Headless Network Installation of Red Hat Linux* 6.2 SBE2 Quick Start Guide for Intel® ISP1100 Internet Server

Version 2.0

About Your Intel® ISP1100 Internet Server

The ISP1100 can be deployed "headless" - without a monitor, keyboard or mouse. This document explains how to install Red Hat Linux[1] on your ISP1100 over the network, using a headless configuration. This approach can be very convenient and cost effective in an environment where you have several new servers to deploy.

Your ISP1100 features two PXE-enabled Intel® Pro/100+ Server network interfaces. PXE (Pre-boot Execution Environment) is an industry standard protocol, which enables PXE agents to communication prior to Operating System boot.

Overview

First you will create an Installation "Boot Server" and install Linux and PXE software. As you add a new headless ISP1100 server to your network, you will create a new "Kickstart" file on the Boot Server to perform the remote installation. Kickstart files are batch scripts, which allow remote installation of Linux to be performed without operator intervention.

This guide assumes you are familiar with Red Hat Linux installation and PXE configuration. If you require more detailed information you may refer to the list of references at the end of this guide.

The remainder of this document will guide you through:

1. Configuring your Boot Server with Linux and PXE
2. Verifying Boot Server PXE configuration
3. Verifying "hands-free" remote installation
4. Using your Boot Server to deploy headless ISP1100 Servers

Note: *It is highly recommended that you verify these steps on a private network first before deploying this method on a live network. Knowledge of Red Hat Linux administration and networking is required.*

*Third-party names and brands are the property of their respective owners.

[1] In order to support "headless installs" on your Intel ISP1100 Server, your Red Hat Linux version must support PXE and "Kickstart". Red Hat Linux 6.2 SBE2 supports these ISP1100 features and is available from Intel. Refer to the Red Hat Linux support site for all current Red Hat Linux operating system support information: http://www.redhat.com/support/errata/RHBA-2000013-01.html

Installing Red Hat 6.2 SBE2 on the PXE Server

***Warning**: Please use a blank hard drive for the installation or you will risk data loss.*

1. At the "Welcome to Red Hat Linux 6.2!" screen, type "text" then press ENTER
2. At the "Language Selection" screen, select your language then press Tab → ENTER
3. At the "Keyboard Selection" screen, select your keyboard then press Tab → ENTER
4. At the "Red Hat Linux" screen, press ENTER to continue with the installation process
5. At the "Installation Type" screen, select "Install Custom System" then press Tab → ENTER
6. At the "Disk Setup" screen, select "Disk Druid" then press ENTER
7. At the "Current Disk Partitions" screen, select "Add" to create the following partitions:

   ***Note**: Make your selection using the Arrow, Tab and Space Bar keys*

   - /swap Partition
     - Mount Point: /swap
     - Size (Megs): 2 x RAM
     - Grow to fill disk?: [ ]
     - Type: Linux swap
     - Allowable Drives: [*] hda

   - /boot Partition
     - Mount Point: /boot
     - Size (Megs): 16
     - Grow to fill disk?: [ ]
     - Type: Linux native
     - Allowable Drives: [*] hda

   - / Partition
     - Mount Point: /
     - Size (Megs): 2048
     - Grow to fill disk?: [*]
     - Type: Linux native
     - Allowable Drives: [*] hda

8. At the "Current Disk Partitions" screen, select "Ok" then press ENTER when done
9. At the "Save Changes" screen, select "Yes" then press ENTER
10. At the "Choose Partitions to Format" screen, select "Ok" then press ENTER
11. At the "LILO Configuration" screen, select "Ok" then press ENTER
12. At the "LILO Configuration" screen, select "Master Boot Record (MBR)" then press Tab → ENTER
13. At the "LILO Configuration" screen, press Tab → ENTER to boot the linux operating system by default
14. At the "Hostname Configuration" screen, type in "pxe-server.mydomain.com" then press Tab → ENTER
15. At the "Network Configuration" screen, enter the following information:

    - [ ] Use bootp/dhcp
    - IP address: 192.168.42.100

- Netmask: 255.255.255.0
- Default gateway (IP): _____
- Primary nameserver: _____

16. At the “Mouse Selection” screen, select your mouse then press Tab → Tab → ENTER
17. At the “Time Zone Selection” screen, select your time zone then press Tab → ENTER
18. At the “Root Password” screen, enter a root password then press Tab → ENTER
19. At the “Add User” screen, select “Ok” then press ENTER
20. At the “Authentication Configuration” screen, select “Ok” then press ENTER
21. At the “Package Group Selection” screen, press Tab → Space Bar to select the “Select individual packages” option then press Tab → ENTER
22. At the “Package Group Selection” screen, select “System Environment/Daemons” then press ENTER
23. Add the following packages by pressing the Space Bar. Select “Ok” then press ENTER when done.

    - [*] dhcp
    - [*] inetd
    - [*] nfs-utils (selected by default)
    - [*] pxe
    - [*] tftp

24. At the “Video Card Selection” screen, select your video card then press Tab → ENTER
25. At the “Installation to begin” screen, select “Ok” then press ENTER
26. At the “Bootdisk” screen, select “No” then press ENTER
27. At the “Monitor Setup” screen, select your monitor then press Tab → ENTER
28. At the “Screen Configuration” screen, select “Don’t Probe” then press ENTER
29. At the “Video Memory” screen, select your video memory then press Tab → ENTER
30. At the “Clockchip Configuration” screen, select “No Clockchip Setting” then press Tab → ENTER
31. At the “Select Video Modes” screen, select your video modes by using the Arrow, Tab and Space Bar keys
32. At the “Starting X” screen, select “Skip” then press ENTER
33. At the “Complete” screen, press ENTER to finish the installation
34. Remove the Red Hat 6.2 SBE2 CD and reboot the system

Logging in as Root

1. At the “pxe-server login:” prompt, type “root” then press ENTER
2. At the “Password:” prompt, type in your root password then press ENTER

Copying the Red Hat 6.2 SBE2 CD onto the Hard Drive

1. Insert the Red Hat 6.2 SBE2 CD into the CD-ROM drive
2. Type “mount /mnt/cdrom” then press ENTER
3. Type “mkdir /redhat-cdrom” then press ENTER
4. Type “cp –rR /mnt/cdrom/* /redhat-cdrom” then press ENTER

Note: *Some files will not get copied, this is normal.*

Copying the Kernel and Initial RAMDisk Image

1. Type “cd /mnt/cdrom/misc/src/trees/boot” then press ENTER
2. Type “cp vmlinuz /tftpboot/X86PC/UNDI/linux-install/linux.1” then press ENTER
3. Type “cd ..” then press ENTER
4. Type “cp initrd-network.img /tftpboot/X86PC/UNDI/linux-install/linux.2” then press ENTER

Creating the Kickstart Directory

1. Type “mkdir /kickstart” then press ENTER

Configuring the NFS Daemon

1. Type “pico /etc/exports” then press ENTER
2. Enter the following lines into the exports file:

    - /redhat-cdrom (ro)
    - /kickstart (ro)

3. Press CTRL+X → Y → ENTER to save the changes

Starting the NFS Daemon

1. Type “/etc/rc.d/init.d/nfs start” then press ENTER

Configuring the PXE Daemon

1. Type “pico /etc/pxe.conf” then press ENTER
2. Under the [UseDHCPPort] section, change the value to “0”
3. Under the [Discovery_Bcast_Disabled] section, change the value to “1”
4. Under the [X86PC/UNDI/MENU] section, change the boot order as follows:

    - 13,Remote Install Linux
    - 0,Local Boot
    - # 14,Remote Boot Linux

5. Press CTRL+X → Y → ENTER to save the changes
6. Type “pico /etc/services” then press ENTER
7. Under the “# Local services” heading, add the following ports:

    - linuxconf 98/tcp
    - pxe 67/udp # PXE Service
    - pxe 4011/udp
    - mtftp 1759/udp

8. Press CTRL+X → Y → ENTER to save the changes
9. Type “pico /etc/inetd.conf” then press ENTER
10. Under the “Tftp service” section, add the following services:
    - tftp dgram udp wait root /usr/sbin/tcpd in.tftpd
    - mtftp dgram udp wait root /usr/sbin/tcpd in.mtftpd

- #tftp dgram udp wait root /usr/sbin/tcpd in.tftpd

11. Press CTRL+X → Y → ENTER to save the changes

Starting the PXE Daemon

1. Type "/etc/rc.d/init.d/pxe start" then press ENTER

Restarting the inetd Daemon

1. Type "/etc/rc.d/init.d/inet restart" then press ENTER

Configuring the DHCP Daemon

Note: *Please use your own MAC address for the hardware ethernet value and replace mydomain.com with your own domain name. Each NIC will have its own unique MAC address. The MAC address for the dual port NIC on the ISP1100 server platform is available on the right side of the bezel. On the label, the top MAC address corresponds to the lower NIC and the bottom MAC address corresponds to the upper NIC.*

The letter N represents the number of PXE clients, please replace it with a number. Text following a "#" symbol is treated as a comment.

1. Type "pico /etc/dhcpd.conf" then press ENTER
2. Enter the following information:

- subnet 192.168.42.0 netmask 255.255.255.0 {
- range 192.168.42.1 192.168.42.99;
- option dhcp-class-identifier "PXEClient";
- option subnet-mask 255.255.255.0;
- option broadcast-address 192.168.42.255;
- option domain-name "mydomain.com";
- }
-
- # Setting up the Configuration File for N Number of PXE Clients
-
- host PXEClient1 {
- hardware ethernet 00:90:27:F6:6E:66;
- fixed-address 192.168.42.1;
- option host-name "PXEClient1";
- option domain-name "mydomain.com";
- }
-
- host PXEClient2 {
- hardware ethernet 00:D0:B7:56:11:9E;
- fixed-address 192.168.42.2;
- option host-name "PXEClient2";
- option domain-name "mydomain.com";
- }

- # host PXEClientN {
- # hardware ethernet XX:XX:XX:XX:XX:XX;
- # fixed-address 192.168.42.N;
- # option host-name “PXEClientN”;
- # option domain-name “mydomain.com”;
- # }

3. Press CTRL+X → Y → ENTER to save the changes

Creating a DHCP Lease File

1. Type “touch /var/state/dhcp/dhcpd.leases” then press ENTER

Starting the DHCP Daemon

1. Type “/etc/rc.d/init.d/dhcpd start” then press ENTER

Configuring the NFS, PXE and DHCP Daemon to Start Automatically at Boot

1. Type “chkconfig --level 3 nfs on” then press ENTER
2. Type “chkconfig --level 3 pxe on” then press ENTER
3. Type “chkconfig --level 3 dhcpd on” then press ENTER

Creating a Kickstart File for N Number of PXE Clients

Note: *A kickstart file is required for each PXE client. For example, if you have 3 PXE clients, you will need to have 3 kickstart files in the /kickstart directory with the following names: 192.168.42.1-kickstart, 192.168.42.2-kickstart and 192.168.42.3-kickstart.*

The kickstart file below assumes a 9 GB hard drive for the PXE client. If your hard drive is smaller than 9 GB, please modify the --size value accordingly.

1. Type “cd /kickstart” then press ENTER
2. Type “pico 192.168.42.N-kickstart” then press ENTER
3. Enter the following information:

- lang en_US
- network --bootproto dhcp
- nfs --server 192.168.42.100 --dir /redhat-cdrom
- keyboard us
- zerombr yes
- text
- skipx
- install
- clearpart --all
- part swap --size 256
- part /boot --size 16
- part / --size 2048 --grow
- part /home --size 2048 --grow

- part /usr --size 2048 --grow
- part /var --size 512 --grow
- part /tmp --size 512 --grow
- part /opt --size 512 --grow
- mouse genericps/2
- timezone --utc US/Pacific
- rootpw linux
- authconfig --useshadow --enablemd5
- lilo --location mbr
- reboot
- %packages
- @ Base
- @ X Window System
- @ KDE
- @ Mail/WWW/News Tools
- @ DOS/Windows Connectivity
- @ Networked Workstation
- @ NFS Server
- @ Anonymous FTP Server
- @ Web Server
- @ Emacs
- @ Development
- @ Kernel Development
- @ Utilities
- %post
- useradd admin
- passwd -d admin
- echo “Headless installation successful…congratulations!” >> /etc/motd
- echo “Login as admin, run passwd to enable account password!” >> /etc/motd
- echo “admin is created to allow telnet into the PXE clients.” >> /etc/motd

4. Press CTRL+X → Y → ENTER to save the changes

Rebooting the PXE Server

1. Type “shutdown -r now” then press ENTER
2. Remove the Red Hat 6.2 SBE2 CD

Testing the Headless Installation

1. Ensure the PXE client has a blank hard drive.
2. Connect the PXE client to the PXE server with a hub or crossover.
3. Power on the PXE client to begin the installation.
4. At the “Press any key to enter kernel parameters…” prompt, press ENTER
5. At the “Enter kernel parameters:” prompt, type “ks” then press ENTER
6. If the installation completes successfully, then the PXE server is properly configured. For subsequent PXE client installations, no interaction is required from the user.
7. If the installation does not complete successfully, please check each configuration for typos. (Linux is case-sensitive).