

PXE installation mode

This chapter is concerning about the advanced topic of the installation manual.

In general, we use CD or floppy to boot installation program. But, if we meet the situation that there is not a CD drive or floppy drive in the computer, we can adopt PXE installation mode. In addition, in the situation that many computers have to be installed the operating system all at one time, PXE installation mode is an efficient working mode.

1. What is PXE

Strictly speaking, PXE is not an installation mode but a booting mode. The necessary condition of PXE installation is that there must have a NIC that PXE supports in the computer. That is to say, there must be a PXE client in NIC.

Protocol makes the computer start up through network. The protocol includes client port and server port, PXE client is in the ROM of NIC. When the computer booting, BIOS move PXE client to memory and then carry out. PXE client download the forane files to the native computer through network.

It needs to configure DHCP server and TFTP server when running PXE protocol. DHCP server is used to distribute a IP address for PXE client. So, it needs to add relevant PXE configuration when configuring DHCP server. Additionally, there has existed TFTP Client already in the ROM of PXE client. PXE Client downloads the needed file from TFTP Server through TFTP protocol.

2. Carry out PXE installation

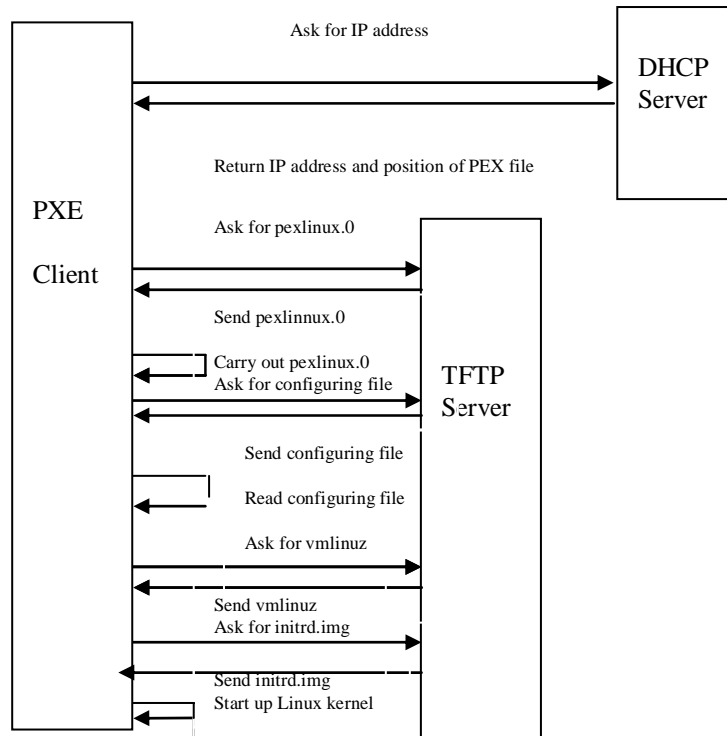
The needed devices when carry out PXE installation:

- A DHCP Server;
- A TFTP Server;
- A host computer to be installed, which has a PXE supporting NIC;
- A server that used to save installation files of system, such as NFS、HTTP or FTP Server.



In general, DHCP Server and TFTP Server are in the same Linux Server. Of course, we can also configure this server to be NFS/HTTP/FTP Server that is used to save installation files.

The following picture is the sketch map of PXE booting mode:



Sketch map of PXE working

In the picture above, “PXE Client” is the computer to be installed with Asianux 2.0, “TFTP Server” and “DHCP Server” run on other Linux Server. pexlinux.0、configuring files、vmlinuz and initrd.img are all put under the root directory /tftpboot of TFTP Server of Linux Server.

2.1 Step one: configuring TFTP Server

Use the command `rpm -qa | grep tftp` to check out whether the tftp software package has been installed, if it has not, install it.

The configuring file of TFTP Server is `/etc/xinetd.d/tftp`, the configuring file appoint `/tftpboot` as the location of the root directory of TFTP Server. The following is an example of tftp configuring file:

```

service tftp
{

```

```

socket_type    = dgram
protocol       = udp
wait           = yes
user           = root
server         = /usr/sbin/in.tftpd
server_args    = -s /tftpboot
disable        = no
per_source     = 11
cps            = 100 2
flags         = IPv4
}

```



In general, tftp service does not start up according to the startup of xinetd service, it needs to modify the file `/etc/xinetd.d/tftp`, change `disable=yes` into `disable=no`. Concerning more introduction of `xinetd`, please refer to [《Network management manual of Asianux 2.0》 8.1 section: Xinetd](#)

The `pxelinux.0` file appointed in `dhcpd.conf` is put under `/tftpboot`, during the carryout, `pxelinux.0` has to read configuring file, all the configuring files are put under `/tftpboot/pxelinux.cfg/`. Linux kernel `vmlinuz` and Linux root file system `initrd.img` are also put under `/tftpboot`.

2.2 Step two: configuring pxelinux

On TFTP Server, copy the file `/usr/lib/syslinux/pxelinux.0` down to directory `/tftpboot` the native computer; then establish a directory `pxelinux.cfg` under `/tftpboot` to save configuring files of `pxelinux`. We can use the file `isolinux.cfg` under the directory `isolinux` in the first CD as the configuring file, just copy it as `/tftpboot/pxelinux.cfg/default`; lastly, copy `isolinux/*.msg` to the directory `/tftpboot/pxelinux.cfg`. default files are as follows:

```

default linux
prompt 1
timeout 600
display boot.msg
F1 boot.msg
F2 options.msg
F3 general.msg
F4 param.msg

```

```
F5 rescue.msg
F7 snake.msg
label linux
kernel vmlinuz
append initrd=initrd.img
label text
kernel vmlinuz
append initrd=initrd.img text
label expert
kernel vmlinuz
append expert initrd=initrd.img
label ks
kernel vmlinuz
append ks initrd=initrd.img
label lowres
kernel vmlinuz
append initrd=initrd.img lowres
```

2.3 Step three: making Linux kernel and root file system

Copy vmlinuz (Linux kernel) and initrdRF.img (root file system) under /images/pxeboot of the first installation CD to the directory /tftpboot of TFTP Server.

Note: there are two files of root file system under /images/pxeboot of the first installation CD, initrd.img is relevant to the installation process of Asianux, initrdRF.img is relevant to the installation process of Asianux 2.0, please copy the file initrdRF.img to the directory /tftpboot of TFTP Server and name as initrd.img.



The relevant root file system of Asianux 2.0 is initrdRF.img, please copy this file to the directory /tftpboot of TFTP Server and name as initrd.img.

2.4 Step four: configuring DHCP Server

The configuration file of DHCP Server is /etc/dhcpd.conf, it needs to add the relevant PXE configuration when configuring the DHCP Server, the configuration files are as follows:

```
ddns-update-style interim;
```

```

ignore client-updates;

allow booting;
allow bootp;

# This is the name of the file the boot ROMs should download.
    filename "pxelinux.0";

# This is the name of the server we should get it from.
    next-server 172.16.82.28;

default-lease-time 1200;
max-lease-time 9200;
option subnet-mask 255.255.255.0;
option broadcast-address 172.16.82.255;
option routers 172.16.80.1;
option domain-name-servers 172.16.82.11;
#option domain-name "redflag-linux.com";
subnet 172.16.80.0 netmask 255.255.248.0 {
    range 172.16.82.70 172.16.82.80;}

# You need an entry like this for every host unless you're using dynamic addresses.
host client1 {
    hardware ethernet 00:0A:EB:0B:3A:F4;
    fixed-address 172.16.82.77;
}

```

Explanation: host client1{...} defines the binding relationship between MAC address and IP address of NIC.



Concerning the configuring information of DHCP, please refer to [《Network management manual of Asianux 2.0》](#)

2.5 Step five: Start up TFTP service and DHCP service

Use the following command to start up TFTP service:

```
# service xinetd restart
```

Use the following command to start up DHCP service:

```
# service dhcpd restart
```

2.6 Step six: Start up PXE NIC

Start up the computer to be installed, configure to boot host computer from PXE according to the clues, and then enter network booting progress. If the configuration of DHCP Server and TFTP Server are correct, the prompt boot: will appear on the screen, it will enter installation interface after press <enter>.

Starting up from PXE network needs to install PXE start-up chip on NIC; to some types of NIC, it can also write PXE start-up code into memory in mainboard; some other computer that have bland, its mainboards integrate NIC, and can support PXE startup directly.



The usually used RTL8139 chip NIC, its PXE start-up configuring mode is: when starting up the computer, press <Shift+F10> according to the hints on the screen. Select PXE in start-up type to open network starting up option.

3. Reference document

If you need more help, please refer to the following documents:

[/usr/share/doc/syslinux-2.06/pxelinux.doc](#)

[/usr/share/doc/syslinux-2.06/isolinux.doc](#)

[/usr/share/doc/syslinux-2.06/syslinux.doc](#)

[/usr/share/doc/pxe-0.1/README](#)