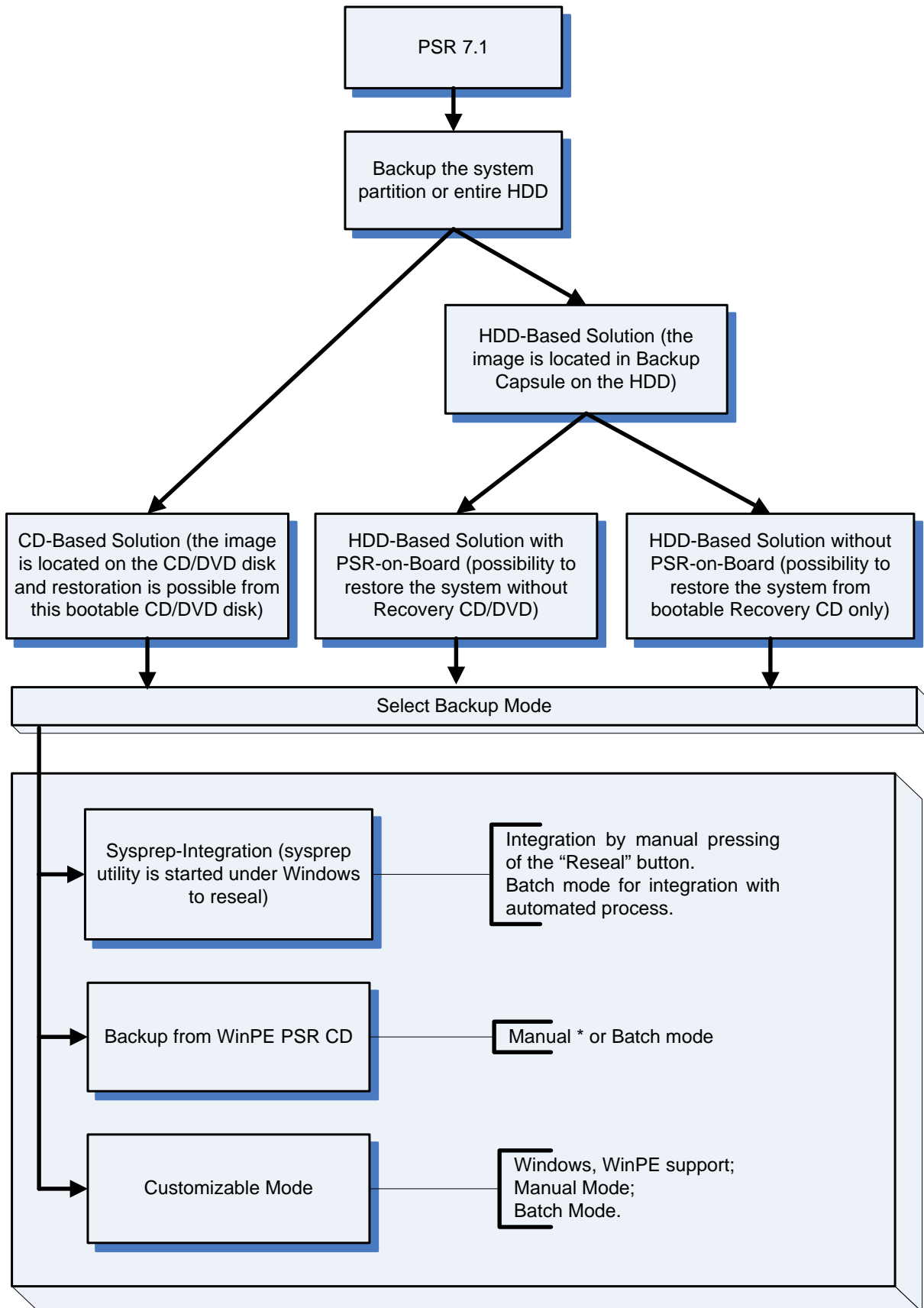
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## Paragon System Recovery General Scheme



\* At the present time, the PSR-on-Board feature is disabled in the manual HDD-Based Solution for WinPE PSR.



Paragon System Recovery (PSR) includes the following components:

- PSRSysprep.MSI file (Sysprep-Integration Mode);
- WinPE PSR CD ;
- Recovery CD for HDD-Based Solution without PSR-on-Board;
- Supplementary Package for integration into the custom technology process that includes:
  - Post-cloning patcher for PSR-on-Board solution ([see for more info](#));
  - Backup package that may simplify integration in the custom technology process.

## Introduction

This workshop describes the step-by-step instruction on how to use WinPE PSR Solution (for other Backup Mode, see corresponding workshops), in the shape of bootable WinPE PSR CD. This solution is designed to expand PSR flexibility and can also be used as an alternate method for preparing computers with the possibility to restore operating systems (Windows, Linux,...) and the entire hard disk to the initial state, including all the customizations, at any time without or with complementary tools. WinPE PSR gives an opportunity to backup the entire system (system partition or whole HDD) during any step of PC preparing with any operating system. In addition, WinPE PSR does not impose any limitations on system requirements.

This solution is automated and specifically intended for OEMs (original equipment manufactures) who produce computers and preinstall operating systems, and who need to supply recovery tools to end-users with the possibility to recovery operating systems or entire hard disks.

This solution can be widely used not only by OEMs but also by system integrators and VARs (value added resellers) who customizes computer systems for their clients. All these system builders can get the obvious benefits of using this solution since it allows them to increase efficiency of their customer relationship process by providing their customers with convenient and reliable tools for automatic system restoration.

## Overview

Computers that were prepared with WinPE PSR are supplied to end-users and allow them to restore the system to the initial state without or with additional tools (CD/DVD) in case of severe system damage. WinPE PSR provides with a technology to create a system backup (disk or partition), secure zone on a local disk (Backup Capsule) to store the backup archive and the program



loader to restore this backup archive at PC boot in a fast and easy way. The technology also provides the possibility to burn system backups to bootable CD/DVD medias and restore them by booting from these CD/DVD.

End-users can fully automatically restore the system to the initial state by pressing the **Alt** button at PC boot or by booting from Recovery CD/DVD.

## Terms

**Paragon System Recovery (PSR)** is convenient and reliable automatic system restoration with wide file systems and Windows servers range support (see <http://psr.paragon.ag/> for more information).

The **PSR-on-Board** feature includes PSR that is installed to Backup Capsule and Boot Manager that is installed in the first track of a disk to boot this PSR. This feature provides end-users with possibility to automatically restore the system to the initial state by pressing the **Alt** button at PC boot. Moreover, it is possible to restore the system by booting from Recovery CD/DVD too.

The **Microsoft Windows Preinstallation Environment (WinPE)** is a stripped down version of Windows XP that can be booted from CD/DVD. WinPE does not require a hard drive to boot, it can run solely from a CD/DVD drive by using the memory for dynamic data. This feature makes WinPE an excellent and very convenient tool for data backup/recovery and system maintenance purposes.

**Recovery CD/DVD** is supplied with a new computer and allows the end user to restore the system to the initial state in case of severe system damage. There are two types of Recover CD/DVD: with a backup image and without it. The PSR provides the OEM with a technology to create the Recovery CD/DVD with a backup image in a fast and easy way (Recover CD/DVD without a backup image is already supplied with PSR). On the end-user side, usage of these Recovery Discs is also as fast and easy as possible. The Recovery Discs are bootable and in case of containing backup images (partition or entire HDD) are very useful if it is not necessary to store backup images on local hard isks. The process of restoration can be totally automated without the necessity for the end user to be involved.

**Backup Capsule** is a secure zone on the hard disk (usually a separate hidden partition) where WinPE PSR solution can save its backup archives and restore module (PSR-on-Board).

## WinPE PSR

WinPE PSR offers different scenarios for backup/restoring the system partition or entire hard disk. These solutions differ from each other in methods of storing backup archives (on CD/DVD or local HDD) and in methods of restoring them (from HDD or CD/DVD):

- HDD-Based Solution with PSR-on-Board – The backup image (partition or disk) is located in Backup Capsule on the local hard disk. It is possible to restore the system without Recovery CD/DVD by pressing **Alt** button at PC boot;

**Note:** This solution imposes a limitation on disk cloning after the backup is finished. Please see the [HDD Cloning Issues for HDD-Based Solution with PSR-on-Board](#) chapter for more information.

- HDD-Based Solution without PSR-on-Board - The backup image (partition or disk) is located in Backup Capsule on the local hard disk. It is necessary to have Recovery CD/DVD to restore the image;
- CD-Based Solution – The image (partition or disk) is located on the CD/DVD and restore is possible by booting from this CD/DVD.

## How it works

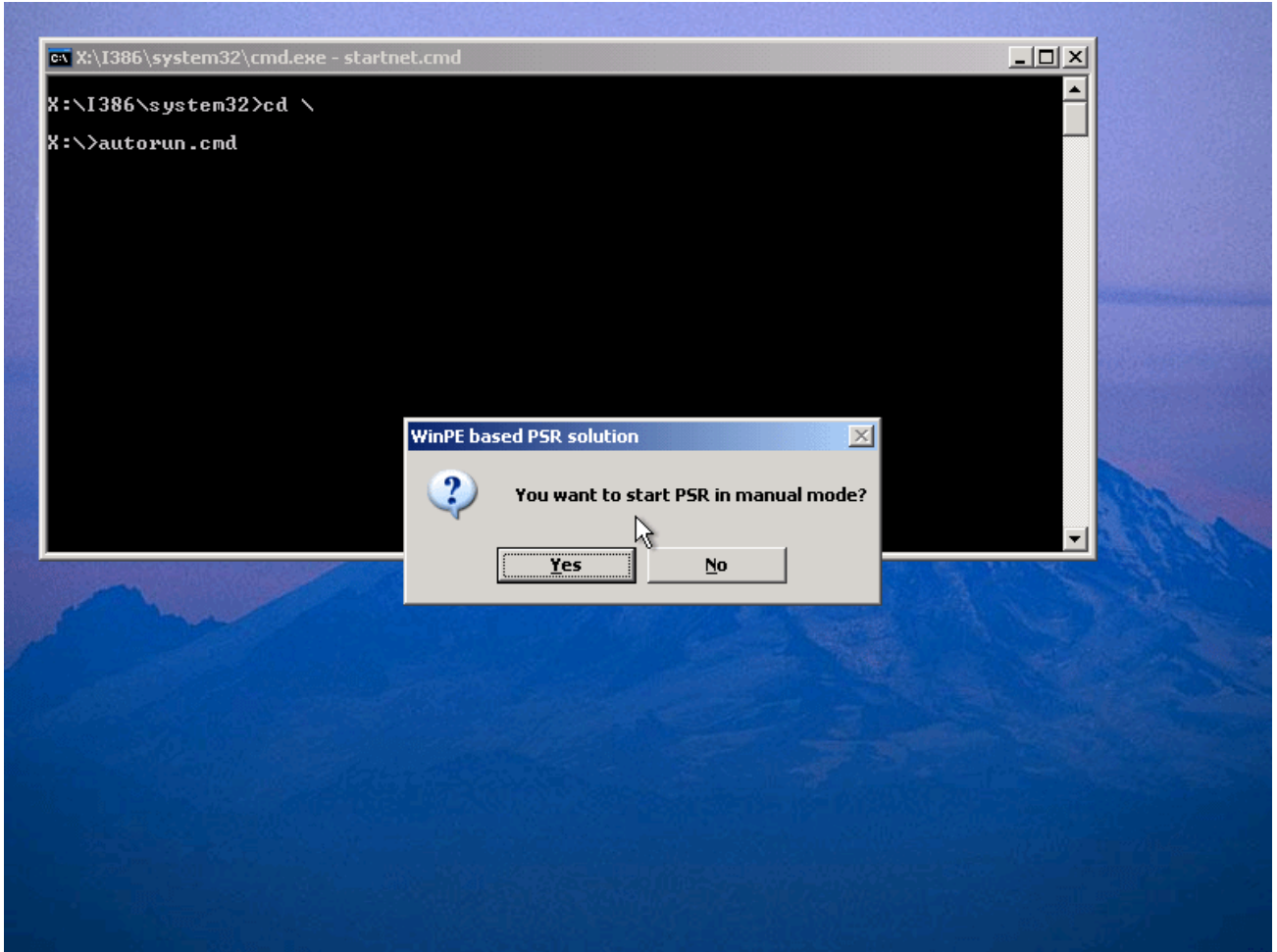
It is a good practice to use WinPE PSR after assembling a computer, installing an operating system on the hard disk, all necessary drivers and additional applications inclusive of System Preparation Tool (sysprep utility).

## Backup Operation

After the PC is prepared, it is necessary to boot the PC from WinPE PSR bootable CD.

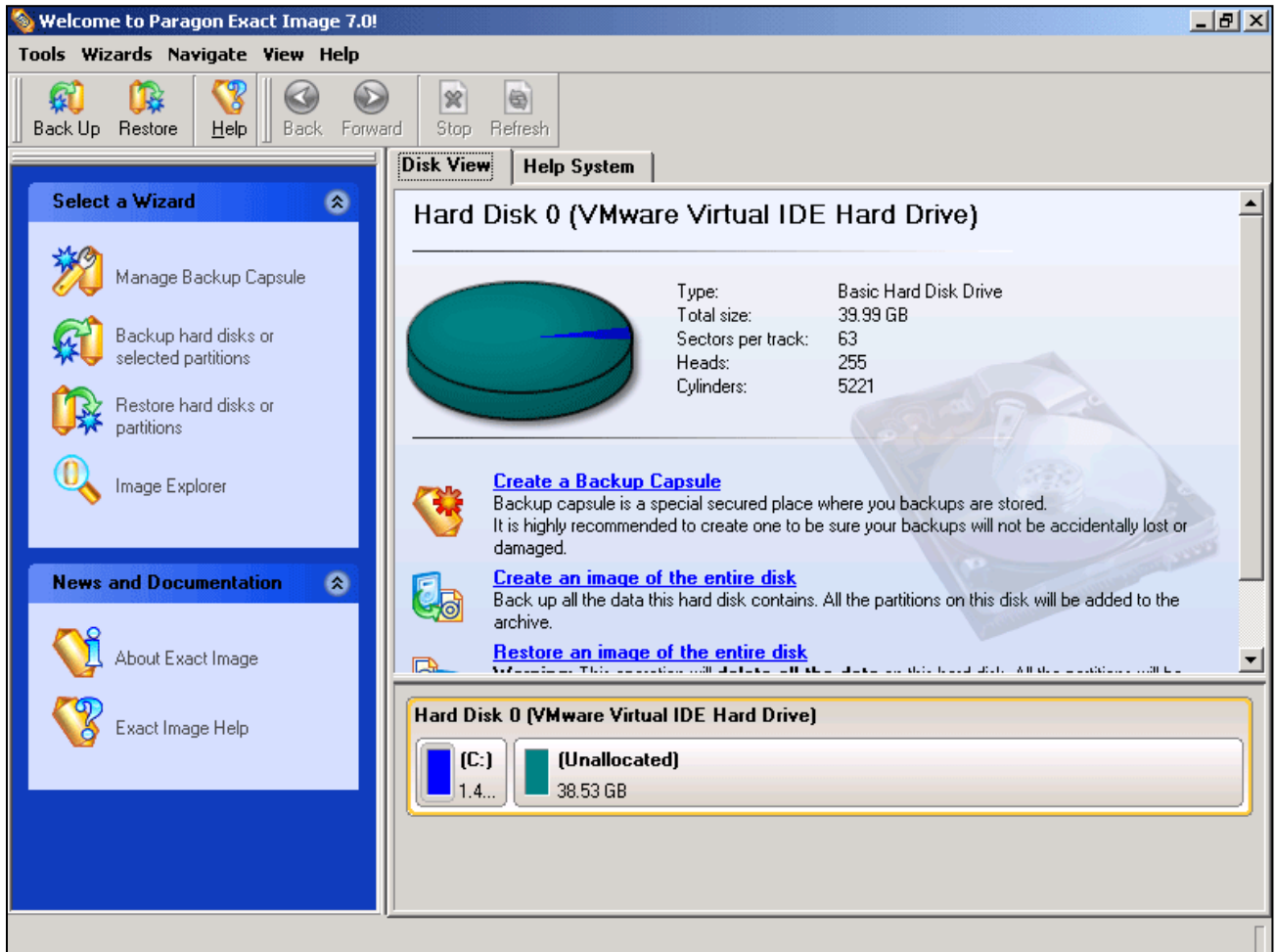


During booting WinPE PSR, the user will be suggested to choose starting PSR in manual mode.



## PSR manual mode

After pressing the **Yes** button, Paragon Exact Image will be started:



To backup a partition or an entire hard disk to Backup Capsule we will use the following helpful wizards:

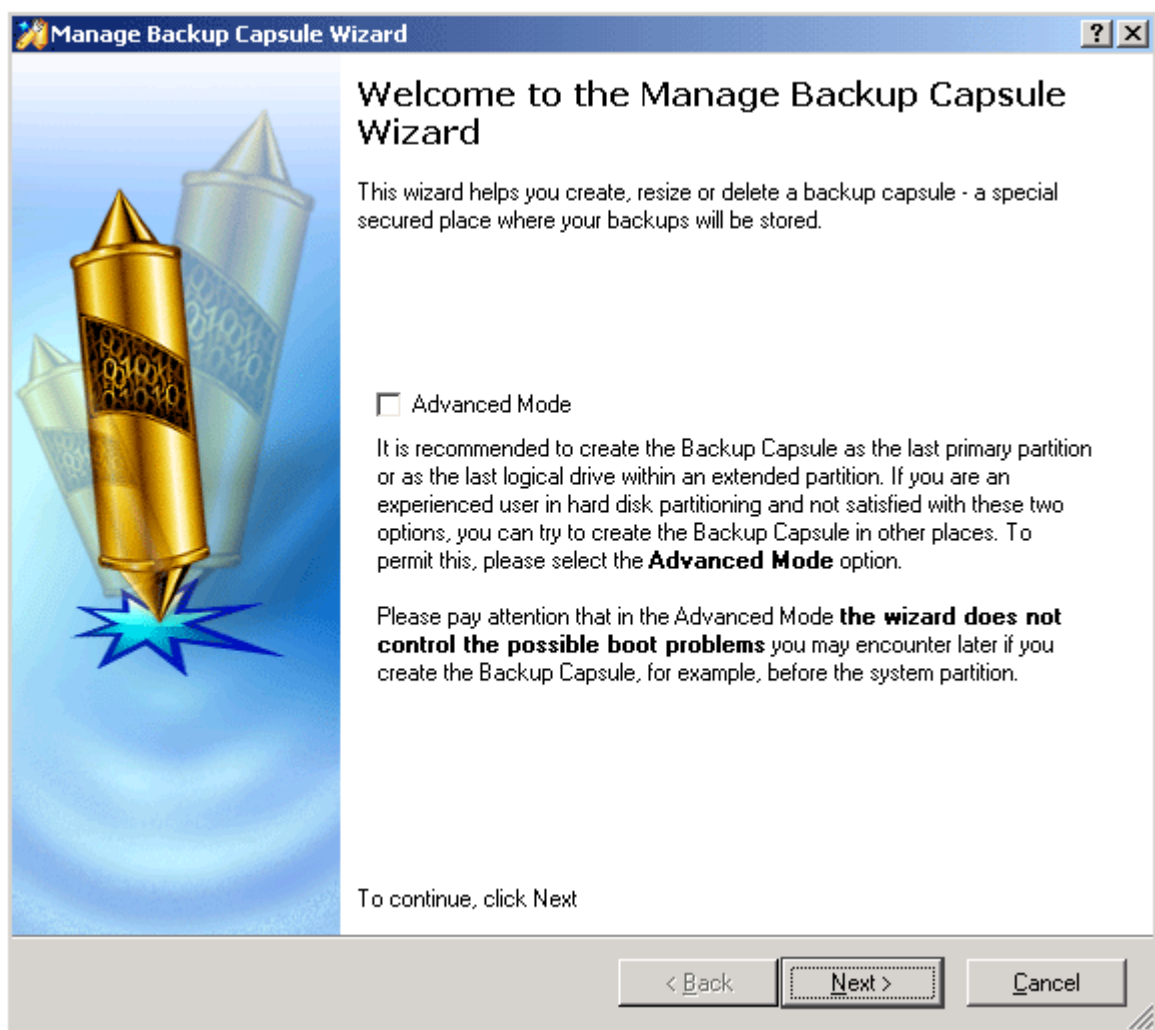
- **Manage Backup Capsule** - All operations related to the Backup Capsule, including its creating and managing, are performed with the “Manage Backup Capsule Wizard”;
- **Backup hard disks or selected partitions** – To create an image (backup) of a separate partition or whole hard disk to Backup Capsule or CD/DVD disks. The backup includes a complete partition or hard disk image – the system will immediately become bootable after restoring.

## HDD-Based Solution

The PSR restore module, in the form of Recovery CD/DVD or PSR-on-Board, searches backup images on the Recovery CD/DVD disk and then on Backup Capsule. Therefore, it is important to know that the restore module does not search the backup images on general partitions. That is why, if we need to use HDD-Based solution we should start with Backup Capsule creation.

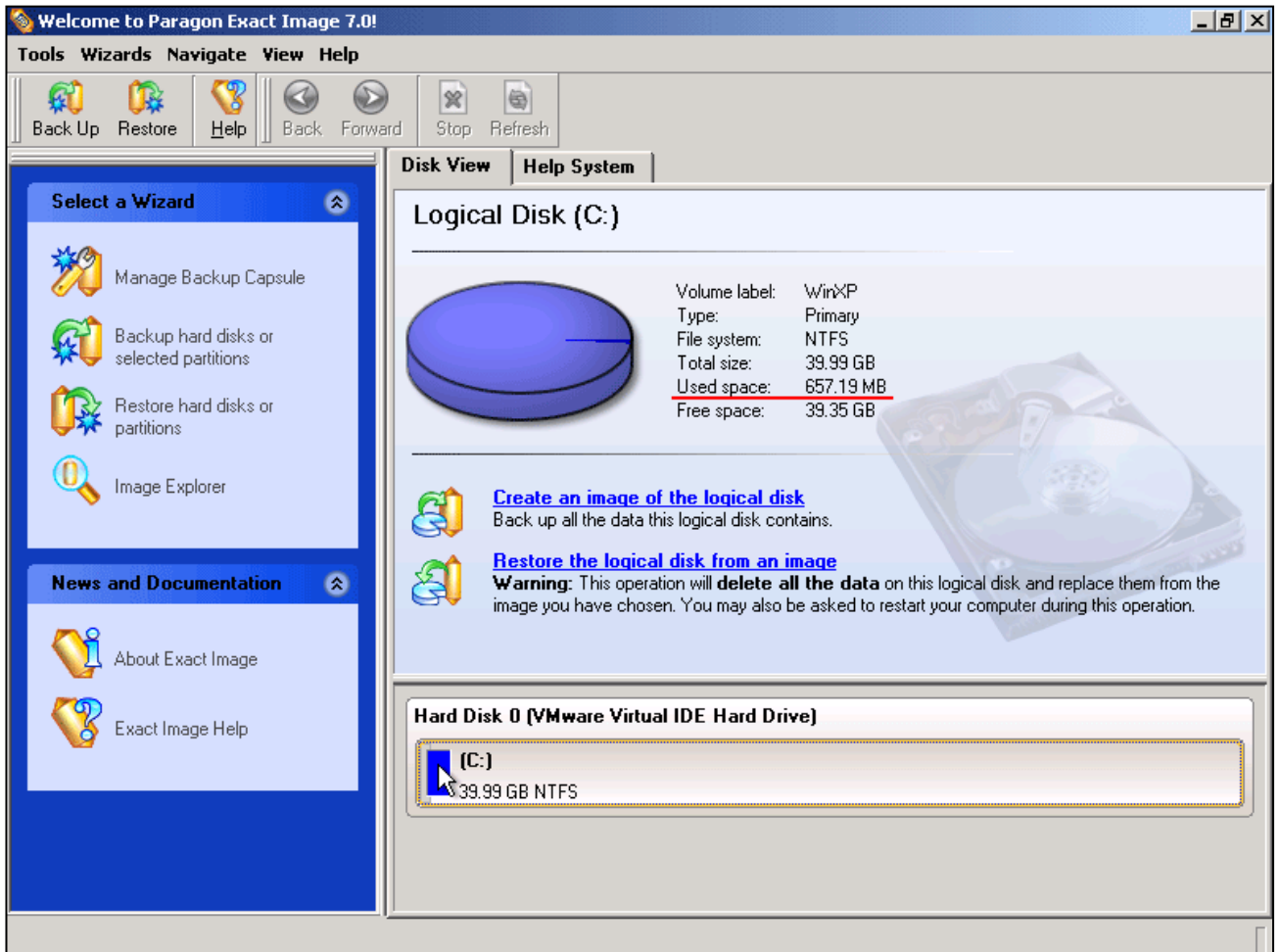
### *Backup Capsule Creation*

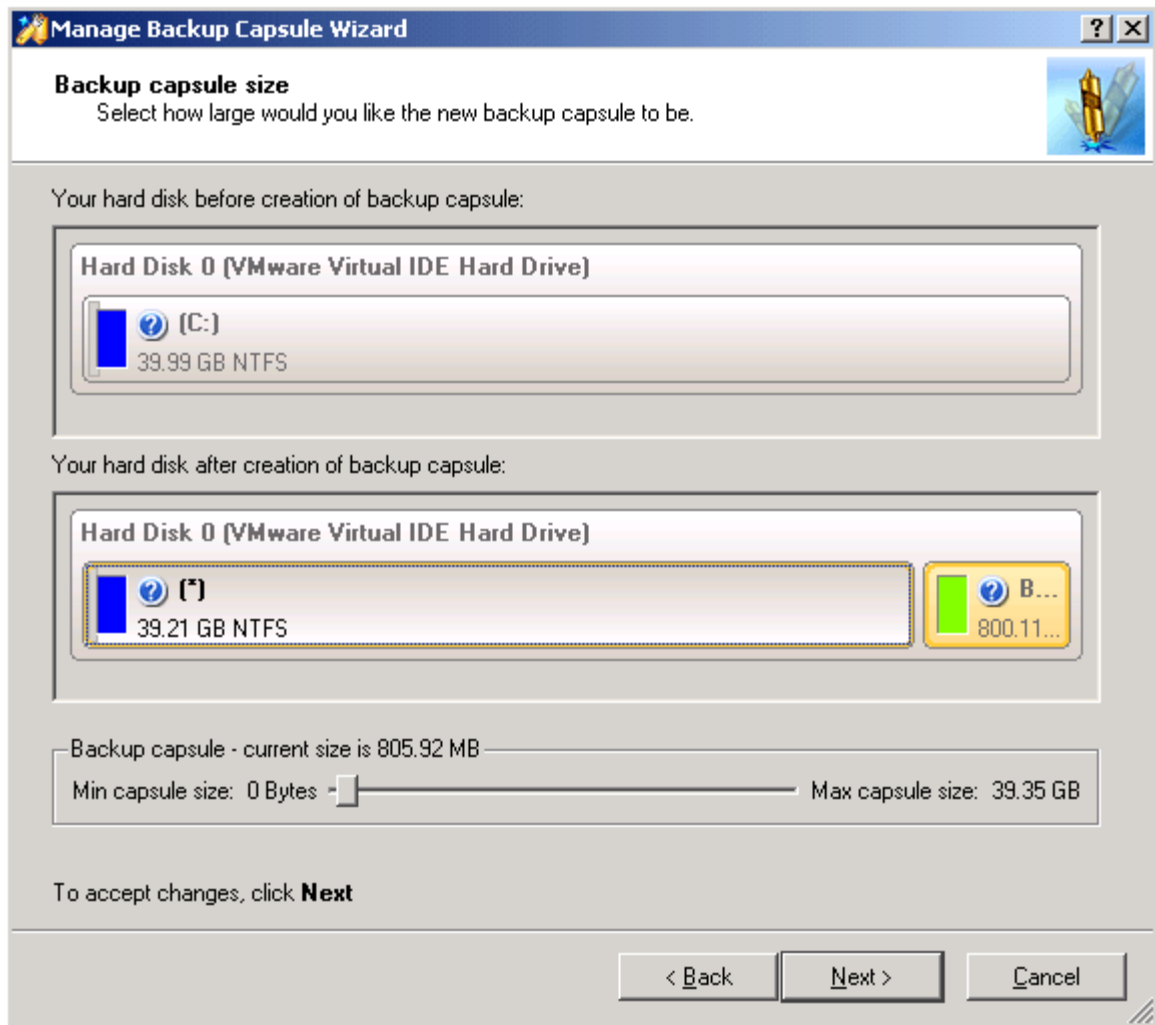
1. Click on **Manage Backup Capsule** in the left pane to start “Manage Backup Capsule Wizard”;



2. Click **Next** to proceed.
3. In the appeared dialog select a hard disk and mark the position where you would like to create Backup Capsule. Press **Next** to proceed.

- The next dialog offers to select the size of Backup Capsule. Notice that it's highly recommended to create Backup Capsule which size is not less than the used space of the partition or entire disk (sum of the used space of all partitions on the disk) you are going to backup (657.19MB, in our case).



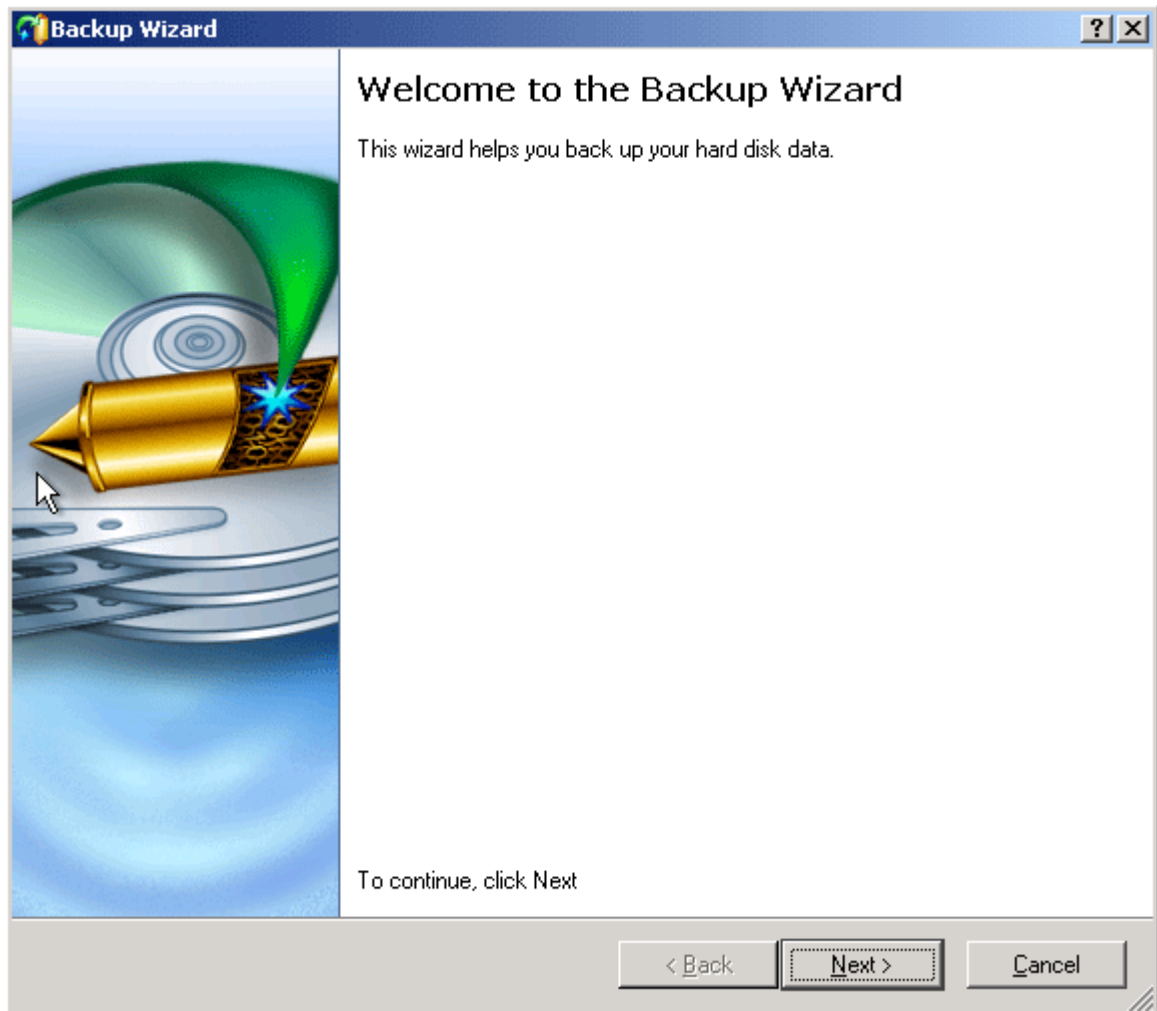


5. Press **Next** to proceed.
6. In the appeared dialog select “Yes, apply the changes physically” and press **Next**.
7. It will take some seconds to create Backup Capsule.
8. Press **Finish**.

**Note:** Backup Capsule can be used immediately after its creation is finished.

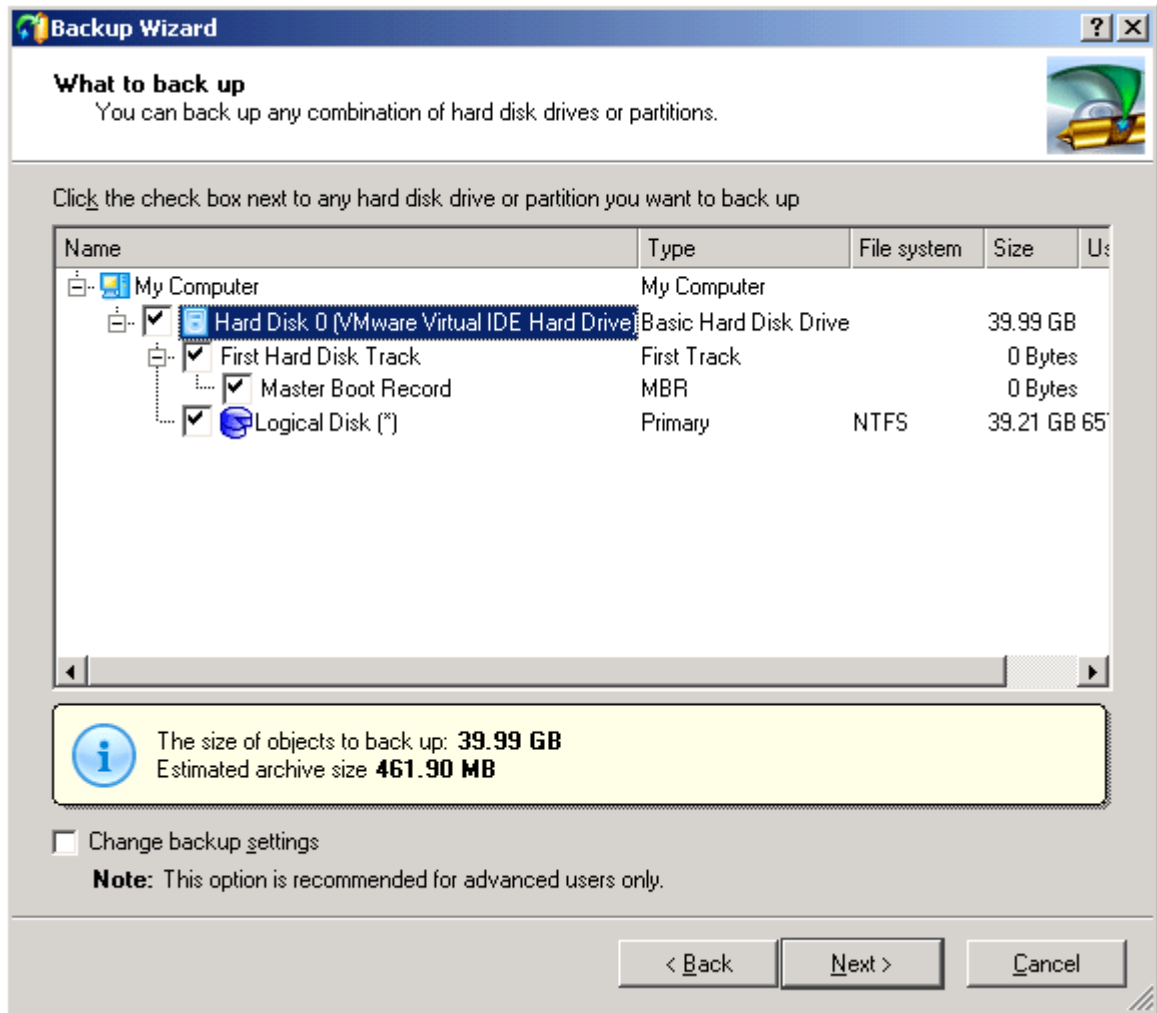
### *Image creation to Backup Capsule*

1. Click on **Backup hard disks or selected partitions** in the left pane to start the Backup Wizard.

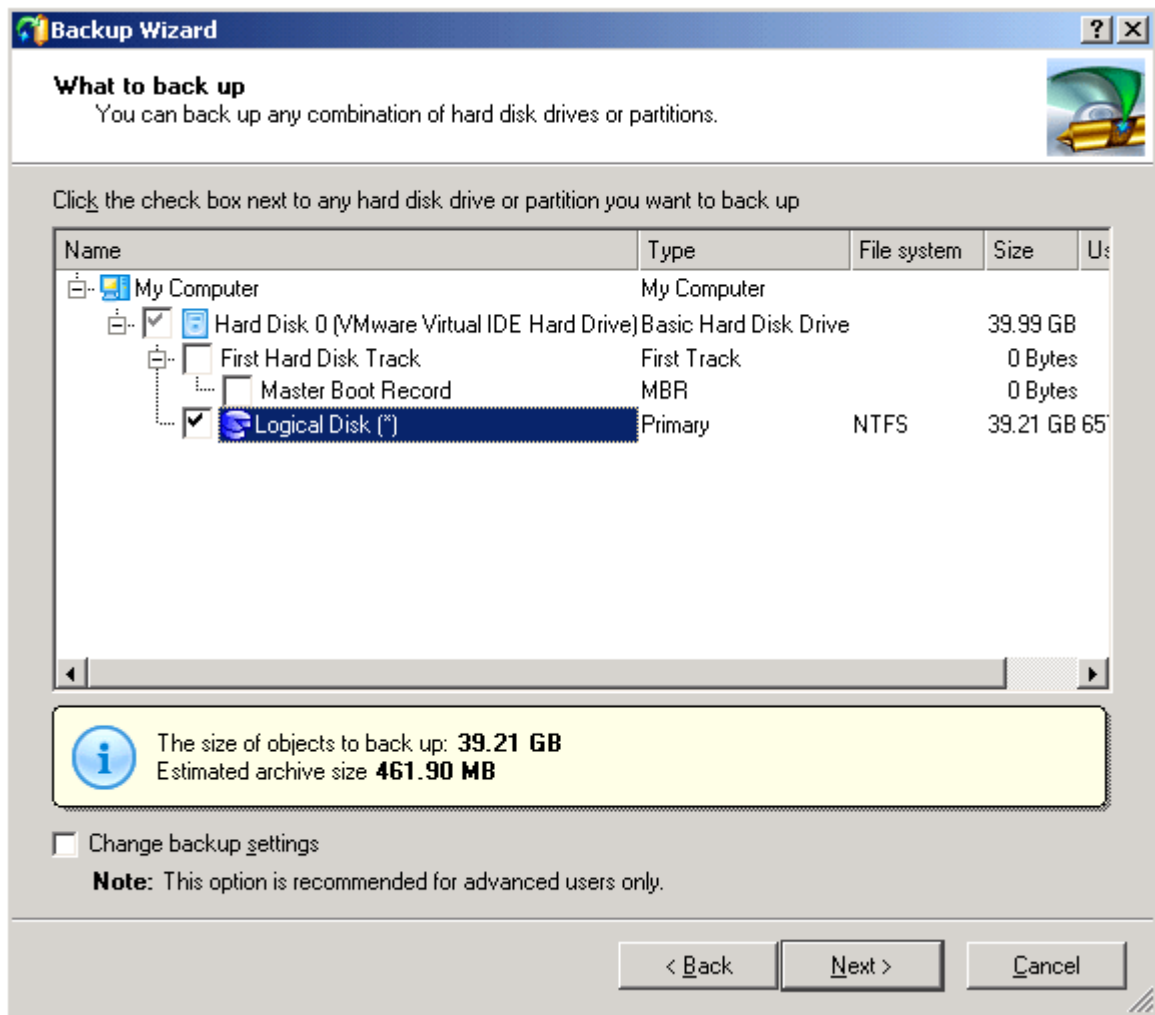


2. Press **Next** to proceed.
3. In the appeared dialog, tick you want to backup.

To select an entire disk, please tick the checkbox next to the disk name:

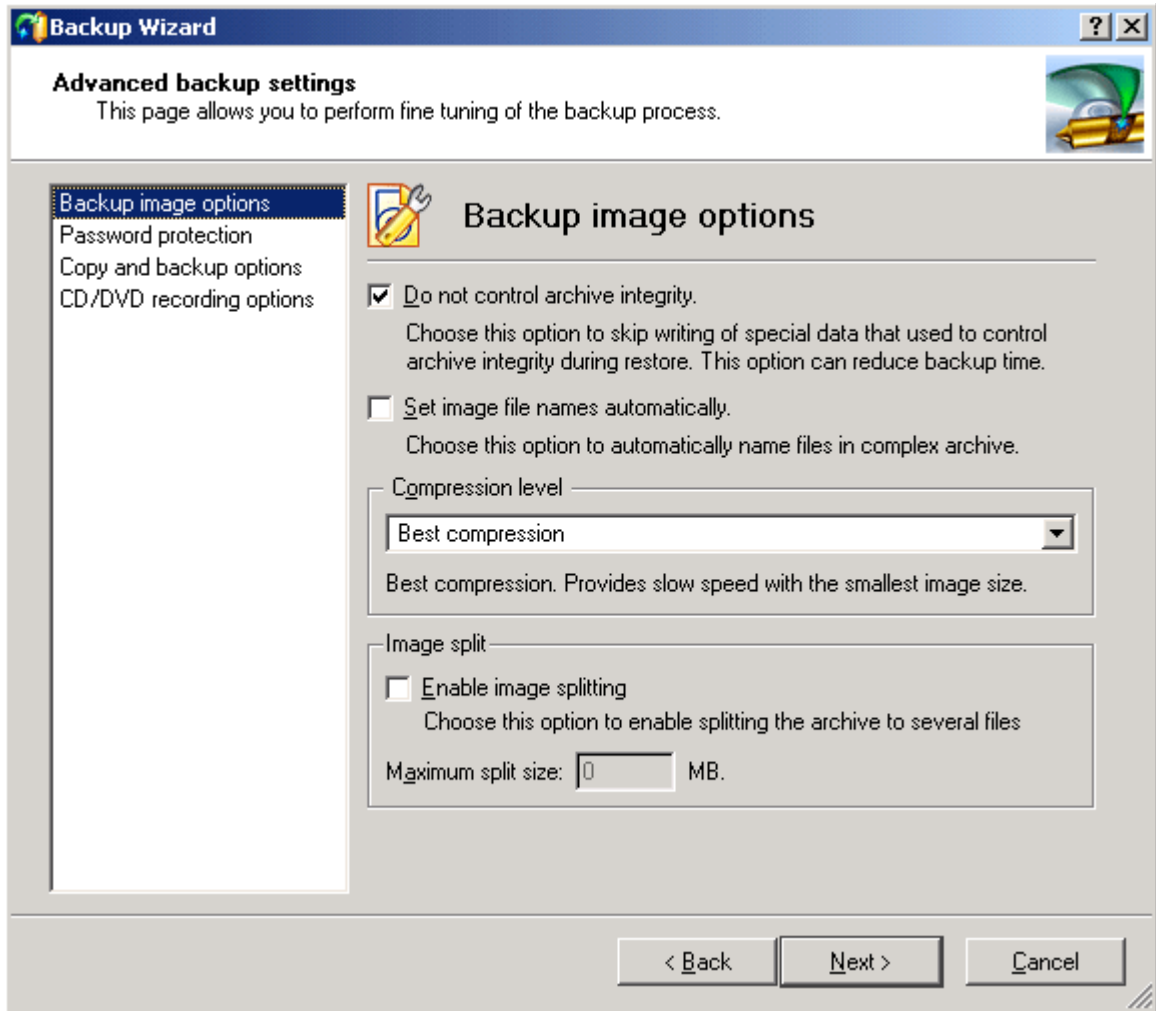


To select a partition, please tick the checkbox next to the partition name:

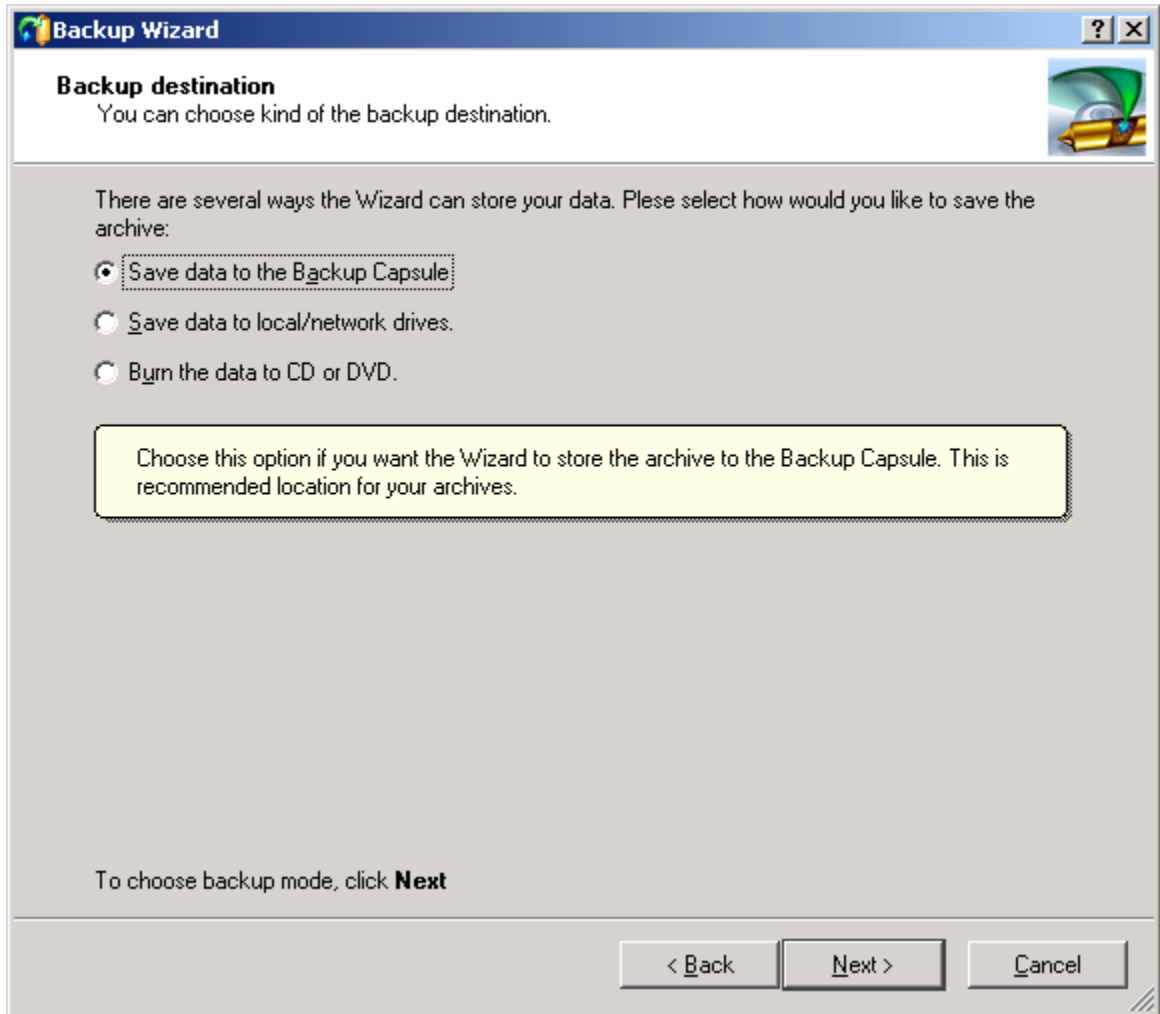


In our case, we select “Logical Disk (C:)” to backup the system partition.

**Note:** It is always possible to change the advanced backup settings by clicking on the **Change backup settings** checkbox at the bottom of the dialog.

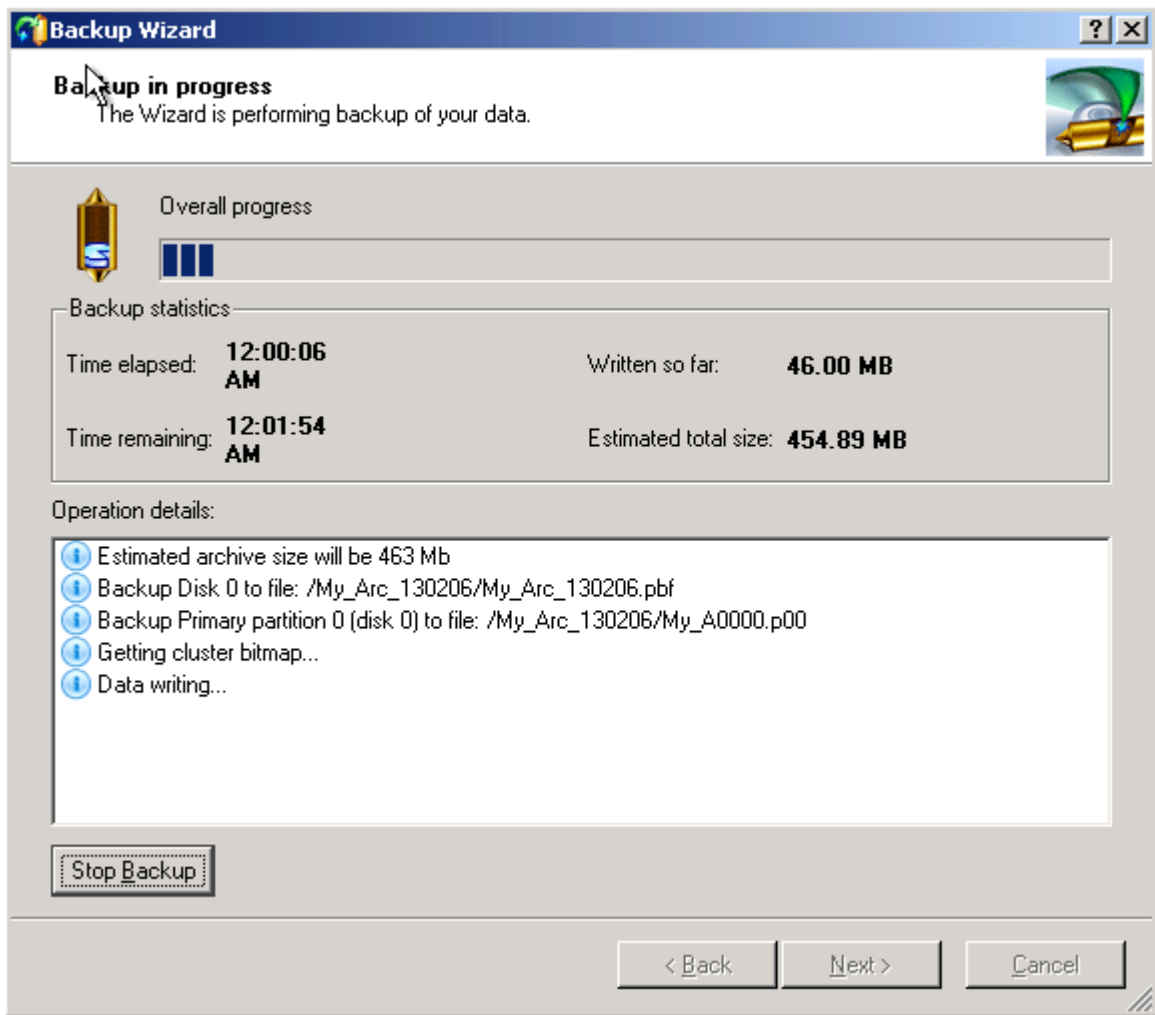


4. Press **Next** to proceed.
5. In the next dialog, select where you want to place the backup image (“Save data to the Backup Capsule”).



6. Press **Next** to proceed.
7. In the next dialog, specify the archive name on Backup Capsule. The archive name will be used as a subfolder where backup archive will be stored.
8. Press **Next** to proceed.
9. In the next dialog, you can specify a short comment to describe the archive. Below you can also select one of the following options:
  - a. **Back up now** – Choose this option if you want to backup the data immediately (select this option for our case).
  - b. **Generate script** - Choose this option to save the backup commands as a script file (\*.psl). The Paragon Script Language (PSL) will be used to create the script. You can edit the script manually and/or run it later using Paragon Script Interpreter.

10. Press the **Next** button twice to start the backup operation.



11. At the end of the backup operation, press the **Finish** button to finish.

After the backup operation is completed, Backup Capsule will contain the backup archive.

**Note:** You can browse the archive by using **Image Explorer** (in the left pane of Exact Image).

**Note:** End-user can restore the system by using Recovery CD/DVD without any backup image that is already supplied with PSR (see the [Restore Operation](#) chapter, for more information).

### CD-Based Solution

This solution is intended for creating Recovery CD/DVD with the backup image of one or several partitions (for instance, system + service partitions).



The bootable Recovery CD/DVD with the backup image should be created by OEM-manufacturer using the Backup Wizard. The Recovery CD/DVD can be made either particularly for every supplied computer or direct for the whole bulk of similar computers.

This solution does not require creating Backup Capsule on the local disks, because the backup image will be located on Recovery CD/DVD.

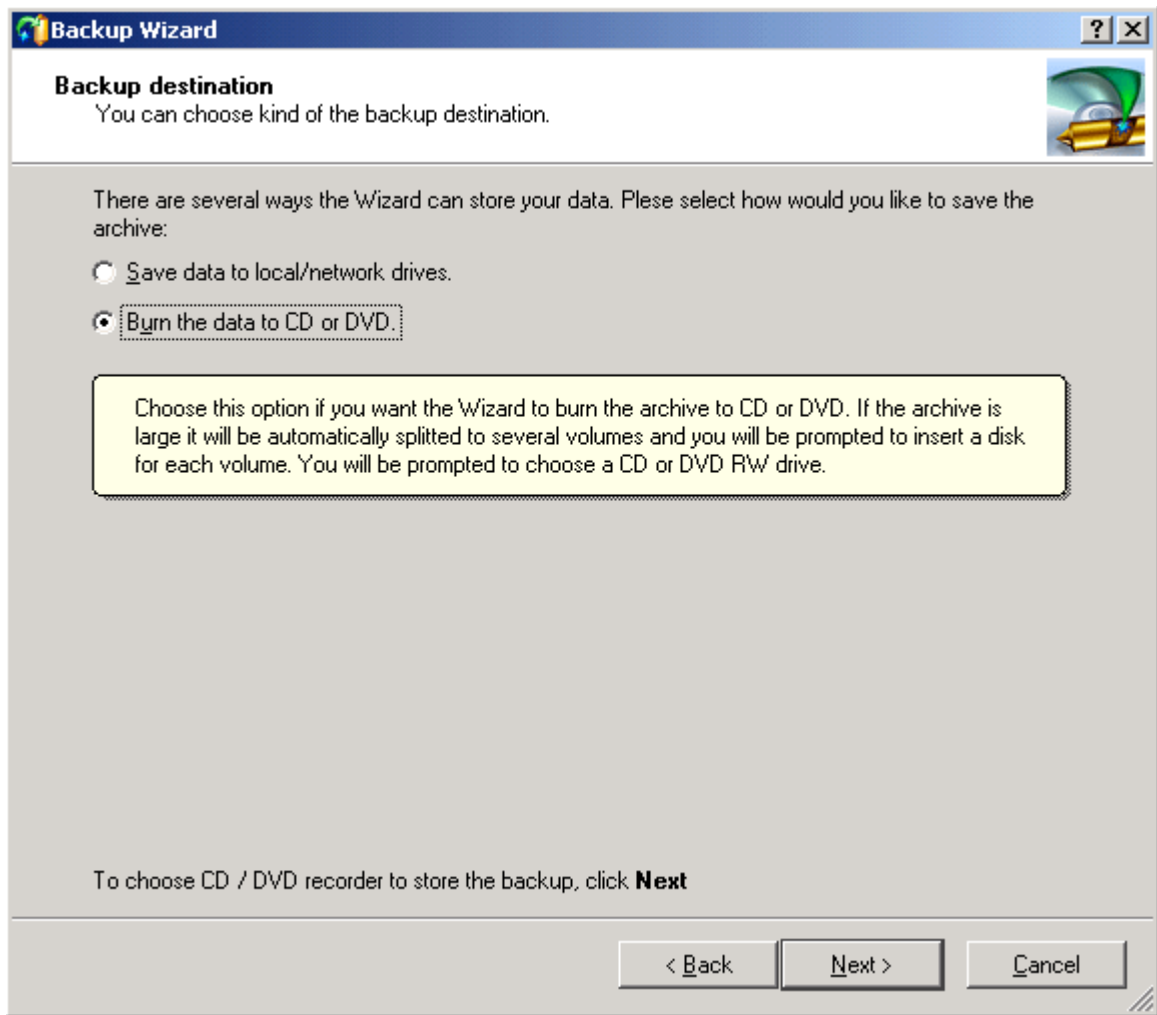
### *Image creation to Recovery CD/DVD*

1. Start the manual mode (Exact Image);
2. Click on **Backup hard disks or selected partitions** in the left pane to start the Backup Wizard.
3. Press **Next** to proceed.
4. In the appeared dialog, tick you want to backup (partition or hard disk).

**Note:** It is always possible to change the advanced backup settings by clicking on the **Change backup settings** checkbox at the bottom of the dialog.

5. Press **Next** to proceed.

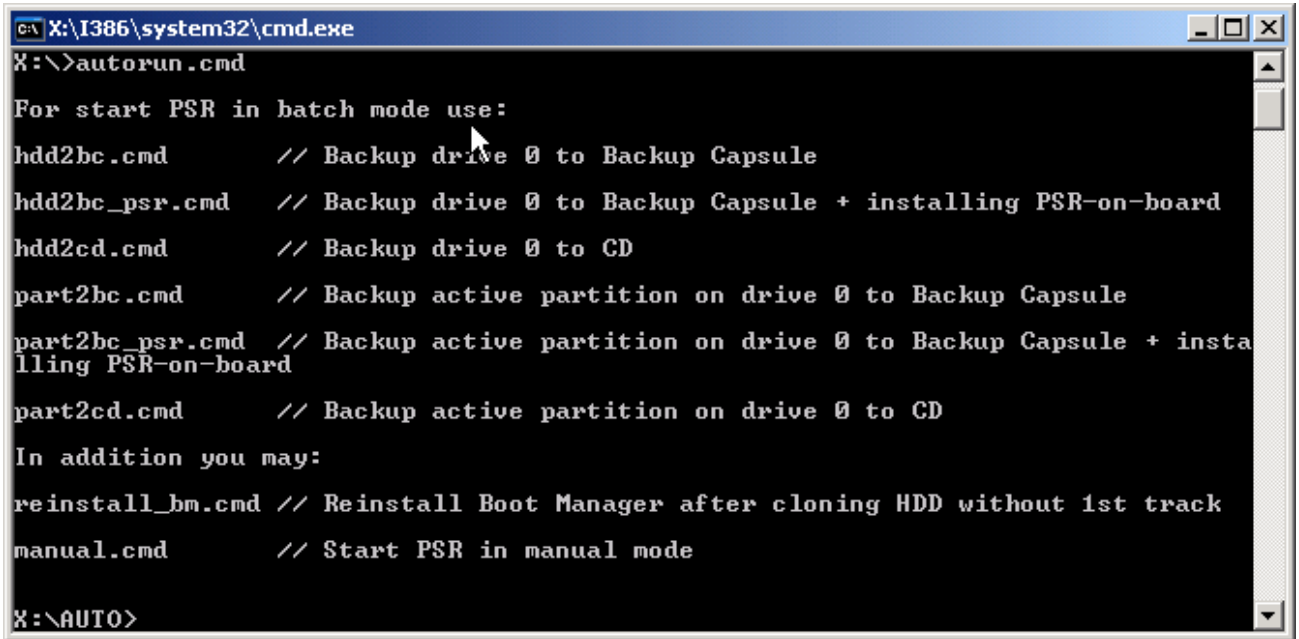
6. In the **Backup Destination** dialog, select **Burn the data to CD or DVD**.



7. Press **Next** to proceed.
8. In the appeared dialog choose the preferable CD/DVD recorder. Press **Next** to proceed.
9. In the next dialog, you can specify a short comment to describe the archive. Press the **Next** button twice to burn the backup image on the bootable CD/DVD.
10. At the end of the backup operation, press the **Finish** button to finish. The Recovery CD/DVD is done.

## PSR Command line mode

In spite of usability and directness of the manual mode, the batch (command line) mode gives more ample opportunities for backup/restore operations.



```
C:\X:\I386\system32\cmd.exe
X:\>autorun.cmd

For start PSR in batch mode use:
hdd2bc.cmd          // Backup drive 0 to Backup Capsule
hdd2bc_psr.cmd     // Backup drive 0 to Backup Capsule + installing PSR-on-board
hdd2cd.cmd         // Backup drive 0 to CD
part2bc.cmd        // Backup active partition on drive 0 to Backup Capsule
part2bc_psr.cmd    // Backup active partition on drive 0 to Backup Capsule + installing PSR-on-board
part2cd.cmd        // Backup active partition on drive 0 to CD

In addition you may:
reinstall_bm.cmd   // Reinstall Boot Manager after cloning HDD without 1st track
manual.cmd         // Start PSR in manual mode

X:\>AUTO>
```

Using this mode, it is possible to:

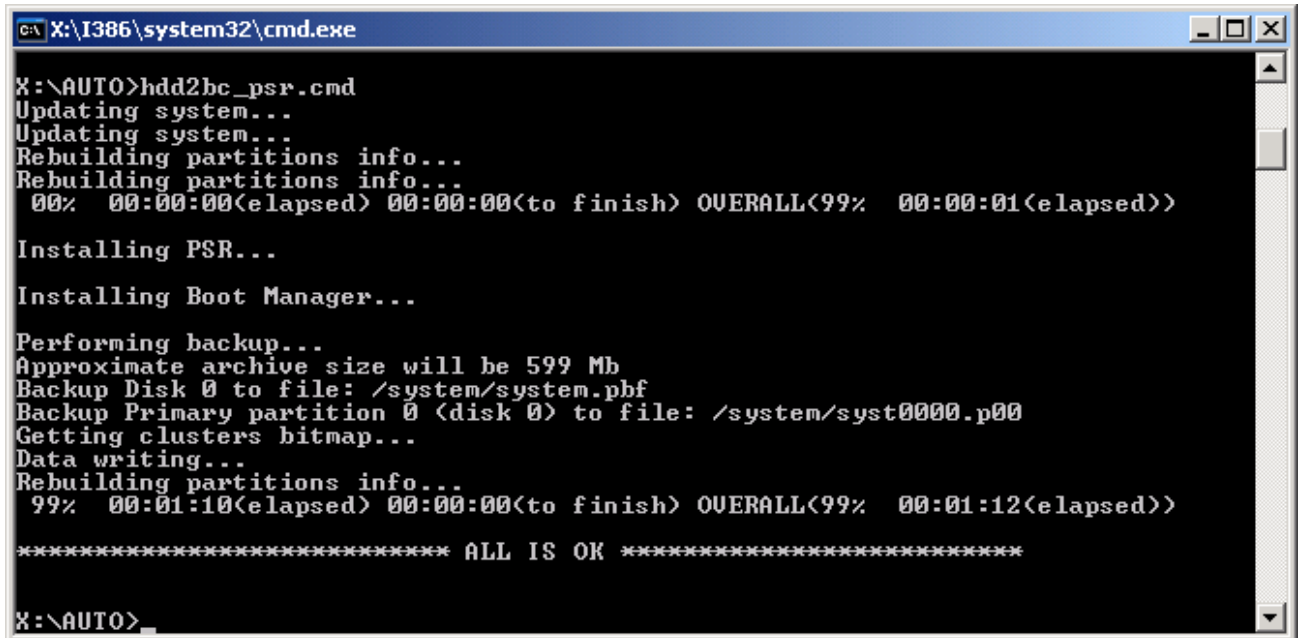
- Backup the first hard disk to Backup Capsule;
- Backup the first hard disk to Backup Capsule + installing PSR-on-Board;  
**Note:** This operation imposes a limitation on disk cloning after the backup is finished. Please see the [HDD Cloning Issues for HDD-Based Solution with PSR-on-Board](#) chapter for more information.
- Backup the first hard disk to CD/DVD;
- Backup the active partition of the first hard disk to Backup Capsule;
- Backup the active partition of the first hard disk to Backup Capsule + installing PSR-on-Board;
- Backup the active partition of the first hard disk to CD/DVD;
- Reinstall Boot Manager of PSR-on-Board after cloning the hard disk without the 1st track.
- Start PSR in the manual mode (Exact Image).

Each of these operations can be performed by typing one of the script file names that are shown in the picture above.

### Example.

Let's backup the system (alias active) partition to Backup Capsule, also installing PSR-on-Board.

Type in the command line **hdd2bc\_psr.cmd** and press **Enter**.



```
C:\X:\I386\system32\cmd.exe
X:\AUTO>hdd2bc_psr.cmd
Updating system...
Updating system...
Rebuilding partitions info...
Rebuilding partitions info...
 00% 00:00:00(elapsed) 00:00:00(to finish) OVERALL<99% 00:00:01(elapsed)>
Installing PSR...
Installing Boot Manager...
Performing backup...
Approximate archive size will be 599 Mb
Backup Disk 0 to file: /system/system.pbf
Backup Primary partition 0 (disk 0) to file: /system/syst0000.p00
Getting clusters bitmap...
Data writing...
Rebuilding partitions info...
 99% 00:01:10(elapsed) 00:00:00(to finish) OVERALL<99% 00:01:12(elapsed)>
***** ALL IS OK *****
X:\AUTO>
```

The following operations will be performed:

- Creation of Backup Capsule;
- Creation of the backup archive in Backup Capsule;
- Creation of the special restore module in Backup Capsule. The restore module is used to launch PSR-on-Board engine for restoring the backup archive;
- Set the special boot manager (PSR-on-Board loader) to the first track to be able to pass the control to the restore module without any additional tools in case of severe system damage.

After the backup operation is completed, Backup Capsule will contain the backup archive and PSR-on-Board. Moreover, the first track of the first HDD will contain Boot Manager (PSR-on-Board loader).

To reboot the PC, just close the Windows Console (CMD.exe) dialog.

## Restore Operation

In case of system crash or any severe damage, a user can always restore the system by restoring the system backup (partition or disk) from Backup Capsule or Recovery CD/DVD.

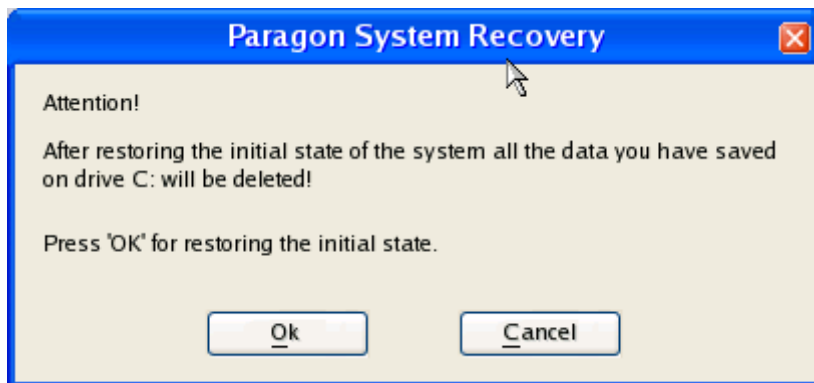
After using WinPE\_PSR Solution to create the backup archive, there are several ways to restore the system, which are depended on the backup method chosen during the backup operation:

- Restoration by pressing the **Alt** button at PC boot (backup image and PSR-on-Board engine are on Backup Capsule);



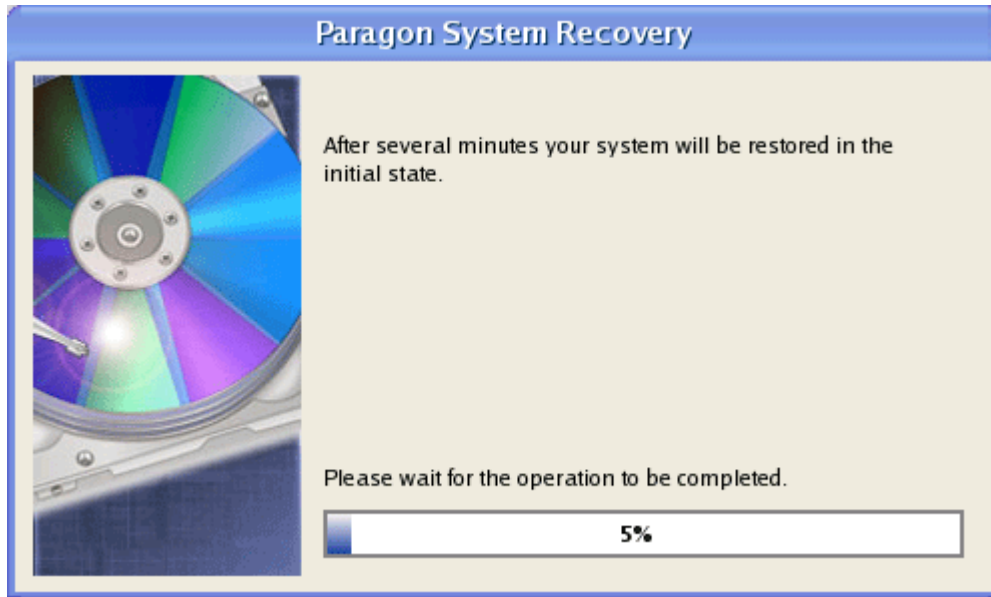
- Restoration by booting from Recovery CD/DVD (backup image is on Backup Capsule or Recovery CD/DVD).

After pressing the **Alt** button at PC boot or booting from Recovery CD/DVD, you will see the first Paragon System Recovery dialog with the following attention message:



Press **OK** to proceed.

After pressing **OK**, you will see the next dialog that will show the progress bar of the restore operation from Backup Capsule.



After finishing the restore operation, you will see the following dialog:

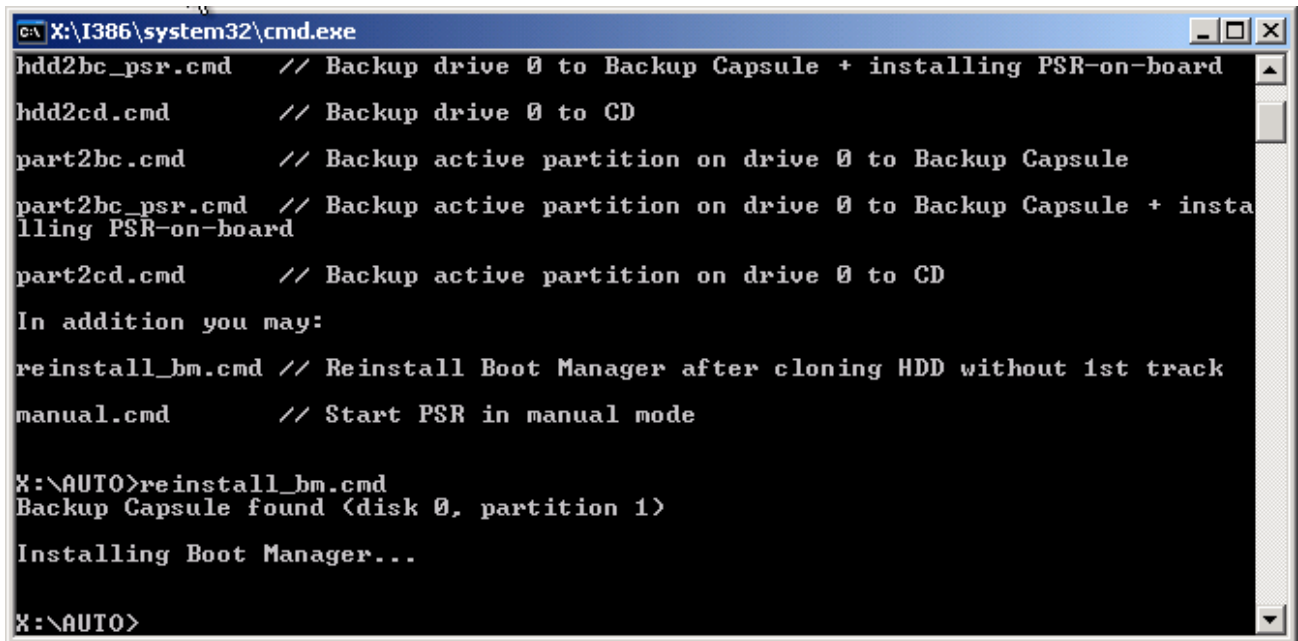


Press **OK** to reboot and finish the restore operation.

## HDD Cloning Issues for HDD-Based Solution with PSR-on-Board

After preparing a computer and backing up the system partition or entire disk to Backup Capsule, you can easily clone the computer's disk for other target computers.

However please note that there is the only one condition - the first track must be copied too because it contains Boot Manager (PSR-on-Board loader). In case, the software, that is used to clone the disk, does not copy the first track you should patch the disk, which was cloned, by using the following option in the batch mode: **reinstall\_bm.cmd**.



```
C:\X:\I386\system32\cmd.exe
hdd2bc_psr.cmd // Backup drive 0 to Backup Capsule + installing PSR-on-board
hdd2cd.cmd // Backup drive 0 to CD
part2bc.cmd // Backup active partition on drive 0 to Backup Capsule
part2bc_psr.cmd // Backup active partition on drive 0 to Backup Capsule + installing PSR-on-board
part2cd.cmd // Backup active partition on drive 0 to CD
In addition you may:
reinstall_bm.cmd // Reinstall Boot Manager after cloning HDD without 1st track
manual.cmd // Start PSR in manual mode

X:\AUTO>reinstall_bm.cmd
Backup Capsule found (disk 0, partition 1)
Installing Boot Manager...

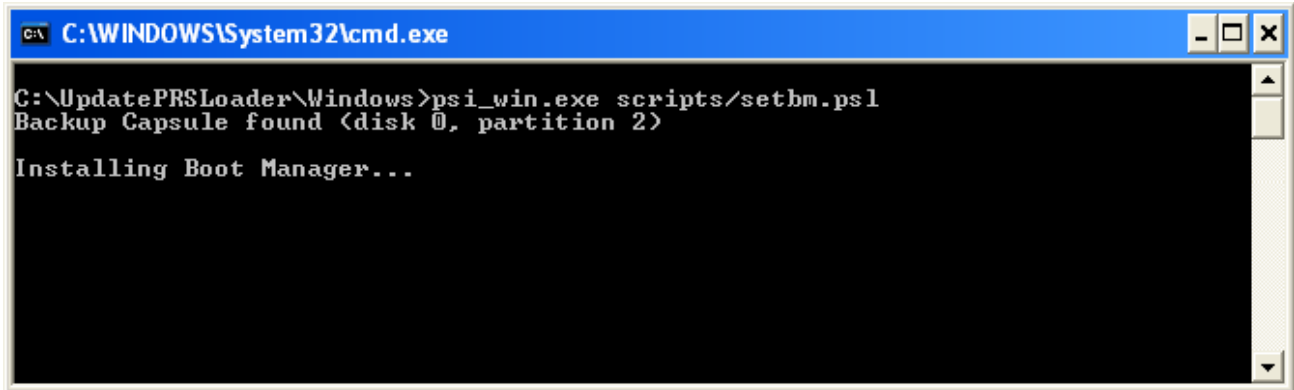
X:\AUTO>
```

**Note:** The **reinstall\_bm.cmd** script file scans all local disks and all their partitions for Backup Capsule. Only the first disk with Backup Capsule will be patched to recover Boot Manager to the first track.

Alternatively, you can also use Windows utility from the **UpdatePSRLoader** package. For example, to update the first track you should start the **do\_setbm.bat** file from the **Windows** folder in the **UpdatePSRLoader** package.

**Note:** The **UpdatePSRLoader** package contains three folders for different operating systems: Windows, Linux and DOS.

After running the **do\_setbm.bat** file you should see the following confirmation message:

A screenshot of a Windows command prompt window. The title bar reads 'C:\WINDOWS\System32\cmd.exe'. The command prompt shows the following text:

```
C:\UpdatePRSLoader\Windows>psi_win.exe scripts/setbm.psl
Backup Capsule found (disk 0, partition 2)
Installing Boot Manager...
```

**Note:** The **do\_setmb.bat** batch file starts Paragon Script Interpreter (**psi\_win.exe**) to execute the **setbm.psl** script file in the **scripts** folder. The **setbm.psl** script file scans all local disks and all their partitions for Backup Capsule. Only the first disk with Backup Capsule will be patched to recover Boot Manager to the first track.

## Summary and Conclusion

Since the process of system recovery takes place on the end user side, it should be as simple as possible. The end user prefers to understand what is going on with the system. If the system needs to be restored, the end user wants to know a direct way of actions. The WinPE PSR solution provides such directness.

In case of using Recovery Discs, the end user should just insert the disc into the bootable drive, boot from it and press the "Restore" button when asked. The system will be restored to the state when the Recovery Disk was created. By using such recovery disks, the end-user will restore the operating system just in several minutes, even without any particular knowledge in the computer field.

As to Backup Capsule, when the computer is booting, it is necessary to click on the **Alt** button and confirm the restore operation when asked. It follows that there is no need to store and look after Recovery Discs. They may be lost when the end user needs them desperately, whereas a hard-disk-based recovery solution is always on hand to run. The system will be restored to the state when the backup archive on Backup Capsule was created.

This solution allows OEMs to reduce time of their manufacturing process and increase end-user system reliability. Moreover, OEMs can always add their own pictures and logotypes to change the product according to their standards and wishes.