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Chapter 31. Kickstart Installations

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31.1. What are Kickstart Inst

Many system administrators would prefer to use Kickstart on their machines. To answer this need, Red Hat provides a system administrator can create a single file containing the details of a typical installation.

Kickstart files can be kept on a single server and the installation method can support the use of a single file on many machines, making it ideal for network and system administrators.

Kickstart provides a way for users to automate the installation process.

Linux Administration I: Automated Install

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Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author (s) and do not necessarily reflect the views of the National Science Foundation

Lesson Overview

One task administrators do frequently is install software. Since software installation is routine and follows a predictable pattern, software developers have created various methods to automate installs so that the process requires less human interaction.

In this lesson, you will consider different installation environments and various software tools and utilities available for each situation. You will determine which automated install method is applicable for specific environments, and you will learn how to create a Kickstart install and a Partimage install. You will also demonstrate your ability to backup and restore a system configuration with each of these automated tools.

This lesson is important to learn because it explores tools that administrators use to make installs easier, while decreasing the amount of time spent on user input. These time savings translate into decreases in company expenses.



Student Expectations

You should know what will be expected of you when you complete this lesson. These expectations are presented as objectives.

Objectives are short statements of expectations that tell you what you must be able to do, perform, learn, or adjust after reviewing the lesson.

Select the **Objective** tab on the left to review this lesson's objective.



Objective

Given the need to deploy dozens of servers, students will be able to configure an automated install solution such as kickstart (scripted install) or partimage (hard drive cloning). The student will be able to determine which method is applicable to their environment.



Labs

Some of your assignments require you to perform tasks on a live Linux system.

You will need access to a fully configured Linux system to complete specific tasks and to execute requested configurations. One option we recommend is the use of VirtualBox and a virtual install of Ubuntu Linux and other Linux distros.

[Download](#) and install the latest version of VirtualBox to your computer. Use the version appropriate for your operating system. [Instructions](#) for using VirtualBox can be found [here](#).

Once VirtualBox is configured on your computer, [download and install](#) the latest version of Ubuntu Linux that is appropriate for your operating system and install it within VirtualBox. The downloaded file will be an ISO image that can be used “as is” in VirtualBox. Follow this [tutorial](#) to install the Linux OS in VirtualBox on Windows PC. Follow [these directions](#) if you own Mac.

Please contact your instructor if you have questions on labs configuration.

Outline

In this lesson, you will explore:

- Auto Install options
- Drive Images
- Kickstart
- Partimage



Install Considerations

After completing your Linux training, you were employed by a company and stationed in the IT department. After orientation, your new supervisor approaches you with a network diagram and highlights a section of the map with about 300 computer desktops designated for use by customer service representatives. He wants you to switch each machine from a Microsoft Windows OS to Linux desktops by the end of next week.

However, no more than 1/3 of the computers in the department can be non-operational at the same time. You calculate one hour for each install for 300 machines, with only eight working hours in each day. You recognize that traditional install methods of going to each machine individually to do a manual install would take a considerable amount of time. What would you do to meet your supervisor's deadline and get the task done?

Many Linux administrators are employed by medium to large-scale business and educational organizations. While you may be comfortable with the time it takes to install Linux on a single machine through the graphical installer it may become impossible and inefficient to do so when you get to a larger installed user base. Imagine the time it will take to install Linux on 200 machines, then do all the updates, and then setup all the users.

Select **PLAY** below to view an introductory video.

View Video
VideoLesson10Introduction(C2L10S14).mp4



Install Considerations (Contd)

Additionally, in many organizations, users are grouped in roles or (departments) and not all of them require the same set of software installed on their machines. Insurance companies often separate their employees into various categories—customer service representatives, developers, finance, legal, and sales. Every employee does not need the same software. A customer service representative does not need development tools, so software would only be installed when needed.

Remember, the first rule of system security is that if the user does not need it, don't give it to him.

You as the Linux administrator, working in conjunction with your customer, will need to define the software and the hardware required by each group (or role) of users. Once you make this determination, you will decide the proper installation method.



Automated & Manual Installs

In an automated (or scripted) Linux installation, there is almost no human interaction. Small applications are used to automate the process. For instance, the Anaconda Installer is one example of a tool that uses a configuration file to answer all the questions that the manual installer would normally ask. When used correctly, Anaconda allows for a complete installation without the need for a user answering repetitive questions or selecting *Next* after each prompt.

In an imaged installation, a hard drive partition is restored to an identical image (or content) that the original machine had. This process can be used to bypass configuration issues because restored images are fully-installed systems ready to go with all the software already installed and functional.

A manual installation is similar to a virtual machine install. Both installations require the user to respond to a set of questions and provide answers in order to configure the machine.



Required Reading:

- [Auto & manual installs](#)
- [Fedora 14 install](#)
- [Ubuntu 10 install](#)

Images

Drive Image

A drive image is a block-by-block copy of the hard drive partition. The imaging software does not look at the contents of the drive, but copies it all. A 100 GB partition will create a 100 GB image file. The drive that the image will be restored to must be at least the size of the original drive. The closer the computer hardware is to that of the original computer the more successful the restore will be.

Partimage

Partimage is one of the available drive imaging software applications. Partimage works on all Linux drive types with the exception of ext4 drives. Partimage is the open source equivalent of Norton's Ghost and other commercial applications. Partimage is also found on a ISO file called SystemRecoveryCD.iso—a tool every Linux administrator should have in his/her toolkit.



Required Reading:

- [Disk cloning software](#)
- [Partition imaging](#)
- [Partimage](#)
- [Partimage Intro](#)
- [Installing Partimage](#)

Kickstart

RedHat originally created Kickstart in an early version of their Linux distribution. Kickstart is recognized by the Anaconda installer and allows the “scripting” of the installation. This script includes the partitioning of hard drives, setting up of users, initializing network interfaces, configuration of the XWindows system, and the installation of software packages.

Kickstart installs are available for RedHat, Fedora, CentOS, and Ubuntu (though better choices exist for Ubuntu). Kickstart is most effective with RedHat (RPM) based installations.

Required Reading: Kickstart

- [Redhat Kickstart](#)
- [Kickstart](#)
- [How to](#)



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Chapter 31. Kickstart Installations

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Scripts & Boot Prompts

Script

A script is a short program that is the equivalent of a batch file on a DOS or Windows machine.

A script is usually used to configure a piece of software or installation in an automated manner and may also be used to run jobs. Scripts may be written in BASH, CSHELL, Python, Java, PHP, and other languages.

Boot Prompt and Loader

The boot loader is the first piece of software that runs when you power-up a computer system. The boot loader is called from the BIOS or the EFI firmware interface as the machine boots. The boot loader then displays a boot prompt for user interface or runs a default boot sequence that calls the default version of the Linux kernel.

Common boot loaders are GRUB and LILO in the Linux operating system.



Required Reading:

- [Shell scripting tutorial](#)
- [Linux Boot Loaders](#)

User Role

A user role is another way to describe the job description of the user. In most organizations, you will find that users have a role of *User*, *Administrator*, *Support*, and *Developer*. You may have to define roles further based on the software that the user needs to have installed on his/her machine, or the access he or she needs to network resources.

To figure out the correct role for users, first look at their departments, and their functions. The first rule of computer security is that you do not grant users access to software that they do not need in order to do their jobs. If the user does not need access to development software, do not install it on their machines. Try not to create too many groups of users as it takes time and resources to manage each group.



Required Reading:

- [User role management](#)

Installation Methods

In order to decide on the proper installation method, you must look at the number of users, their roles, and their software needs. Additionally, you must look at the mix of the hardware installed in the organization.

A few simple rules for installation methods:

- Small numbers of users, or large number of individualized applications require manual installation.
- Numerous machines with a small number of user roles and similar hardware configuration should use Partimage with drive images.
- All other installations use Kickstart.



Required Reading:

- [Automatic installation](#)
- [Types of installation](#)
- [Linux installation strategies](#)

Appropriate Distro for Kickstart

As you have learned in past lessons, there are a number of Linux distributions available. If you wish to use Kickstart you will want to consider using a RedHat (or RPM) based build. While Kickstart is available for Ubuntu and some of the other Debian-based builds, it is a native RedHat application.

Having said that, make sure you use a build that matches the needs of your users and the needs of the organization. Once you have committed an organization to a Linux distribution, you will find it extremely difficult to change to another distribution.

You will find most corporations using RedHat, CentOS, and Fedora. You will find most educational institutions use RedHat based builds on servers, and Ubuntu on user desktops, though these “generalizations” are just that. Look at the software, look at the needs of the users, and make your decision.



Required Reading:

- [Available Linux distros](#)

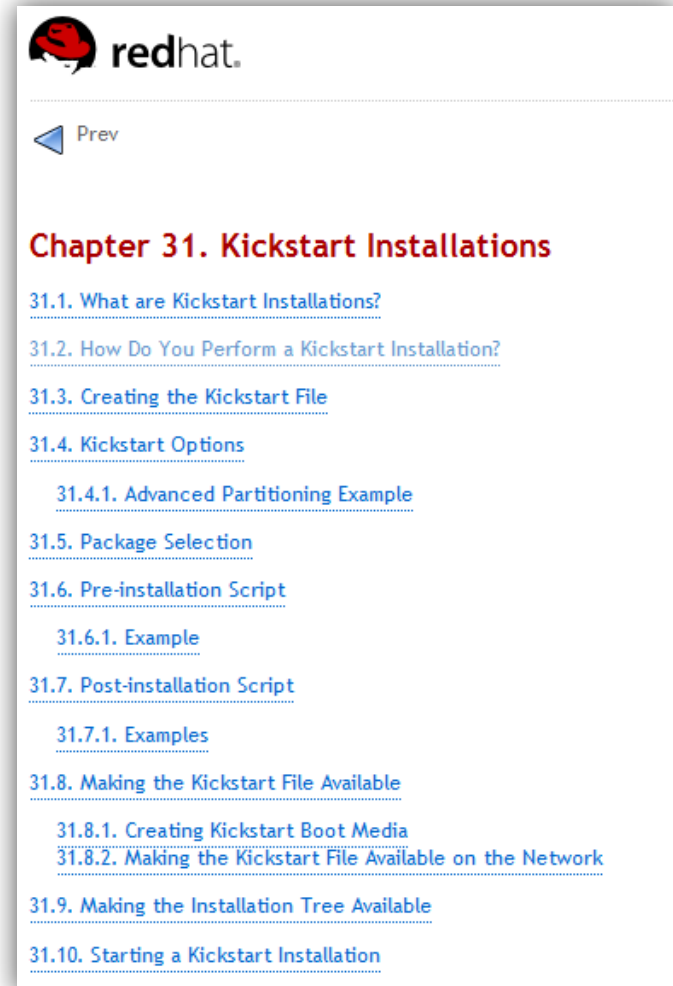
Kickstart Install Overview

Kickstart installations can be performed from a CDROM, DVD, local hard drive, NFS, FTP, or HTTP servers. In order to perform a Kickstart install you must:

1. Create a Kickstart file.
2. Create a boot media with the Kickstart file or make the Kickstart file available on the network.
3. Make the installation tree available.
4. Start the Kickstart installation at the boot prompt.

Required Reading:

- [Kickstart installs](#)



The screenshot shows a Red Hat document page. At the top left is the Red Hat logo and the word "redhat.". Below that is a navigation arrow pointing left with the text "Prev". The main heading is "Chapter 31. Kickstart Installations" in red. Below the heading is a list of sub-chapters, each with a blue link and a dotted underline:

- [31.1. What are Kickstart Installations?](#)
- [31.2. How Do You Perform a Kickstart Installation?](#)
- [31.3. Creating the Kickstart File](#)
- [31.4. Kickstart Options](#)
 - [31.4.1. Advanced Partitioning Example](#)
- [31.5. Package Selection](#)
- [31.6. Pre-installation Script](#)
 - [31.6.1. Example](#)
- [31.7. Post-installation Script](#)
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- [31.8. Making the Kickstart File Available](#)
 - [31.8.1. Creating Kickstart Boot Media](#)
 - [31.8.2. Making the Kickstart File Available on the Network](#)
- [31.9. Making the Installation Tree Available](#)
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Kickstart on Fedora

The steps to preparing a system is to create a Kickstart configuration file:

1. Open a terminal window from your desktop.
2. Type **sudo yum upgrade** to update the system to the most recent version of the software.
3. Type **sudo yum install revisor** to install the kickstart configuration software.
4. Reboot your system to make sure you have access to the most recent kernel and all installed software.



Select **PLAY** below to view a video on Kickstart installation.

View Video
VideoLesson10Kickstart(C2L10S24).mp4

Required Reading:

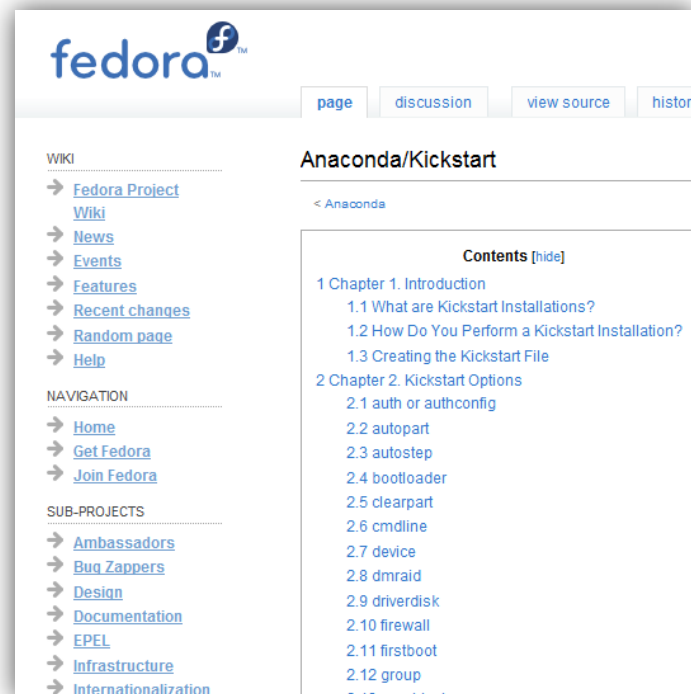
- [Anaconda & Kickstart](#)
- [Kickstart tips and tricks](#)
- [Using Revisor with Fedora](#)

Configuring the Kickstart File

Follow these steps to configure your Kickstart file:

1. Open a terminal window from your desktop.
2. Type **sudo system-config-kickstart**
3. Choose your installation options from each section of the installation from start to finish.
4. Define the required hard-drive partitions including the swap partition. You can define your network devices here or leave them out all together.
5. Check the box to encrypt your root password.
6. Check the box to run the first-time setup utility upon system reboot.
7. Install all the “base” software packages unless you have a specific reason for not doing so.
8. Save the file once you have verified all of your installation options. Select **File** → **Save** and name the file **ks.cfg**
9. Use FTP, SFTP, SCP, or any other option copy the **ks.cfg** file to an available location on a network server, for example a public web directory or FTP accessible directory.

After this final step you can begin your Kickstart installation.



Required Reading:

- [Fedora and Kickstart](#)
- [Automating the Installation](#)
- [Kickstart Installations](#)

Installing with Kickstart

To begin a Kickstart installation you must boot from an installation DVD, or CD-ROM. The live CD will not work properly.

1. Boot the machine.
2. Press the <space> or <TAB> key at the beginning of the Linux boot sequence.
3. Press the TAB key to bring the default boot into the line editor. TAB during the boot sequence allows you to edit the boot parameters.
4. Add **ks=http://webserver/ks.cfg** to the end of the boot parameter line. For an FTP server the line would change to **ks=ftp://ftpserver/ks.cfg**
The full line must point to the exact location and name of the ks.cfg file. Your machine must also have a working internet connection, without the use of wireless drivers.
5. Once the file is found, the installation will complete on its own.
6. Once completed, the system will install and reboot when complete.
7. If you chose configuration option to run the first-time setup utility at first reboot you will have the option to add a user. If you did not, you will have to perform the add-user tasks as system administrator using the root password you included in the Kickstart file.



Select **PLAY** below to view a video on Kickstart installation.

View Video
VideoLesson10KickstartInstallation(C2L10S26).mp4

NOTE: Occasionally you will experience an error running the Kickstart script. When an error occurs, examine the error message and then try to fix the configuration file. The most effective fix is to comment out the line causing the error by inserting a “# “ (pound sign with space after it). The installer will try to resolve anything missing on its own.

Required Reading:

- [Installing with CD/DVD](#)
- [Starting Kickstart installation](#)

Kickstart Summary

To summarize the Kickstart install process:

1. Install Revisor to get all Kickstart configuration files.
2. Configure and create **ks.cfg** file
3. Copy the **ks.cfg** file to an accessible location on your network.
4. Install the new version of Linux on boot from an install DVD or CD-ROM on the machine that needs upgrading.
5. Press space or tab at the boot prompt, and then press TAB to edit the boot parameters.
6. Add **ks=xxxx** (where xxx is full path to ks.cfg file) to the end of the boot parameters.
7. Watch your system install.

Reboot the machine and add any necessary users or configurations.



The screenshot shows a page from the Fedora documentation. At the top left is the Fedora logo. Below it is a navigation arrow labeled 'Prev'. The main heading is '9.4. Automating the Installation with Kickstart'. Below the heading is a paragraph: 'A Kickstart file specifies settings for an installation. Once the installation system carries out the installation process without any further input from a user.' There are two callout boxes: a green one with a yellow sticky note icon titled 'Every Installation Produces a Kickstart File' and an orange one with a yellow star icon titled 'Important – Kickstart installations and Firstboot'. The green box explains that the installation process automatically writes a Kickstart file to /root/anaconda-ks.cfg. The orange box explains that Firstboot does not run after installation from a Kickstart file unless the 'user' option is specified in the file.

Required Reading:

- [Techrepublic](#)

Partimage

```
| Partition Image 0.6.0-rc2 |
* Partition to save/restore
sda1 -extended- #
sda5 jfs 150.98 MB
sda6 jfs 150.98 MB
sda7 xfs 149.98 MB
sda8 reiserfs-3.5 149.98 MB
hda1 ntfs 1.95 GB
hda2 -extended-

* Image file to create/use
/mnt/backup/linux-redhat-7.1.partimg.gz

Action to be done: <Next (F5)>
(*) Save partition into a new image file
( ) Restore partition from an image file <About>
( ) Restore an MBR from the imagefile <Exit (F6)>

[X] Connect to server
IP/name of the server: 192.168.10.2 Port: 13000
SSL disabled at compile time
```

Configuring Partimage

To use Partimage you will need to:

1. Configure a Linux installation from any distribution in the exact way you want it to install on your machines.
2. Create a second partition or have an external drive available to which you will copy the partition image. The storage device could be a server, though you will not have access to wireless drivers.
3. Download and copy the System Rescue ISO to CD or DVD.
4. Reboot the machine using the System Rescue DVD or ISO.
5. Choose standard options at the boot menu.
6. Type: **partimage** from the prompt and press enter.
7. Follow the prompts (selecting the correct partition) and copy the image of the partition to the second drive or server from step 2 above.
8. Shutdown and reboot the machine once the image has been copied.

You can now restore the partition to another machine.

WARNING: Partimage will not backup or restore ext4 partition types found on many new Linux installations. Ext3 is the most recent partition type that Partimage can recognize.

Select **PLAY** below to view a video on Partimage configuration.



View Video
VideoLesson10ConfiguringPartimage(C2L10S29).mp4

Required Files:

- [Rescue CD](#)
- [Partimage](#)

Required Reading:

- [System Rescue manual](#)

Partimage Operations

Complete these steps on a machine on which you intend to install Linux. You will be using the partition image you created in the prior slide.

1. Boot from the System Rescue CD and choose standard options at the boot menu.
2. From the prompt, type: **partimage** (Press ENTER)
3. Select the partition you wish to restore.
4. Follow the prompts on selecting your image file and select **Continue**.
5. Once the restore has completed eject the CDROM and reboot the machine.
6. Complete any machine specific installation that is required.



Select **PLAY** below to view a video on Partimage operations

View Video
VideoLesson10PartimageOperations(C2L10S30).mp4

As you may have noticed, Partimage takes a much larger image/configuration file than the Kickstart configuration file.

Required Reading:

- [Partimage usage](#)

Partimage Summary

To summarize the Partimage installation process:

1. Download and install System Rescue Cd including Partimage.
2. Configure a system to the exact setup you wish to install on other machines.
3. Reboot that system using the system rescue CD.
4. Run Partimage at the prompt.
5. Create an image file from using the default options available on the Partimage main screen.
6. Check the image file and ensure they are saved and you are able to install the images on a test machine before you change the configuration of the original machine.
7. Boot the machine that needs to be imaged using the System Rescue CD.
8. Run the Partimage program at the prompt.
9. Select the partition you wish to restore and the correct image file from the prompts.
10. Reboot the machine using System Rescue CD once the imaging process completes.
11. Complete the restore process using the appropriate choices on the Partimage screen.

As you may have noticed, Partimage requires a much larger image/configuration file than the Kickstart configuration file.

```
Partition Image 0.6.0-rc2
* Partition to save/restore
sda1 -extend
sda5 jfs
sda6 jfs
sda7 xfs
sda8 reiserf
hda1 ntfs
hda2 -extend

* Image file to create/use
/mnt/backup/linux-redhat-7.1.partimg.gz

Action to be done:
(*) Save partition into a new image file
( ) Restore partition from an image file
( ) Restore an MBR from the imagefile

[X] Connect to server
IP/name of the server: 192.168.10.2
SSL disabled at compile time
```

Required Reading:

- [Partimage usage](#)

Lesson Summary

While it is easy to manually install a Linux system it is much easier and time efficient to use automated installation in large installations. If you have users with many different roles you will want to use Kickstart since it lends itself to many different configurations. If you have one or very few user groups you will want to consider Partimage, unless you have ext4 Linux partitions.

Regardless of the installation method, evaluate the various builds available and choose the best one for your users' needs. Keep the number of installation methods small in order to minimize the maintenance required.

As each new version of your distribution is made available you will need to test your Kickstart installation to make sure it still works. As each new distribution is made available you will need to re-create your Partimage installation files.

