

Paragon Deployment Manager™

User Manual

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1 Introduction

Network facilities are becoming increasingly crucial in the present day IT environment. Traditionally communication used to be established between individual hosts, i.e. sender (or source) and receiver. However, such recent phenomena as IP video conferencing, streaming media, etc. gave rise to a real problem of efficient one-to-many communication means. Just imagine, how much network traffic would be needed to conduct an IP video conferencing among a dozen of participants. Actually the current Internet technology simply cannot keep up. That is where Multicast comes into scene. It is a specially developed technique providing data delivery from one location to many others without any unnecessary packet duplication, thus minimizing server load whereas maximizing the network performance. With that technique only one packet is sent from a source and is replicated as needed in the network to reach as many end users as necessary. Obvious benefits it offers may also be successfully applied to the problem of the system deployment technological chain.

Paragon Deployment Manager™ is a powerful multifunctional solution for system deployment, recovery and cloning. Besides possibility to make complete, reliable backups of the system and critical data, it enables, by employing state-of-the-art network technologies, to automatically deploy practically unlimited number of computers at a time as easy and quickly as never before.

Paragon Deployment Manager provides a user-friendly interface with highly customizable automation and an abundant set of post imaging configuration options, i.e. everything to make a job of a system administrator as easy and convenient as possible. Moreover, minimum efforts are required for integration with [Microsoft® Sysprep](#) for a complete out of the box experience.

With our solution you will dramatically reduce deployment time, resource requirements and costs. The key features of the program are listed in [the special chapter](#).

Setting up any operation is accomplished by using practical wizards. Each step of the wizard includes in-depth information in order to allow the user to make the right choice. Graphical representations of the data help the user to gain a better understanding.

In this manual you will find the answers to many of the technical questions which might arise while using the program.

2 Key Features

Let us list some of the key features:

- ❑ [User friendly interface](#). Easily understood icons accompany all functions of the program.
- ❑ [Comprehensive wizards](#) simplify even the most complex operations.
- ❑ Fast and powerful system imaging and hard disk partitioning with Paragon Hard Disk Manager™.
- ❑ Support of [deployment templates](#) to minimize the system deployment time and costs.
- ❑ Use of [Post-Config](#) options enables to easily customize the client disk layout and set up the required Windows settings (PC name, DNS, display, etc.).
- ❑ Ready-made [Post-Config templates](#) to accomplish the most frequently used operations after deployment.
- ❑ [PXE Server](#) support to remotely boot client computers.
- ❑ [Multicast Deployment](#) provides simultaneous deployment of one image to many computers.
- ❑ [Unicast Deployment](#) to launch the deployment procedure from the client's side, thus bypassing the central console management.
- ❑ [Automatic multisession cyclic deployment](#) for manufacturing purposes.
- ❑ [Simple Restore configuration](#) to deploy directly from the bootable media.
- ❑ The system of advanced log facilities (session logs, history logs, current activity logs, etc.) assists the user to monitor real-time every action of the program in order to get in-depth information on the deployment procedure.

3 Installation and Package Contents

This chapter provides information that is needed to perform the correct installation of the program, and in addition, checks if the current installation is working correctly.

There can be situations when it is required to deploy the client computer(s) but no network support is available at the moment. Especially for that purpose the Boot Media Builder™ already contains the *Simple Restore* configuration to deploy directly from the bootable media.

3.1 Package Contents

Deployment Server:

The installation package for the Deployment Server includes the following components:

- ❑ **Hard Disk Manager** to create/restore backup images or carry out partitioning operations, etc;
- ❑ [PXE Server](#) (includes [DHCP](#) and [TFTP](#) services for 10.0.0.x subnet) to remotely boot client computers;
- ❑ [Infrastructure Server](#) to initiate and control the deployment procedure;
- ❑ [Deployment Console™](#) to set up and manage remote computers;
- ❑ [Boot Media Builder](#) to prepare client bootable media.

Target Module:

The Target Module also contains several components. It does not require installation:

- ❑ [Multicast/Unicast Client](#) to make remote computers be recognized in the network as targets for deployment purposes;

- ❑ **Hard Disk Manager** to create/restore backup images or carry out partitioning operations, etc;
- ❑ **Simple Restore Wizard™** to easily get the system back on track again;
- ❑ **Log Saver** to tackle problems with handling the program by compressing logs to send to the Paragon Support Team.



With the help of the Boot Media Builder it is also possible to [create a custom item](#) to set for execution some Paragon script or any other program.

3.2 Minimum System Requirements

To use the program on a computer satisfactorily, ensure that it meets the following minimum system requirements:

Deployment Server:

- ❑ Operating systems: Windows 95/98/ME/2000/XP/2003 Server and XP/2003 64-bit
- ❑ Network Interface Card (NIC): 100 Mbps and higher
- ❑ Open ports in Firewall for TCP/UDP: from 2017 to N, where N depends on max number of sessions in progress, working simultaneously, [PXE support](#)
- ❑ Intel Pentium CPU or its equivalent, with 300 MHz processor clock speed
- ❑ 256 MB of RAM
- ❑ SVGA video adapter and monitor
- ❑ Mouse (recommended)

Target Module:

- ❑ Network Interface Card (NIC): 100 Mbps and higher
- ❑ [PXE-enabled](#) NIC (recommended)
- ❑ [Wake-up on LAN](#) support (recommended)
- ❑ Intel Pentium CPU or its equivalent, with 300 MHz processor clock speed
- ❑ 128 MB of RAM

3.3 Installation Procedure

Since the Target Module does not require installation, this operation can only be applied to the Deployment Server. The installation package contains several components, some of which are independent ([PXE Server](#), [Infrastructure Server](#), [Deployment Console](#)), i.e. they can be installed separately on different computers.



To optimize the network performance it is strongly recommended to install the *Infrastructure Server* on a *File Server* where master images are kept.

The installation process consists of the following steps:

1. Run Setup Application

From the folder, where the setup files are kept, run the *Deployment Manager.MSI* file. This application will guide the user through the process of the program installation. The setup utility is compiled with the **InstallShield SDK**, hence it contains the standard user interface and set of installation steps.



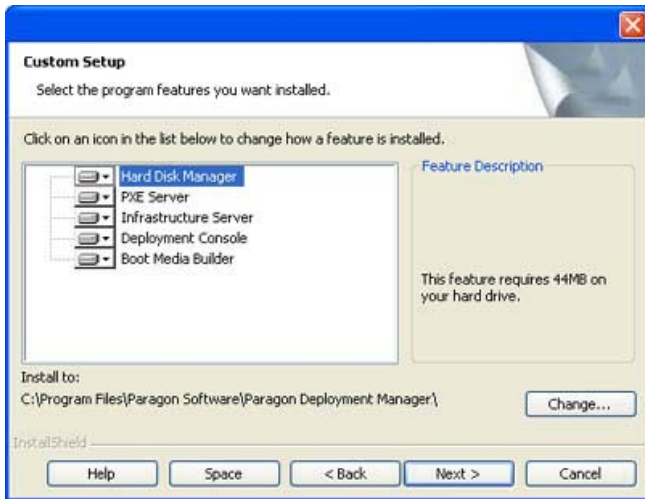
In case there is some previous version of the program installed on the computer, the program will offer the user to uninstall it first.

2. Starting Setup

The Welcome page informs that the application is being installed. Click the *Next* button to continue.

3. Select Components to Install and an Installation Folder

The next page enables the user to select what components are to be installed and also set an installation folder:



Click the popup menu for the required item (left click of the mouse button on the icon), then select whether to install the component or not. A brief description to the selected feature and approximate disk space needed to install it will be displayed on the right, thus precluding any mistake being made on the part of the user.



To know more on how to select particular components to install, please click the *Help* button.

Choose the folder where the program will be installed. By default, the installation folder will be created as:

C:\Program Files\Paragon Software\Paragon Deployment Manager. To select another folder, click the *Change...* button.



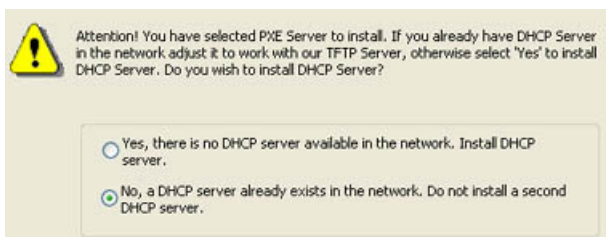
Click the *Space* button to get information on available space of all disks in the system.

Click the *Next* button to continue.

4. Set PXE Server (in case it's been selected to install)

According to the current LAN configuration there are different work algorithms to set up the PXE Server:

1. Click the *Yes* button if there is no DHCP server at all, thus the program will install and [configure](#) both [DHCP](#) and [TFTP](#) servers;
2. Click the *No* button if there is an active DHCP server, in that case the program will only install the TFTP server and then [configure the current DHCP server to work with it](#).



To make the *PXE Server* work properly the user should define DHCP parameters for the PXE Server:

Start IP address:	<input type="text" value="10.0.0.20"/>
Subnet mask:	<input type="text" value="255.0.0.0"/>
Amount of the IP addresses:	<input type="text" value="50"/>



It is not recommended to install the Paragon PXE Server when there is already an active DHCP server in the LAN.

5. Set path to the Archive Storage (in case the Infrastructure Server has been selected to install)

The Set Path to the Archive Storage page offers the user to define a default location of backup images:

Path to the Archive Storage:	<input type="text" value="C:\ImageStorage\"/>	<input type="button" value="Browse"/>
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To avoid any problems with mounting network shares the name should contain no more than 12 symbols.

6. Set Infrastructure Server (in case it's not been selected to install)

On this page the user should define a name or IP address of the computer with Infrastructure Server installed:

Deployment Infrastructure Server:	<input type="text" value="10.0.0.1"/>
-----------------------------------	---------------------------------------

Click the *Next* button to continue.

6. Verify Setup Settings

The Ready to Install the Program page informs the user that everything is ready to install the program. Press the *Back* button to return to any of the previous pages and modify the installation settings. Click the *Install* button to complete the installation process.

7. Copying Files

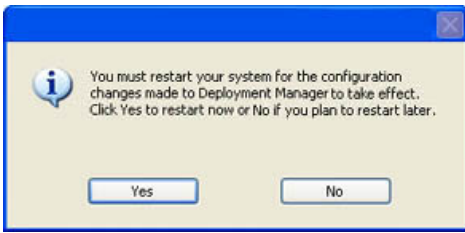
The Copying Files page shows the overall progress of the installation. Click the *Cancel* button to abort the setup.

8. Finishing the Installation

The Final page reports the end of the setup process. Click the *Finish* button to complete the wizard.



All components of the package except Hard Disk Manager are ready to launch immediately after completing the installation process. Hard Disk Manager uses a kernel mode *hotcore driver*, that is why the system reboot is required to complete its setup.



4 Basic Concepts

This chapter explains terms and ideas that show how the program works. To understand these helps to obtain a general notion of the operation performance and makes it easier for the user to operate the program.

4.1 Multicast versus Broadcast and Unicast in the Framework of System Deployment

In the course of time there have been developed three principal techniques as far as transmission of data on the network is concerned, i.e. Unicast, Broadcast and the cutting edge Multicast. Offering diverse work concept, all the three are used for accomplishing specific tasks. Let us just see how these transmission techniques can be applied to the system deployment issue.

In general system deployment involves simultaneous deployment of multiple computers for the manufacturing purposes. As for the network capacities this procedure is realized as transmission of some standardized backup images from the Server to multiple Target computers. Thus the most suitable data transmission technique is to offer the following relevant characteristics:

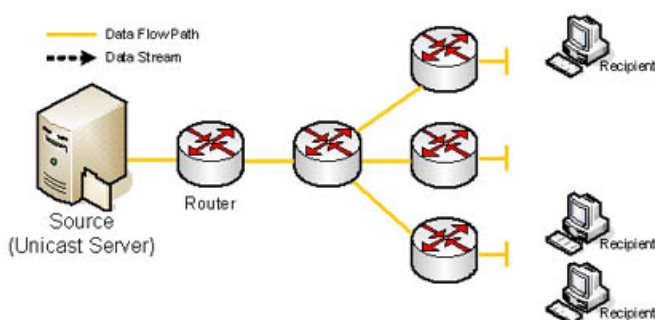
- ❑ Simultaneous transmission of one image to many computers without any redundant packet duplication
- ❑ The least possible Server work-load
- ❑ Open scalability

To get a better notion of the problem, let us just scrutinize the three transmission techniques a bit more closely.

4.1.1 Unicast

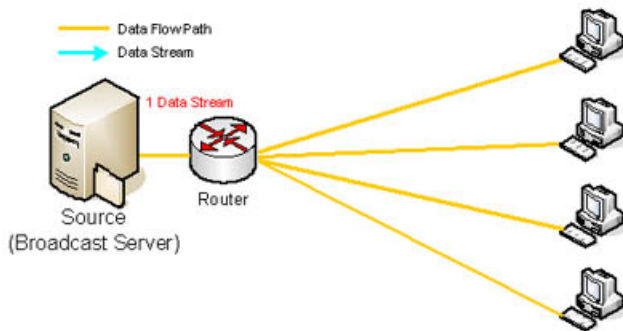
As the name infers, Unicast involves traffic going from one host to another. A copy of every packet goes to every host that requests it. Unicast is easy to implement as it uses well established IP protocols, however it becomes extremely inefficient when many to many communication is required. Since a copy of every packet must be sent to every host requesting access to the data this type of transmission is inefficient in terms of both network and server resources and presents fairly obvious scalability issues.

Nevertheless as far as the system deployment issue is concerned, in some particular cases the Unicast technique can offer pretty much flexibility, allowing the user for instance to start a deployment session immediately from the client side, thus bypassing the central console management.



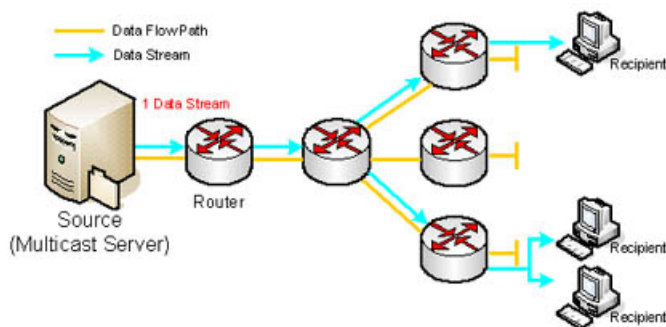
4.1.2 Broadcast

Broadcast seems to be a solution, but it's not certainly the solution. If you want all the hosts in your LAN be deployed, you may use broadcast. Broadcast provides the possibility for one host, typically a server, to send to all receivers on a subnet. Packets will be sent only once and every host will receive them as they are sent to the broadcast address. The problem arises when perhaps only particular hosts and not all are to receive those packets. Broadcast packets must be processed, regardless of whether or not some certain hosts are interested in the broadcast. Thus, all hosts on that subnet will see increased CPU usage, which is not efficient for hosts not participating in the broadcast.



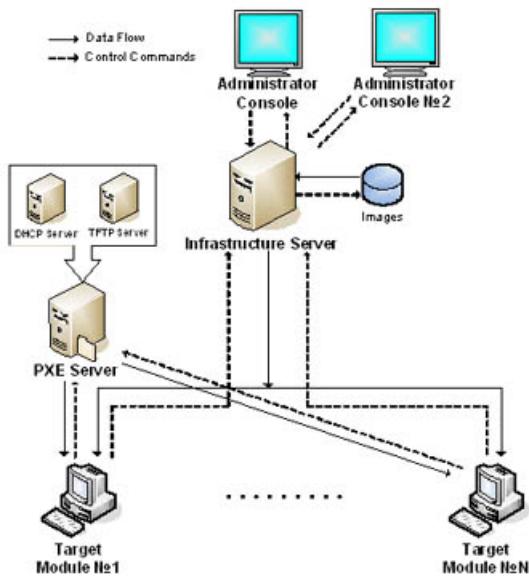
4.1.3 Multicast

Developed back in the 1980s, multicast is an efficient transmission scheme for supporting group communication in networks. The concept of a group is crucial to multicasting. Every multicast requires a multicast group; the sender (or source) transmits to the group address, and only members of the group can receive the multicast data. A group is defined by a Class D address in the address space **224.0.0.0-239.255.255.255**. Contrasted with unicast, where multiple point-to-point connections must be used to support communications among a group of users, multicast is more efficient because each data packet is replicated in the network - at the branching points leading to distinguished destinations, thus reducing the transmission load on the data sources and traffic load on the network links.



To sum up, it should be mentioned that the multicast technology is the most suitable for the system deployment, since, instead of sending thousands of copies of backup images, the server streams a single flow that is then directed by routers on the network to the target computers that have indicated that they want to receive the data. This eliminates the need to send redundant traffic over the network and also tends to eliminate CPU load on systems that are not using the multicast stream, yielding significant enhancements to efficiency for both server and network.

4.2 Paragon Multicast Architecture



Explanation:

- ❑ There can be several Administrator Consoles;
- ❑ The Administrator Console sends instructions (create/delete/start/stop/close... multicast session parameters, receive logs) to the Infrastructure Server and enables to manage and monitor the deployment procedure.
- ❑ The Infrastructure Server initiates and controls the deployment procedure;
- ❑ Master images (backup archives) can be placed separately (on a File Server) from the Infrastructure Server;
- ❑ PXE Server – a PC with [DHCP](#) and [TFTP servers](#); Images from PXE server are Linux based, prepared by Paragon; Target Module – object of the deployment procedure.



To optimize the network performance it is strongly recommended to install the *Infrastructure Server* on a *File Server* where master images are kept.

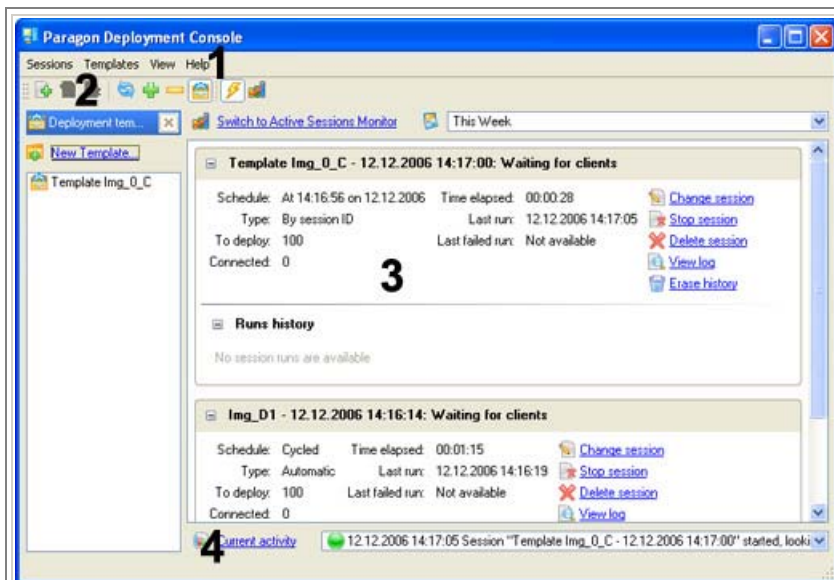
5 Deployment Console Functionality

This chapter introduces the console functionality to the user. The *Deployment Console*™ offers a user-friendly interface that helps to effectively accomplish required operations while minimizing the possibility of making any mistake. Most operations are performed through the system of wizards. Buttons and menus are accompanied by easy understandable icons. Nevertheless, any problems that might occur while managing the program can be tackled by reading this very chapter.

5.1 Interface Overview

When the user starts the console, the first component that is displayed is called the *Main Window*. It enables the user to run wizards, specify program settings and to visualize the operating environment.

The Main window can be conditionally subdivided into several sections that differ in their purpose and functionality:



1. [Main menu](#)
2. [Tool Bar](#)
3. [Operations Bar](#)
4. [Current Activity Bar](#)
5. [Status Bar](#)

Some of the panels have similar functionality with a synchronized layout. The program enables the user to conceal some of the panels to simplify the interface management.

5.1.1 Main Menu






The Main Menu provides access to the entire functionality of the program. The available functions are as listed below:





MENU ITEM	FUNCTIONALITY
Sessions	
New Session...	Starting the Create New Deployment Session Wizard that assists the user to create new sessions

Modify Session...	Starting the Edit Deployment Session Wizard that helps to modify parameters of existing sessions
Delete Sessions...	This option enables to delete sessions
Exit	Exit the program
Templates	
New Template...	Starting the Create New Deployment Template Wizard that assists the user to create new templates
Modify Template...	Starting the Edit Deployment Template Wizard that helps to modify parameters of existing templates
Delete Template...	This option enables to delete templates
View	
Refresh	Refresh the contents of the Operations Bar
Expand All	Show detailed information on sessions
Collapse All	Hide detailed information on sessions
Status Bar	Display the Status bar
Templates Pane	Display the Deployment templates pane
Active Session Monitor	Display the active session(s) monitor
All Sessions Runs	Display all available sessions
Settings...	Edit the general settings of the program
Help	
Contents	Open the program help
Manual	Open the general manual of the product
About	Open the dialog with information about the program

5.1.2 Tool Bar

The Toolbar provides fast access to the most frequently used operations:

BUTTON	FUNCTIONALITY
	Create a new session
	Modify a session
	Delete a session
	Refresh the contents of the Operations Bar
	Show detailed information on sessions

	Hide detailed information on sessions
	Show/hide the Templates pane
	Show/hide available sessions
	Show/hide the active session(s) monitor

5.1.3 Operations Bar

The Operations Bar is located in the center of the main window that emphasizes its importance. Depending on the defined settings, the Operations Bar may display the [Deployment Templates Pane](#) and/or the [Sessions Pane](#).

5.1.3.1 Deployment Templates Pane

The Deployment templates pane enables to manage deployment templates (get information on all available templates, create new templates, edit or delete existing ones).



To know more on how to manage deployment templates, please consult the [Managing templates](#) chapter.

5.1.3.2 Sessions Pane

The Sessions pane provides the possibility to monitor current state of the active session(s) as well as to get an in-depth statistics on all sessions ever run.

- ❑ To get access to the active sessions monitor the user should click the *Active Sessions Monitor* link at the left top corner of the pane.
- ❑ To view statistics on sessions the user should click the *Sessions Runs* link at the left top corner of the pane.

By clicking on the appropriate link the user enables to change, stop or delete the selected session, view log on the session activity as well as to erase the session history. Besides the program provides the session filter to easily group sessions according to the time of start.



To know more on how to manage sessions, please consult the [Managing Sessions](#) chapter.

5.1.4 Current Activity Bar

By clicking on the *Current Activity* link, in the opened window the user can see a well informative log of actions carried out by the program.

5.1.5 Status Bar

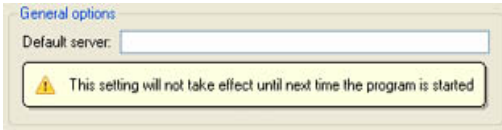
This is the bottom part of the main window. The status bar displays menu hints, for each item the cursor points to.

The user can hide (or show) the bar with the appropriate Main menu item: *View > Status bar*.

5.2 Settings

The Settings dialog is available from the Main menu: *View > Settings*. According to the modified parameters it can be conditionally divided into several sections.

5.2.1 General Options

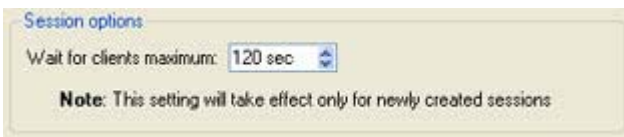


This section enables the user to set a name or IP address of the Infrastructure Server used by default. It can be of great use when the Infrastructure Server has been migrated to some other location as it saves from reinstalling the Deployment Console.



The option will take effect only after the program restart.

5.2.2 Session Options



Here the user can define how much time (in seconds) the program is to wait for clients to deploy.



The option will only be valid for newly created sessions.

5.3 Managing Templates

The Deployment Console provides the possibility to manage deployment templates (create new templates, edit or delete existing ones) without accomplishing the deployment procedure. All available templates are listed in the Deployment Templates pane.

5.3.1 Creating new templates

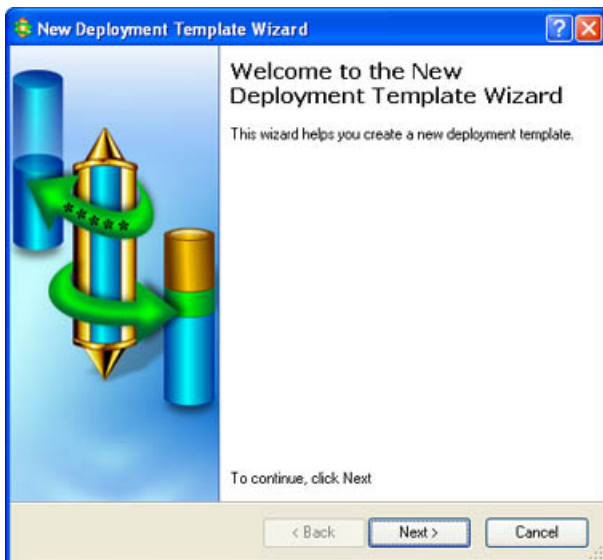
There are several ways to create a new template:

- ❑ In the Main menu: select *Templates > New Template...*
- ❑ In the *Deployment Templates* pane: click the *New Template...* link.
- ❑ Call the popup menu for the selected template (right click of the mouse button) in the *Deployment Templates* pane and then choose the menu item: *New Template...*



The last two choices are only available when the Deployment Templates pane is active (Main menu: *View > Templates Pane*)

After following one of the above mentioned actions, the Welcome page of the *New Deployment Template* wizard is displayed.



The wizard is so well designed that the user simply needs to follow its easy step-by-step instructions to carry out the operation. Here the user sets the parameters of the operation defining:

- ❑ **Image to deploy.** Select the previously created with *Paragon Hard Disk Manager* image to be deployed.



To know more about Paragon Hard Disk Manager functionality, please consult the program's help

- ❑ **Template name.** After selecting the required image to deploy, the wizard automatically offers an easy to understand name containing the archive name itself. It also leaves the possibility to do it manually.
- ❑ **Session type.** This section enables to switch between three options:
 - *Automatic mode*, when clients to deploy are automatically assigned after the session is launched;
 - *By session ID*, when clients to deploy are defined according to the Session ID of the bootable client media (it is needed to set the required Session ID);
 - *By MAC address*, when clients to deploy are defined according to the MAC address (it is needed to choose either the desired MAC addresses from available on the network at the moment, or load the previously created list).
- ❑ Depending on the choice, the next page of the wizard offers to set:
 - *Possibility to add targets on-the-fly*;
 - *The highest possible number of active targets*;
 - *A minimum of active targets*;
 - *Session time limit*.
- ❑ **Use of Post-Config options.** After the deployment procedure is accomplished, it is possible to send additional data to the clients. It can be a [sysprep file](#), some script, drivers, etc. Just press the *Browse* button to search for the required configuration file.

As a result of the operation the user receives a newly created template available in the *Deployment Templates* pane. Once a new deployment template is made the user can use it to skip all the steps of the deployment procedure.

5.3.2 Modifying existing templates

There are several ways to modify an existing template:

- ❑ In the Main menu: select *Templates > Modify Template...*
- ❑ Call the popup menu for the selected template (right click of the mouse button) in the *Deployment Templates* pane and then choose the menu item: *Modify Template...*



The last choice is only available when the Deployment Templates pane is active (Main menu: *View > Templates Pane*)

After following one of the above mentioned actions, the Welcome page of the Edit Deployment Template wizard is displayed. The work algorithm is practically the same as with the [New Deployment Template](#) wizard, except the user can see all the previously set parameters of the selected template to make the necessary modifications.

As a result of the operation the user receives a modified template available in the *Deployment Templates* pane.

5.3.3 Deleting templates

There are several ways to delete a template:

- ❑ In the Main menu: select *Templates > Delete Template...*
- ❑ Call the popup menu for the selected template (right click of the mouse button) in the *Deployment Templates* pane and then choose the menu item: *Delete Template...*



The last choice is only available when the Deployment Templates pane is active (Main menu: *View > Templates Pane*)

After following one of the above mentioned actions, the user is offered to confirm deletion of the selected template.

5.4 Managing Sessions

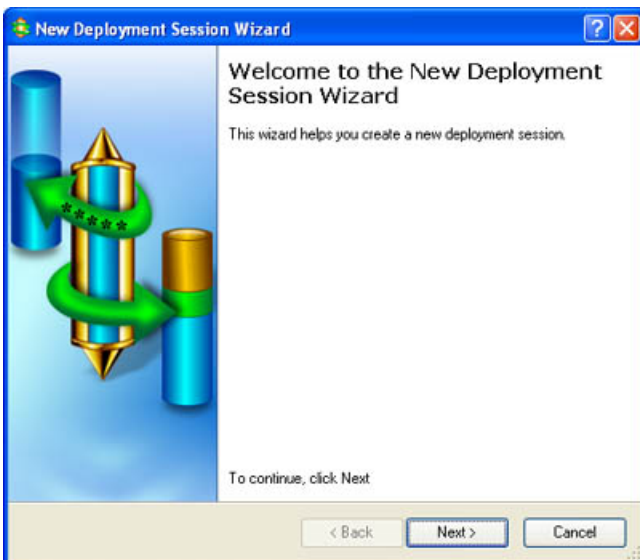
With the Deployment Console the user can easily manage sessions (create new sessions, modify or delete existing ones).

5.4.1 Creating new sessions

There are several ways to create a new session:

- ❑ In the Main menu: select *Sessions > New Session...*
- ❑ In the Toolbar: click the *New Session...* button.

After following one of the above mentioned actions, the Welcome page of the *New Deployment Session* wizard is displayed.



The wizard is so well designed that the user simply needs to follow its easy step-by-step instructions to carry out the operation. Here the user sets the parameters of the operation defining:

- ❑ **Use of a deployment template.** The user may use some [previously created deployment template](#) to launch a new session, thus the wizard will only offer to [enter a session name](#) and [schedule the operation](#). In case there are no available templates or the user is not willing to use any, the wizard will proceed through all the steps.
- ❑ **Image to deploy.** Select the previously created with *Paragon Hard Disk Manager* image to be deployed.



To know more about Paragon Hard Disk Manager functionality, please consult the program's help

- ❑ **Session name.** After selecting the required image to deploy, the wizard automatically offers an easy to understand name containing the archive name itself. It also leaves the possibility to do it manually.
- ❑ **Session type.** This section enables to switch between three options:
 - *Automatic mode*, when clients to deploy are automatically assigned after the session is launched;
 - *By session ID*, when clients to deploy are defined according to the Session ID of the bootable client media (it is needed to set the required Session ID);
 - *By MAC address*, when clients to deploy are defined according to the MAC address (it is needed to choose either the desired MAC addresses from available on the network at the moment, or load the previously created list).
- ❑ Depending on the choice, the next page of the wizard offers to set:
 - *Possibility to add targets on-the-fly*;
 - *The highest possible number of active targets*;
 - *A minimum of active targets*;
 - *Session time limit*.
- ❑ **Use of [Post-Config](#) options.** After the deployment procedure is accomplished, it is possible to send additional data to the clients. It can be a [sysprep file](#), some script, drivers, etc. Just press the *Browse* button to search for the required configuration file.
- ❑ **Schedule the operation.** The program allows the user to automate deployment operations. The utility for this purpose is referred to as the embedded Scheduler, which is used to specify the time for the execution. There are several available options. Depending on the choice, the scheduler will display a form that allows the user to set the schedule:

- **Cyclic.** Mark the option to carry out a cyclic deployment procedure, thus one and the same session will automatically be repeated until it is stopped by the user.



The option is not available for a session where clients to deploy are defined by MAC addresses.

- **Once.** Mark the option to define the date and time when the session is to be launched.
- **Daily.** Mark the option to define the time when the session is to be launched, a period during which the operation will be performed (in days), the date when the operation will be started first and the date after which the task will be deleted from the scheduler's waiting list.
- **Weekly.** Mark the option to define the time when the session is to be launched, a period during which the operation will be performed (in weeks), days of the week, when the operation will be started, the date when the operation will be started for the first time and the date when the operation will cease to run.
- **Monthly.** Mark the option to define the time when the session is to be launched, a day of a month when the operation starts, the date when the operation will be started for the first time and the date when the operation will cease to run.

As a result of the operation the user receives a new session that will be run according to the specified parameters.



All steps of the New Deployment Session wizard can be saved in form of a [template](#) for further use.

5.4.2 Modifying sessions

There are several ways to modify a session:

- In the Main menu: select *Sessions > Modify Session...*
- In the Toolbar: click the *Modify Session...* button.
- Click the *Change session* link in the *Sessions* pane.



The last choice is only available when the Sessions Runs pane is active (Main menu: *View > Sessions Runs*)

After following one of the above mentioned actions, the Welcome page of the *Edit Deployment Session* wizard is displayed. The work algorithm is practically the same as with the [New Deployment Session](#) wizard, except the user can see all the previously set parameters of the selected session to make the necessary modifications.

As a result of the operation the user receives a modified session.

5.4.3 Deleting sessions

There are several ways to delete a session:

- In the Main menu: select *Sessions > Delete Session...*
- In the Toolbar: click the *Delete Session...* button.
- Click the *Delete session* link in the *Sessions* pane.

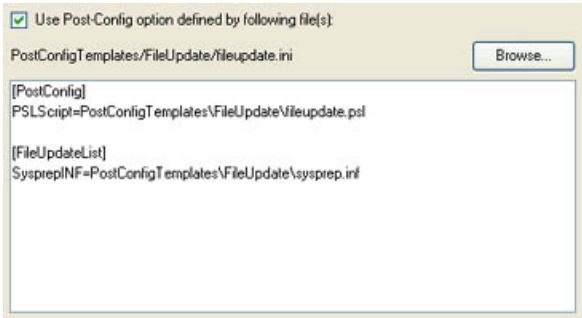


The last choice is only available when the Sessions Runs pane is active (Main menu: *View > Sessions Runs*)

After following one of the above mentioned actions, the user is offered to confirm deletion of the selected session.

5.5 Post-Config Usage

After the deployment procedure is accomplished, the program enables to easily customize the client disk layout and set up the required Windows settings (PC name, DNS, display, etc.). Especially for that purpose so called *Post-Config* options have been introduced:



To make good use of them the user should bare in mind the following issues:

- ❑ Options can only be defined through one configuration **.ini** file of a certain format;

```
[PostConfig] // to define a .psl script for the Post-Config
PSLScript=PostConfigTemplates\FileUpdate\fileupdate.psl

[FileUpdateList] // to define files to update
SysprepINF=PostConfigTemplates\FileUpdate\sysprep.inf
```

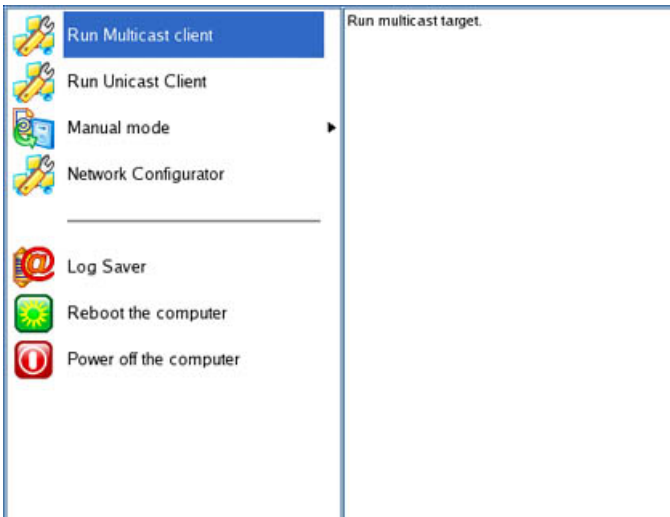
- ❑ Options cover a limited range of functionality:
 - Set a Paragon script for execution after deployment;
 - Update files on the client computer after deployment;
 - Modification of **.ini** files on the client computer after deployment.

The Paragon Deployment package comes with a set of ready-made Post-Config templates that can be found in the [Archive Storage](#) directory.

6 Target Related Functionality

This chapter introduces the target module functionality to the user. As it was already mentioned in the previous chapters, the main purpose of the *Target Module* is to get client computers ready for deployment. It can be initiated either with the help of the [bootable media](#) or the [PXE facilities](#). Actually it is a Linux SuSe based program, which offers a Windows XP like environment.

After the client computer has been booted the user can see a convenient startup menu with the list of available operations on the left and a short description of the selected item on the right:



- ❑ **Run Multicast Client** to launch the multicast deployment procedure;
- ❑ **Run Unicast Client** to launch the unicast deployment procedure;
- ❑ **Network Configurator™** to work with shared resources of the LAN (e.g. copy files or backup images to recover a corrupted system);
- ❑ **Hard Disk Manager** to create/restore backup images or carry out partitioning operations, etc. (to know more about the program please consult documentation that comes with it);
- ❑ **Simple Restore Wizard** to easily get the system back on track again;
- ❑ **Log Saver** to tackle problems with handling the program by compressing logs to send to the Paragon Support Team.

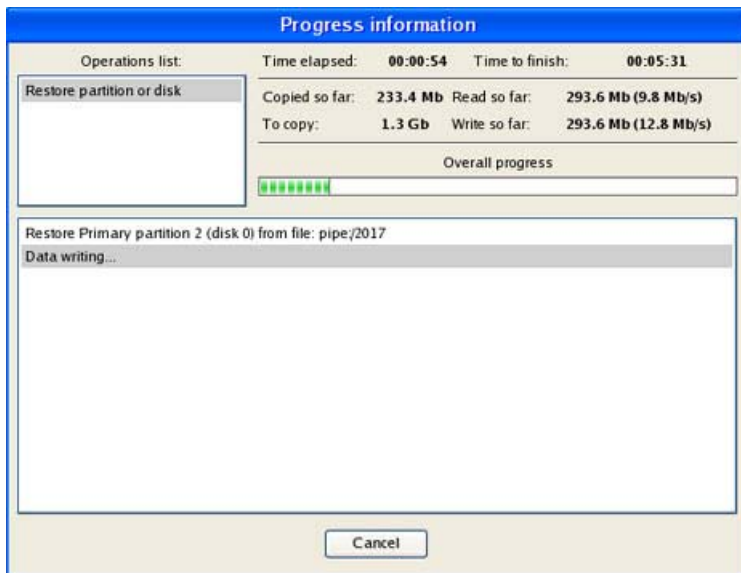


Unlike the *PXE* facilities, the startup menu contents of the bootable media [can be customized](#).

By default the client computer will be automatically initiated after a 10 second idle period.

Depending on the launched client (multicast or unicast) the subsequent work algorithm of the target module may differ:

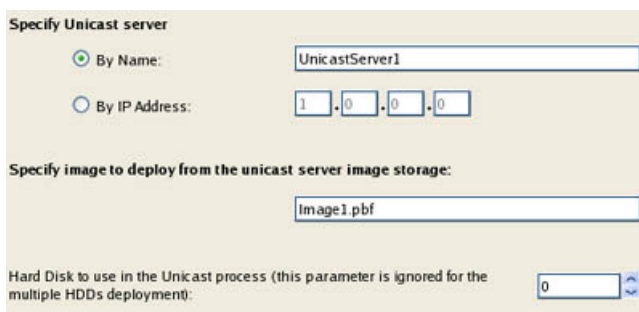
- ❑ **Multicast Client.** After launching it the user can see a well informative statistics window where it is possible to monitor real-time all operations executed at the moment.



- **Unicast Client.** After launching it, the Welcome page of the *Unicast* wizard is displayed.



By following its easy step-by-step instructions the user sets the parameters of the operation defining:



- **Unicast server.** The user should set a name or IP address of the required Infrastructure Server.
- **Image to deploy.** Set the path to the previously created with *Paragon Hard Disk Manager* image to be deployed.



To know more about Paragon Hard Disk Manager functionality, please consult the program's help

- **Hard disk to use** to choose where to deploy a backup image of a separate partition/single hard disk.



This parameter will not be taken into account if a backup image contains two or more hard disks.

Click the *Finish* button to initiate the deployment procedure and launch the [statistics window](#) where it is possible to monitor real-time all operations executed at the moment.



Unlike the PXE facilities, the *Boot Media Builder* enables to set the mentioned above parameters at the [point of creating bootable media](#) thus saving from the need of doing it every time the unicast client is launched.

6.1 Boot Media Builder

The *Boot Media Builder* is a component of the Paragon Deployment package that provides the possibility to build bootable media (CD, DVD) to get a client computer ready for the deployment procedure.

Starting

To start the *Boot Media Builder* the user needs to launch it from the application's program group of the Start Menu. By default, it will be:

Start > Programs > Paragon Deployment Manager > Boot Media Builder

Then the Welcome page of the wizard is displayed.



Settings

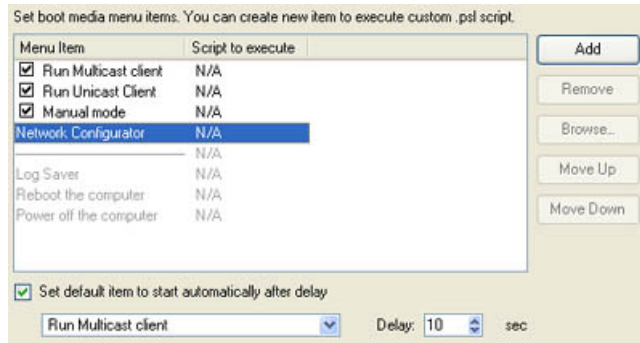
The Boot Media Builder allows the user to configure the settings and start the operation in accordance with the entered parameters. In our case we set the parameters of the future bootable media by defining:

- ❑ **Boot Media Configuration.** The wizard enables to create a new boot media configuration, besides it is possible to modify an existing configuration (the user can see all the previously set parameters to make the necessary modifications) or use some custom CD/DVD image.



The Boot Media Builder already contains the *Simple Restore* configuration that makes it possible to add some particular backup image to the bootable media thus deploy computers directly from it.

- ❑ **Boot Media Menu Customization.** The program allows the user to define the menu contents and some more additional parameters that will be taken into account during the boot media startup:



By marking/unmarking a checkbox opposite the required item of the menu the user can choose whether that particular component will be available or not.

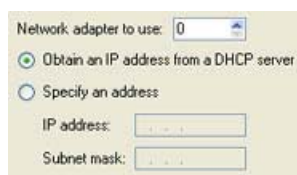


Shadowed items of the menu are not allowed to customize.

Besides it is possible to create new item(s) just by pressing the *Add* button in the right corner of the dialog. This feature can be of great use since it enables to set for execution some Paragon script or any other program. The moment a new item has been created the user can set it [active/inactive](#), define its position in the menu or remove it by pressing the appropriate buttons.

Moreover the user can choose what component of the menu will be automatically selected on the expiry of a certain time limit.

- ❑ **Linux Network Properties.** The user can choose the way how to connect to the network:
 - **Automatically after booting.** This option is particularly beneficial for manufacturing purposes, since it allows automating the deployment procedure. To make it work the user is to set the following additional parameters:



Network adapter to use to select an order number of the required network adapter.

IP address settings to choose whether to get an *IP address* automatically from the [DHCP Server](#) or set it manually, thus bypassing the *DHCP Server capabilities*.

- **Manually after booting.** This option allows the user to manually connect to the network after the client computer has been started up.

- **No network support** thus disabling Multicast/Unicast client. In this case there will be no deployment procedure available.

- ❑ **Network Mount Options.** The program provides the possibility to mount a backup image after booting. The user can choose whether to automatically mount some certain image (enables to set authentication parameters) or do it manually after the client computer has been started up.
- ❑ **Multicast Client Options.** For carrying out a multicast deployment procedure the user is to define a set of additional parameters:

- **Session ID** to assign certain clients to the required Multicast session by using the [Session ID identifier](#).
- **Hard disk to use** to choose where to deploy a backup image of a separate partition/single hard disk.



This parameter will not be taken into account if a backup image contains two or more hard disks.

- **Clear hard disk** before the deployment procedure to make sure there is no data on it, thus avoiding any possible troubles.
 - **Hide partitions** after the deployment procedure.
 - **Check file system integrity** after the deployment procedure to detect possible file system errors.
 - **Paragon script to execute** before the deployment procedure to automatically accomplish, for instance, some partitioning tasks, etc. on the client computer.
- **Unicast Client Options.** For carrying out a unicast deployment procedure the user is to define a set of additional parameters:

- **Unicast server.** The user should set a name or IP address of the required Infrastructure Server.



In case the *Unicast server* has not been set in this section, the program will automatically offer to do it after the *Unicast client* is launched.

- **Image to deploy.** Set the path to the previously created with *Paragon Hard Disk Manager* image to be deployed.



In case the image has not been chosen in this section, the program will automatically offer to do it after the *Unicast client* is launched.

To know more about Paragon Hard Disk Manager functionality, please consult the program's help

- **Hard disk to use** to choose where to deploy a backup image of a separate partition/single hard disk.



This parameter will not be taken into account if a backup image contains two or more hard disks.

- ❑ **CD/DVD Label and Extra Files.** The user can set a label and also add/delete some additional files to the root of the bootable media just by pressing appropriate buttons. The resulted list of files can be saved for further use.
- ❑ **Save Boot Media Configuration.** The wizard enables to save the current boot media configuration by offering an easy to understand file name, thus avoiding any redundant costs. It also leaves the possibility to do it manually.
- ❑ **Target Drive.** The user can choose whether to burn the resulted bootable media right now or just save it in form of an [ISO file](#).
- ❑ **CD/DVD writing parameters** (in case the user selects this kind of media). Writing parameters include writing speed (maximum or minimum) and the ability of ejecting the recorded disc after completing the operation.

The program supports CD-R, CD-RW, DVD-R, DVD+R, DVD-RW, DVD+RW and also DVD-R, DVD+R double layer discs. If the inserted disc is not empty, the Wizard suggests the user erasing its contents. When the user confirms the operation, the program deletes the re-writable disc's contents and begins the recording process.

Results

The Boot Media Wizard starts the operation after completing the settings mentioned above. As a result, the user receives the required bootable media.

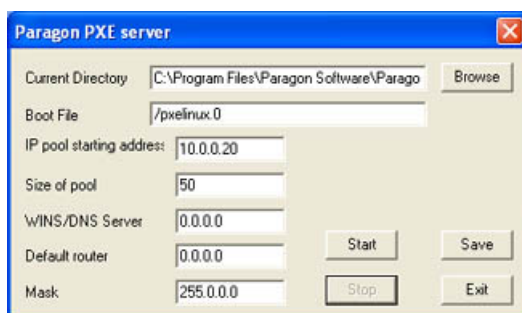


If the Boot Media Builder is not selected during the installation procedure, it will not be available. In this case launch the [setup](#) once again and choose the necessary component.

6.2 Paragon PXE Server

The *Paragon PXE Server* is a component of the Paragon Deployment package that enables to remotely boot a computer with no operating system installed automatically without the user being involved. This procedure implies that a networked client PC is able to enter a network, acquire a network address from the [DHCP server](#) and subsequently download from the [TFTP server](#) a NBP (Network Bootstrap Program) to set itself up, thus saving from the need of bootable media.

Paragon PXE Server works as a service in the system. To make the process of its configuration and management easy and understandable it offers a convenient dialog, where the user can define the following settings:



- ❑ Path to the directory where the PXE Server is located (press the *Browse* button to find the required folder or enter the path manually);
- ❑ TFTP image used to remotely boot the client computers;
- ❑ Start IP address;
- ❑ Number of available IP addresses;
- ❑ WINS/DNS Server;

- ❑ Default router;
- ❑ Subnet Mask;



Client computers must have [PXE support](#) in order to use the PXE Server.

To know more about PXE Server, please consult the [Glossary](#).

6.2.1 Configuring DHCP Server for Deployment Purposes by the Example of Microsoft Windows Server 2003

To set up the [DHCP Server](#) for the deployment purposes, please do the following:

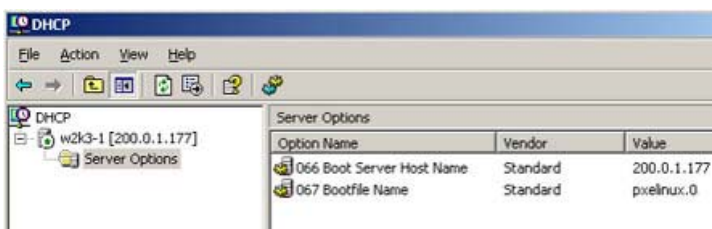
1. Run the DHCP management console.

There are several ways to do that:

- ❑ **Select Start > Run...**, then execute the "DHCPMGMT.MSC /S" command;
- ❑ **Start > Settings > Control Panel > Administrative tools > DHCP.**

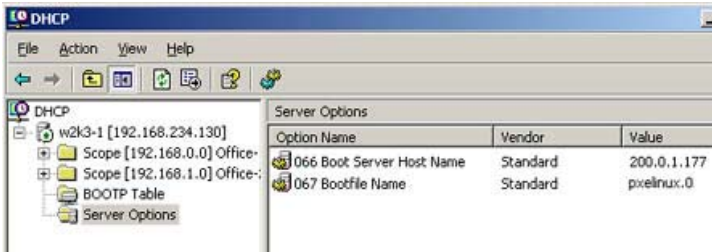


The DHCP management console will be launched:



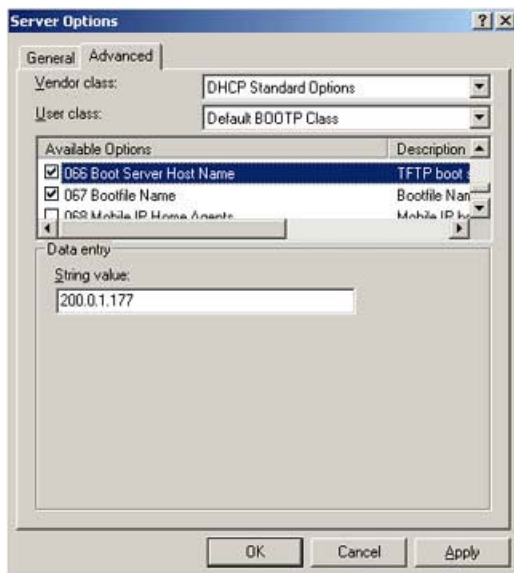
2. Set up your DHCP server correctly.

Windows Server 2003 provides a bunch of services and settings for the DHCP service. You are to set up the global settings of the DHCP server:



There are two DHCP options that need customization that is **Option 066 - Boot Server Host Name** and **Option 067 - Bootfile Name**.

- ❑ Select the **Server Options** item in the DHCP management console and click the **Server Options** item;
- ❑ In the **Server Options** dialog, click the **Advanced** tab;
- ❑ Select the **DHCP Standard Options** vendor class;
- ❑ Select the **Default BOOTP Class** user class;
- ❑ Find the **Option 066** named **Boot Server Host Name**:



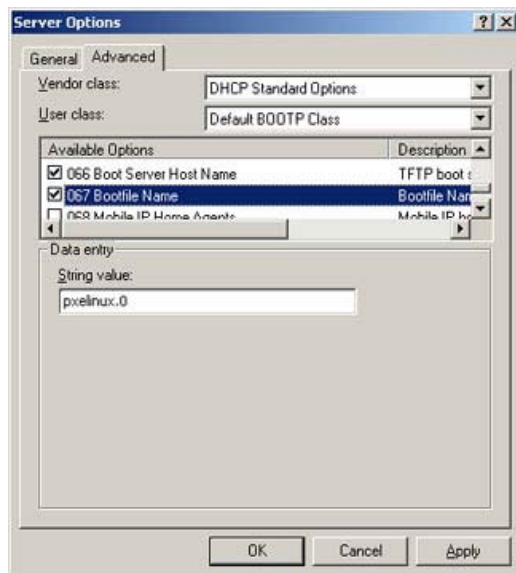
- Mark the **Option 066**;
- Enter an *IP address* or a network name of a [TFTP server](#) that is used for dispatching PXE bootable images.



In case the TFTP server and the DHCP server run on the same computer, enter the computer network name or its IP address as it seen from the other computer of your LAN.

Do not use the *Localhost* alias or its *IP equivalent 127.0.0.1*.

- ❑ Find the **Option 067** named **Bootfile Name**:



- Mark the **Option 067**;
- Specify a relative path to a bootable image and its file name to boot remote computers from.



The specified path should exist and be configured on the TFTP server.

7 Infrastructure Server Functionality

The *Paragon Infrastructure Server* is a component of the Paragon Deployment package that provides all the facilities needed to initiate and control the deployment procedure. It works as a service in the system and is partially set up during the [installation procedure](#).

However a thorough setup is to be carried out through its configuration file. By default, the user can find it here:

C:\Documents and Settings\All Users\Application Data\mcsrv\config\coord.cfg

```
[ServerSettings]
PACKINTERVAL=2
PACKTIME=1:00:00
IMAGEBOOT=C:\ImageStorage\
```

- ❑ **PACKINTERVAL.** During the work of the program it keeps gathering data on the carried out deployment operations and places it in a special database. As time goes by the database starts containing plenty of outdated information, thus considerably increasing in size. To avoid it, the user can choose how often it should be compressed by entering the required period of time in days;



In case the interval is not set, the database will be compressed daily.

- ❑ **PACKTIME** to set the exact time (in the HH:MM:SS format) of the database compression;



In case the time is not set or some impossible value is used, the database will not be compressed at all.

- ❑ **IMAGEBOOT** to define a [default location of backup images](#);
- ❑ **LOGPATH** to set where to place logs of the Infrastructure Server.



In case it is not set, the program will use the Infrastructure Server directory.

8 Typical Scenarios of the System Deployment

This chapter lists various scenarios of the system deployment that may be accomplished with Paragon Deployment Manager. The user can find here useful recommendations and descriptions of operations.

8.1 Automatic Cyclic Deployment by using the PXE Environment

This scenario is an ideal solution when you have to deal with the problem of deploying a bunch of identical computers on a regular basis in the automatic mode. The program provides the possibility to start up clients by using the PXE facilities and then deploy them automatically.

To launch the operation the user should take the following steps:

1. Set up a Windows based *Master computer* by using the [Microsoft Sysprep](#) utility;
2. Create a Master image with Paragon Hard Disk Manager;



To know more about Paragon Hard Disk Manager functionality, please consult the program's help

3. Install the Deployment Console and the Paragon PXE Server;
4. Launch the [New Deployment Session](#) wizard of the Deployment console and set it up to [deploy automatically](#). The user should define:
 - The [session name](#);
 - The [image file](#) to deploy;
 - [Number of clients](#) to deploy;
 - [Allowable number of clients](#) to successfully deploy in order to finish the session (set value or percentage);
 - The [time limit](#) by exceeding which the lagging behind clients may be excluded from the session;
 - [Post-Config](#) options (the [sysprep.inf](#) file may be updated without rebuilding the master image);
 - [Cyclic type](#) in the scheduler providing one and the same session to be automatically repeated after connecting new clients. Thus there is no need to launch the session manually each time new clients are connected;
5. Connect computers and launch them from the Network;
6. The deployment procedure will be automatically launched.

8.2 Automatic Cyclic Deployment by using Bootable Media without Session ID Key

There can be situations when the PXE facilities are not that preferable to deploy PCs or available network cards have no support of booting from the LAN. In this case the user can employ this very scenario. It is practically the same as the [previous one](#). The only difference is that for launching the client module is used bootable media instead of the PXE environment. The Session ID is not taken into account here since computers are identical and there is no need to identify various deployment sessions, otherwise please consult the [Automatic Cyclic Deployment by using Bootable Media with Session ID Key](#) chapter for more information.

8.3 Automatic Multisession Cyclic Deployment by using Bootable Media with Session ID Key

To deploy several computers of different hardware at the same time it is required to use different Master images hence different sessions. Each session provides its own ID and certain target computers are booted from the bootable media containing particular ID. Thus clients are assigned automatically after checking the Session ID.

To launch the operation the user should take the following steps:

1. Set up Windows based *Master computers* for each particular computer(s) by using the [Microsoft Sysprep](#) utility;
2. Create Master images with Paragon Hard Disk Manager;



To know more about Paragon Hard Disk Manager functionality, please consult the program's help

3. Install the Deployment Console;
4. Prepare bootable media with different Session ID for each particular computer(s);
5. [Create templates of the deployment sessions](#) for each particular computer(s). The user should define:
 - The [session name](#);
 - The [Session ID](#);
 - The [image file](#) to deploy;
 - [Number of clients](#) to deploy;
 - [Allowable number of clients](#) to successfully deploy in order to finish the session (set value or percentage);
 - The [time limit](#) by exceeding which the lagging behind clients may be excluded from the session;
 - [Post-Config](#) options (the [sysprep.inf](#) file may be updated without rebuilding the master image);
 - [Cyclic type](#) in the scheduler providing one and the same session is automatically repeated after connecting new clients. Thus there is no need to launch the session manually each time new clients are connected;
6. Boot computers from the [required bootable media](#) to automatically launch the deployment procedure.

8.4 Deployment by using MAC Address as an Identifier for a Particular Session. PCs are Booted either from Network or Bootable Media

It is a common practice for big companies when system administrators have to deal with restoring particular computers on a regular basis. In this case the deployment procedure can be launched manually or scheduled. If a list of the required MAC addresses is available, it is possible to use just one PXE Server for computers of different hardware in that way saving from creation of different bootable media for each particular computer. To boot from the LAN the [Wake-up on LAN](#) feature can be used.

To launch the operation the user should take the following steps:

1. Set up Windows based *Master computers* for each particular computer(s) by using the [Microsoft Sysprep](#) utility;
2. Create Master images with Paragon Hard Disk Manager;



To know more about Paragon Hard Disk Manager functionality, please consult the program's help

3. Install the Deployment Console;
4. Prepare bootable media with different Session ID for each particular computer(s) or install the Paragon PXE server;
5. [Create templates of the deployment sessions](#) for each particular computer(s). The user should define:
 - The [session name](#);
 - [Computers to deploy](#). Either import of a list of MAC addresses or manual selection from the active targets is required;
 - The [image file](#) to deploy;
 - [Number of clients](#) to deploy;
 - [Allowable number of clients](#) to successfully deploy in order to finish the session (set value or percentage);
 - The [time limit](#) by exceeding which the lagging behind clients may be excluded from the session;
 - [Post-Config](#) options (the [sysprep.inf](#) file may be updated without rebuilding the master image);
6. Boot computers from the LAN or the [required bootable media](#). PCs can be automatically rebooted from the Windows in case additional Windows agents are installed. [Wake-up on LAN](#) feature can also be used.
7. Schedule the operation or launch it manually.

8.5 Classical Unicast Deployment without Central Control when Client (Started from the Bootable Media or through the PXE Environment) is to Initiate the Deployment Procedure

To get maximum flexibility the program provides the possibility to initiate deployment sessions from the client's side, thus bypassing the central console management. At first sight this particular scenario might look like a simple restore procedure from the network-shared folder. But that is not exactly so. In this case the client does not access images directly but with the help of the Infrastructure Server facilities.

To launch the operation the user should take the following steps:

1. Install the Infrastructure Server and configure it properly (during the [installation procedure](#) or by using its [configuration file](#)) to use a specific directory as an Archive Storage;
2. Create a Master image with Paragon Hard Disk Manager and place it into the Archive Storage;



To know more about Paragon Hard Disk Manager functionality, please consult the program's help

3. Launch the client computer by using the [Paragon PXE Server](#) or create a bootable CD/DVD with the [Boot Media Builder](#) to do it;
4. Start the [Unicast client](#);
5. Define the required [Infrastructure Server](#) and [image](#) to deploy;



Unlike the *PXE* facilities, the *Boot Media Builder* enables to set the mentioned above parameters at the [point of creating bootable media](#) thus saving from the need of doing it every time the unicast client is launched.

6. Click the *Finish* button to initiate the deployment procedure and launch the statistics window where it is possible to monitor real-time all operations executed at the moment.

8.6 Direct Deployment by using Bootable Media with no Network Support

There can be situations when it is required to deploy the client computer(s) but no network support is available at the moment. Just to tackle problems of that kind the [Boot Media Builder](#) contains the *Simple Restore* configuration to deploy directly from the bootable media.

To launch the operation the user should take the following steps:

1. Install the Boot Media Builder;
2. Create a Master image with Paragon Hard Disk Manager;



To know more about Paragon Hard Disk Manager functionality, please consult the program's help

3. Launch the Boot Media Builder and select “**Load an existing boot media configuration**”;
4. Press the Browse button and find the **SimpleRestoreConfiguration** folder (by default **C:\Program Files\Paragon Software\Paragon Deployment Manager\Boot Media Builder\SimpleRestoreConfiguration**);
5. On the Additional Files page of the wizard select the previously made Master image to add to the bootable media;
6. Burn the resulted bootable media to CD/DVD;
7. Boot the client computer from the bootable media to deploy.

9 Glossary

9.1 Unicast

Unicast is the term used to describe communication where a piece of information is sent from one point to another point. In this case there is just one sender, and one receiver.

Unicast transmission, in which a packet is sent from a single source to a specified destination, is still the predominant form of transmission on LANs and within the Internet. All LANs (e.g. Ethernet) and IP networks support the unicast transfer mode, and most users are familiar with the standard unicast applications (e.g. http, smtp, ftp and telnet), which employ the TCP transport protocol.

9.2 Multicast

Multicast is the delivery of information to a group of destinations simultaneously using the most efficient strategy to deliver the messages over each link of the network only once and only create copies when the links to the destinations split.

The word "Multicast" is typically used to refer to IP Multicast, the implementation of the multicast concept on the IP routing level, where routers create optimal spanning tree distribution paths for datagrams sent to a multicast destination address in realtime. But there are also other implementations of the multicast distribution strategy such as system deployment, etc.

9.3 Broadcast

In computer networking, broadcasting refers to transmitting a packet that will be received (conceptionally) by every device on the network. In practice, the scope of the broadcast is limited to a broadcast domain.

Broadcast transmission is supported on most LANs (e.g. Ethernet), and may be used to send the same message to all computers on the LAN (e.g. the address resolution protocol (arp) uses this to send an address resolution query to all computers on a LAN). Network layer protocols (such as IP) also support a form of broadcast which allows the same packet to be sent to every system in a logical network.

9.4 PXE (Preboot Execution Environment)

The advent of the Preboot Execution Environment (PXE) has provided Altiris with the mechanism to rationalise the cost of installing a new operating system down to an acceptable level. It has enabled the use of Rapid Deploy (a component part of the Altiris eXpress Server which is used to remotely deploy images) over the network by allowing a computer, which has no working operating system to remotely boot from the network without any manual intervention at the machine by an engineer or user.

In short, by employing the abilities referred to above, a client PC should be able to enter a network, acquire a network address from the [DHCP server](#) and subsequently download a NBP (Network Bootstrap Program) to set itself up.

9.5 UDP compared to TCP

TCP cannot be used effectively for multicasting since the TCP protocol is designed for reliable communications between two end points, not between a group of client computers and a server. There are no

multicasting protocols that use TCP. UDP is fast and enables to stream the data: That is, it is not required to wait for an acknowledgment before sending the next packet.

9.6 Sysprep (System Preparation)

The *Microsoft Sysprep* is a handy tool specially designed for system administrators, OEM (Original Equipment Manufacturers) System Builders, etc. to automatically deploy Windows based operating systems on multiple computers. With Sysprep the user can easily remove all the unique information from a Master PC (used as a sample computer) in order to make it ready to deploy its image to many other computers of different hardware configuration. Besides it enables to automatically set up additional configuration options (workgroup, domain, organization name, PC name, default display size, etc.).

All the Sysprep configuration information is kept in one simple **.inf file**.



To know more about Microsoft Sysprep functionality, please consult documentation that comes with the utility.

9.7 Wake-up on LAN

Wake-up on LAN is a technology that enables a network administrator to remotely power on a computer or to wake it up from the sleep mode, thus saving from the need to physically visit each computer on the network. Wake-up on LAN works by sending a wake-up frame or packet to a client machine from a server machine that has remote network management software installed. The Wake-up on LAN network adapter installed in the client receives the wake-up frame and turns on. The scheduled tasks then begin.



To use *Wake-up on LAN* you need a network adapter, motherboard, and remote management software compatible with that technology.

9.8 ISO File

An ISO file contains the complete image of a CD/DVD disc in the ISO 9660 file system. That means that besides data files it includes all the file system metadata (bootstrap code and attributes). These properties make it an attractive alternative to physical media for the distribution of software over the Internet.

9.9 DHCP Server

DHCP (*Dynamic Host Configuration Protocol*) is a protocol for assigning dynamic IP addresses to devices on a network. With dynamic addressing, a device can have a different IP address every time it connects to the network. In some systems, the device's IP address can even change while it is still connected. DHCP also supports a mix of static and dynamic IP addresses.

9.10 TFTP Server

TFTP (*Trivial File Transfer Protocol*) is a simple form of the FTP (*File Transfer Protocol*). TFTP uses the User Datagram Protocol (UDP) and provides no security features. It is often used by servers to boot diskless workstations, X-terminals and routers.