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# Automated Installations of Multiple RHEL/CentOS 7 Distributions using PXE Server and Kickstart Files

by Matei Cezar | Published: October 30, 2014 | Last Updated: January 2, 2015

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This article is an extension of my previous PXE Boot Environment Setup on RHEL/CentOS 7 and it's focused on how you can perform Automatic Installations of RHEL/CentOS 7, without the need for user intervention, on headless machines using a Kickstart file read from a local FTP server.

The environment preparation for this kind of installation has already been processed on the previous tutorial regarding PXE Server setup, the only key missing, a Kickstart file, will be discussed further on this tutorial.

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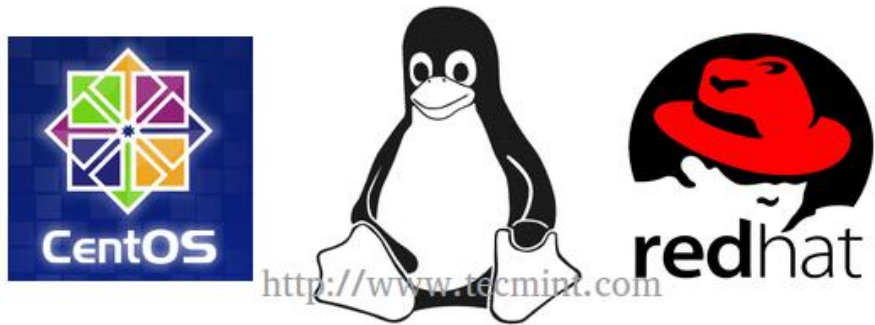
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# Multiple RHEL/CentOS 7 Automated Installations Using PXE Server and Kickstart

Multiple RHEL/CentOS 7 Installation using Kickstart

The simplest way to create a customize **Kickstart** file that you can use it further for multiple installations is to manually perform an installation of RHEL/CentOS 7 and copy, after installation process finishes, the file named **anaconda-ks.cfg**, that resides in **/root** path, to an accessible network location, and specify the **initrd** boot parameter **inst.ks=protocol://path/to/kickstart.file** to PXE Menu Configuration File.

## Requirements

- [Setup a PXE Network Boot Server on RHEL/CentOS 7](#)

This tutorial, and the Kickstart file configuration, only covers the Minimal Installation of RHEL/CentOS 7 without a Graphical Installation, basically the Kikstart file resulted from the previous Minimal Installation procedure of RHEL/CentOS 7.

- [CentOS 7 Minimal Installation Procedure](#)
- [RHEL 7 Minimal Installation Procedure](#)

If you need a Kickstart file that covers **GUI** Installation and a specific partition table, I suggest that you first perform a customizable Graphical Installation of RHEL/CentOS 7 in a virtualized environment and use that resulted Kickstart file for future GUI installations.

## Step 1: Create and Copy Kiskstart File to FTP Server Path

1. On the first step go to your PXE machine **/root** directory and copy the file named **anaconda-ks.cfg** to **Vsftpd** default server path (**/var/ftp/pub**) – also the path for **RHEL/CentOS 7 Local Mirror Installation Source** configured on **PXE network Boot Server – Step 6** (refer PXE Server setup article above).

```
# cp anaconda-ks.cfg /var/ftp/pub/  
# chmod 755 /var/ftp/pub/anaconda-ks.cfg
```

2. After the file has been copied, open it with your favorite text editor and make the following minimal changes.

```
# nano /var/ftp/pub/anaconda-ks.cfg
```

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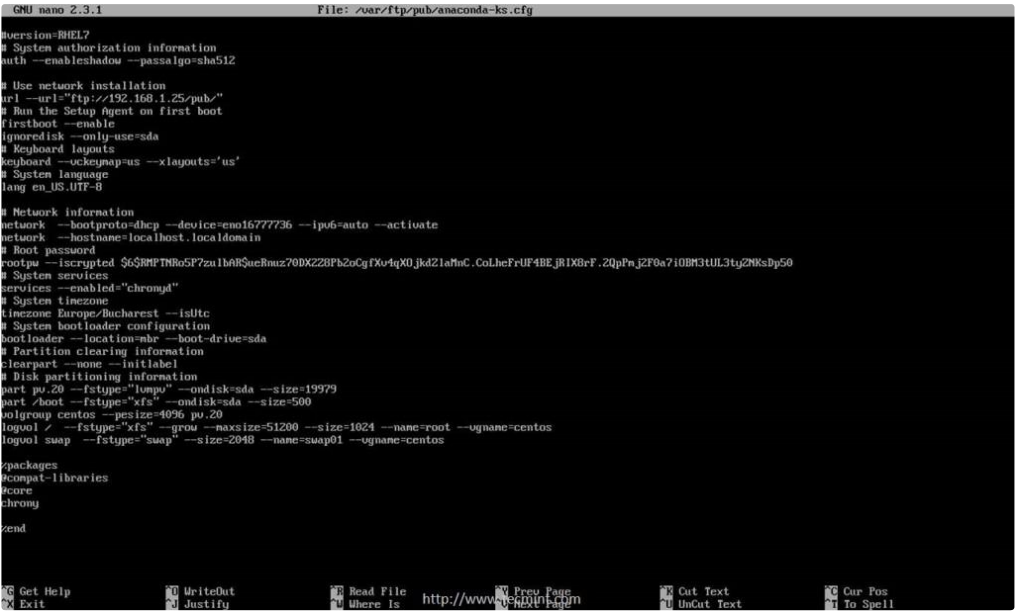
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- Replace `-url` filed with your network installation source location: Ex:  
`-url=ftp://192.168.1.25/pub/`
- Replace **network** `--bootproto` with **dhcp** in case you have manually configured network interfaces on installation process.

An excerpt on how a Kickstart file might look like is presented below.

```
#version=RHEL7
# System authorization information
auth --enablesshadow --passalgo=sha512
# Use network installation
url --url="ftp://192.168.1.25/pub/"
# Run the Setup Agent on first boot
firstboot --enable
ignoredisk --only-use=sda
# Keyboard layouts
keyboard --vckeymap=us --xlayouts='us'
# System language
lang en_US.UTF-8
# Network information
network --bootproto=dhcp --device=enol6777736 --ipv6=auto --activate
network --hostname=localhost.localdomain
# Root password
rootpw --iscrypted $6$RMPTNRo5P7zulbAR$ueRnuz70DX2Z8Pb2oCgfXv4
# System services
services --enabled="chronyd"
# System timezone
timezone Europe/Bucharest --isUtc
# System bootloader configuration
bootloader --location=mbr --boot-drive=sda
# Partition clearing information
clearpart --none --initlabel
# Disk partitioning information
part pv.20 --fstype="lvm" --ondisk=sda --size=19979
part /boot --fstype="xfs" --ondisk=sda --size=500
volgroup centos --pesize=4096 pv.20
logvol / --fstype="xfs" --grow --maxsize=51200 --size=1024 --name=root --vgname=centos
logvol swap --fstype="swap" --size=2048 --name=swap01 --vgname=centos
%packages
@compat-libraries
@core
wget
net-tools
chrony
%end
```

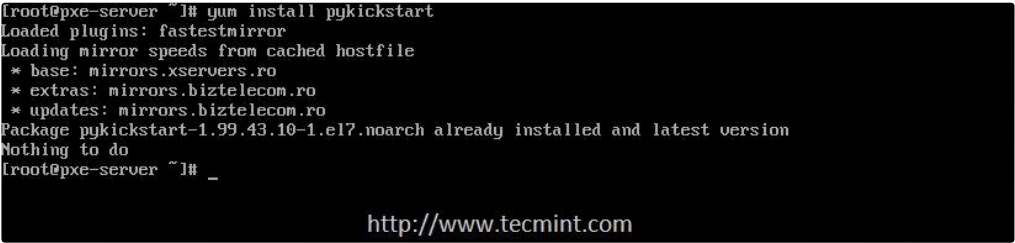


Kickstart Configuration

For more advanced Kickstart file options and syntax feel free to read [RHEL 7 Kickstart Documentation](#).

3. Before attempting to use this file for installations procedures, it is important that you verify the file using **ksvalidator** command included on **Pykickstart** package, especially if manual customizations had been performed. Install **Pykickstart** package and verify your Kickstart file by issuing the following commands.

```
# yum install pykickstart
# ksvalidator /var/ftp/pub/anaconda-ks.cfg
```



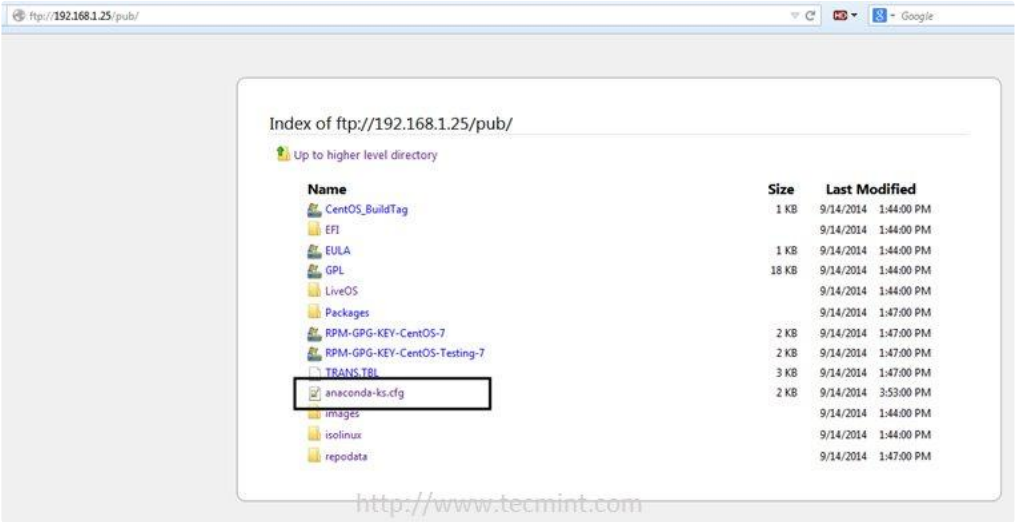
Install Pykickstart Package



Verify Kickstart Files

4. The last verification is to assure that Kickstart file is accessible from your specified network location – in this case **FTP Local Mirror Installation Source** defined by following URL Address.

```
ftp://192.168.1.25/pub/
```



Verify FTP Mirror

## Step 2: Add Kikstart Installation Label to PXE Server Configuration

5. In order to access **Automatic Installation of RHEL/CentOS 7** option from **PXE Menu** add the following label to PXE default file configuration.

```
# nano /var/lib/tftpboot/pxelinux.cfg/default
```

PXE Menu Label excerpt.

### For RHEL 7

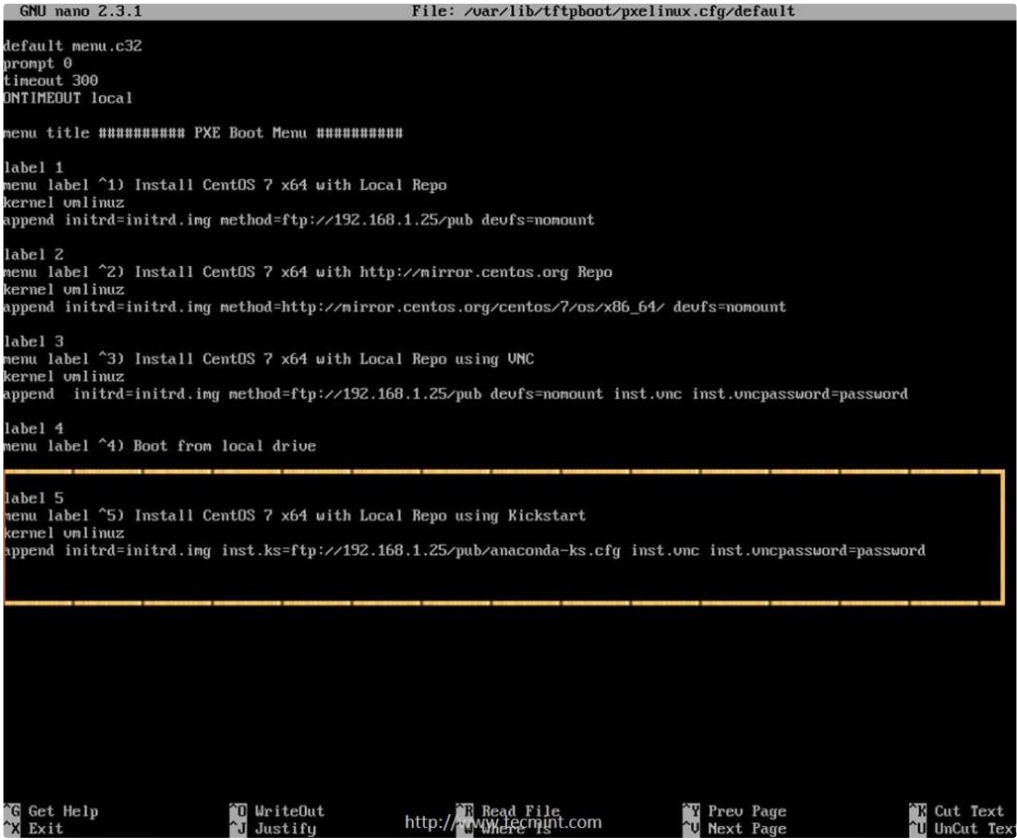
```
label 5
menu label ^5) Install RHEL 7 x64 with Local Repo using Kickst
```



```
kernel vmlinuz
append initrd=initrd.img inst.ks=ftp://192.168.1.25/pub/anaconda-ks.cfg
```

## For CentOS 7

```
label 5
menu label ^5) Install CentOS 7 x64 with Local Repo using Kickstart
kernel vmlinuz
append initrd=initrd.img inst.ks=ftp://192.168.1.25/pub/anaconda-ks.cfg
```

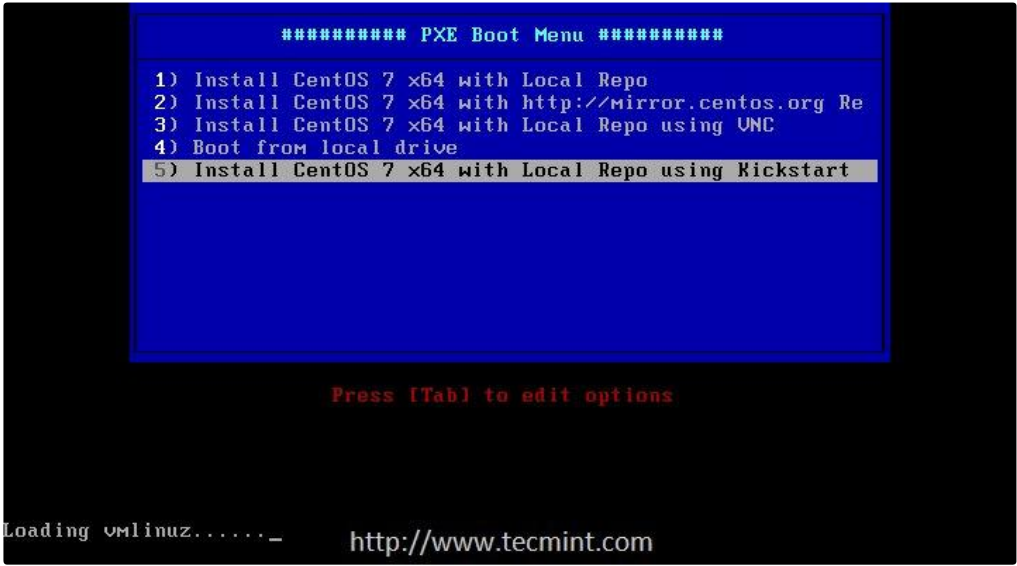


Add Kickstart to PXE Menu

As you can see from this example the automatically installation can be supervised via **VNC** with password (replace VNC password accordingly) and the Kickstart file is located locally on PXE server and is specified by the **initrd** boot parameter **inst.ks=** FTP network location (replace protocol and network location accordingly if you are using other installation methods such as HTTP, HTTPS, NFS or remote Installation Sources and Kickstart files).

## Step 3: Configure Clients to Automatically Install RHEL/CentOS 7 using Kickstart

6. To automatically install RHEL/CentOS 7 and supervise the entire installation process, especially on headless servers, instruct your client machine from BIOS to boot from network, wait a few seconds then press **F8** and **Enter** keys, then select **Kickstart** option from PXE menu.



PXE Boot Menu

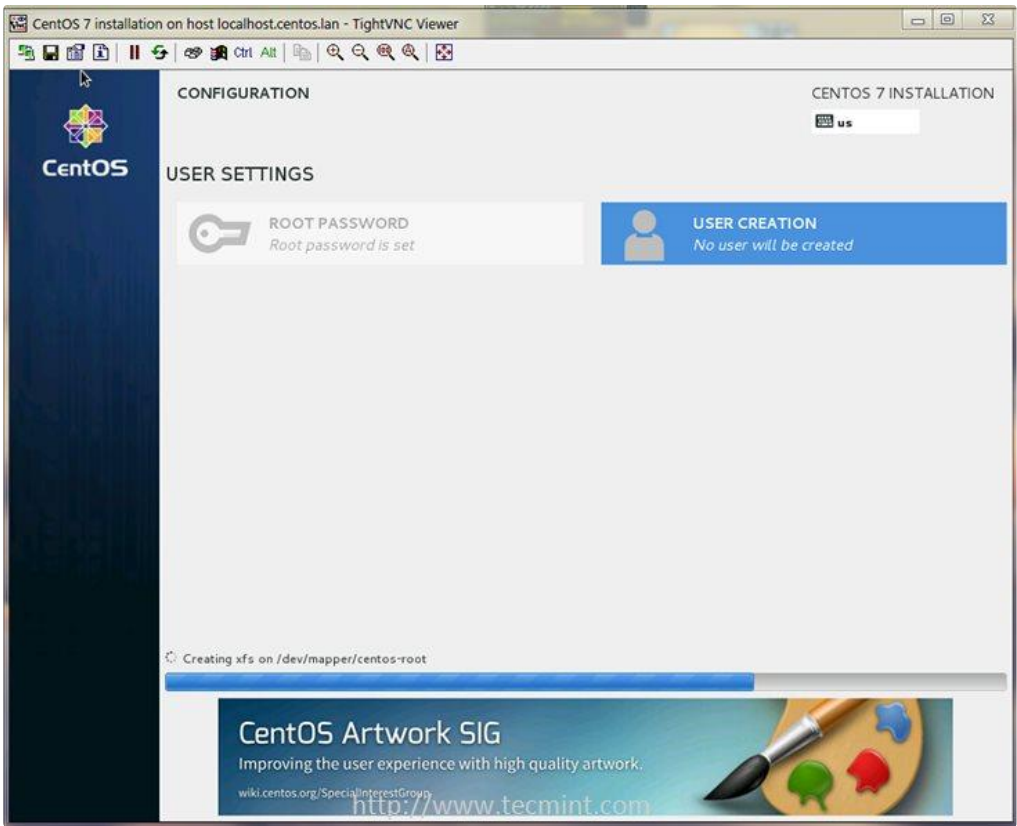
7. After the **kernel** and **ramdisk** loads and detects the Kickstart file, the installation process automatically starts without any intervention from user side needed. If you want to watch the installation process connect with a **VNC** client from a different computer using the address that the installer provides you and enjoy the view.



Automatic OS Installation



Connect to VNC



Kickstart Automatic OS Installation

8. After the installation process finishes login to the newly installed system with **root** account and the password used on previous installation (the

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one that you copied the Kickstart file) and change your client root password by running `passwd` command.

```
CentOS Linux 7 (Core)
Kernel 3.10.0-123.el7.x86_64 on an x86_64

localhost login: root
Password:
Last login: Mon Sep 15 02:28:34 on tty1
[root@localhost ~]# passwd
Changing password for user root.
New password:
Retype new password:
passwd: all authentication tokens updated successfully.
[root@localhost ~]#
```

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Connect to New Installed Server

That's all! **Automatic Kickstart** installations offer a great deal of benefits for system administrators in environments that they have to perform system installations on multiple machines the same time, in a short period of time, without the need to manually interfere with the installation process.

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Matei Cezar

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Sebastien.L ⌚ March 5, 2017 at 10:39 pm

Great article ! One thing : please note that according to your requirements (Setup a PXE Network Boot Server on RHEL/CentOS 7) the Step 2 and chapter 5 should be corrected with this :

menu label ^5) Install CentOS 7 x64 with Local Repo using Kickstart  
kernel centos7/vmlinuz  
append initrd=centos7/initrd.img inst.ks=ftp://192.168.1.25/pub/anaconda-ks.cfg inst.vnc  
inst.vncpassword=password

(centos7 subfolder has been missed in kernel and append ^^)

Thanks

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