install the packages required for tftp, to server out the bootable file
This could be on ANY machine in our network

sudo apt install inetutils-inetd tftpd-hpa
joe@ns2:$ echo "Make sure you are using a machine that has plenty of disk space because we will store an ISO file on it"
Make sure you are using a machine that has plenty of disk space because we will store an ISO file on it
joe@ns2:$
joe@ns2:~$ echo "We must configure tftpd to start automatically"
We must configure tftpd to start automatically
joe@ns2:~$ sudo vi /etc/default/tftpd-hpa
# /etc/default/tftpd-hpa

TFTP_USERNAME="tftp"
TFTP_DIRECTORY="/var/lib/tftpboot"
TFTP_ADDRESS=":69"
TFTP_OPTIONS="--secure"
RUN_DAEMON="yes"
OPTIONS="-l -s /var/lib/tftpd-boot"
TFTP_USERNAME="tftp"
TFTP_DIRECTORY="/var/lib/tftpd-boot"
TFTP_ADDRESS=":69"
TFTP_OPTIONS="-secure"
joe@ns2:~$ echo "restart it"
restart it
joe@ns2:~$ sudo /etc/init.d/tftpd-hpa restart
joe@ns2:~$
```
Netstat -au
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address        State
tcp    0      0    ns2.mojojojo.ml:domain     *:*                    LISTEN
tcp    0      0    localhost:domain          *:*                    LISTEN
tcp    0      0    *:*ssh                     *:*                    LISTEN
tcp    0      0    localhost:953             *:*                    LISTEN
tcp    0      0    280 ns2.mojojojo.ml:ssh    noodledoodle.cs.d:43066 ESTABLISHED
tcp6   0      0    [::]:domain                [::]:*                   LISTEN
tcp6   0      0    [::]:ssh                   [::]:*                   LISTEN
tcp6   0      0    localhost:953             [::]:*                   LISTEN
udp    0      0    ns2.mojojojo.ml:domain     *:*                    LISTEN
udp    0      0    localhost:domain          *:*                    LISTEN
udp    0      0    *:*tftp                   *:*                    LISTEN
udp6   0      0    [::]:domain                [::]:*                   LISTEN
udp6   0      0    [::]:tftp                 [::]:*                   LISTEN
```

```
echo "Is it running?"
Is it running?
```
Now to configure DHCP for netboot

joe@dhcp:~$ echo "Now to configure DHCP for netboot"
Now to configure DHCP for netboot

joe@dhcp:~$ sudo vi /etc/dhcp/dhcpd.conf
#declare my subnet

subnet 144.38.201.32 netmask 255.255.255.224 {
    # define the range we are allowed to serve dynamically
    # the addresses I have already statically assigned
    # should NOT be here
    range 144.38.201.40 144.38.201.50;
    # could override global settings from above
    option domain-name-servers 8.8.8.8;
    option domain-name "mojojojo.ml";
    option subnet-mask 255.255.255.224;
    option routers 144.38.201.33;
    default-lease-time 600;
    max-lease-time 7200;
    #file to look for on tftpd server
    filename "pxelinux.0";
    #tftp server address
    next-server 144.38.201.35;
}

"/etc/dhcp/dhcpd.conf" 137L, 4473C written
joe@dhcp:~$ sudo service isc-dhcp-server restart
joe@dhcp:~$ ps aux | grep dhcp
dhcpd  10575  0.0  2.6  35752 13480  ?   Ss   08:30  0:00 dhcppd -user dhcpd -group dhcpd -f -4 -pf /run/dhcp-server/dhcpd.pid -cf /etc/dhcp/dhcpd.conf
joe    10585  0.0  0.1  14224   924 pts/0   S+   08:31  0:00 grep --color=auto to dhcp
joe@dhcp:~$
joe@ns1:~$ echo "let's test to make sure tftp is running. Could be from any machine in our network"

joe@ns1:~$ sudo apt install tftp
root@ns2:~# echo "Create a file in the tftp directory"
Create a file in the tftp directory
root@ns2:~# echo "Foo file" > /var/lib/tftpboot/foo.txt
root@ns2:~#
joe@ns1:～$ tftp 144.38.201.35
    tftp> get foo.txt
            Received 10 bytes in 0.0 seconds
    tftp> quit
joe@ns1:～$ ls
        foo.txt
joe@ns1:～$ echo "Got it!"
    Got it!
joe@ns1:～$
root@ns2:~# echo "Since it is working, let's now put the real files that we want in that ftp directory"
Since it is working, let's now put the real files that we want in that ftp directory
root@ns2:~# pwd
/home/joe
root@ns2:~# wget http://mirror.cs.dixie.edu/ubuntu-cds/xenial/ubuntu-16.04.3-server-amd64.iso
--2018-01-18 08:45:03--  http://mirror.cs.dixie.edu/ubuntu-cds/xenial/ubuntu-16.04.3-server-amd64.iso
Resolving mirror.cs.dixie.edu (mirror.cs.dixie.edu)... 144.38.192.6
Connecting to mirror.cs.dixie.edu (mirror.cs.dixie.edu)|144.38.192.6|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 865075200 (825M) [application/x-iso9660-image]
Saving to: 'ubuntu-16.04.3-server-amd64.iso'
buntu-16.04.3-serve 18%[===>          ] 151.92M  64.9MB/s
We need to pull some files out of that iso

```bash
root@ns2:~# ls
ubuntu-16.04.3-server-amd64.iso
root@ns2:~# echo "We need to pull some files out of that iso"
We need to pull some files out of that iso
root@ns2:~# mkdir mnt
root@ns2:~# mount -o loop ubuntu-16.04.3-server-amd64.iso mnt/
mount: /dev/loop0 is write-protected, mounting read-only
root@ns2:~#
```
root@ns2:~# cd mnt/ubuntu
root@ns2:~/.mnt/ubuntu# ls
boot  doc  install  md5sum.txt  pool  README.diskdefines
dists  EFI  isolinux  pics  preseed  ubuntu
root@ns2:~/.mnt/ubuntu# cp -r install/netboot/* /var/lib/tftpboot/
root@ns2:~/.mnt/ubuntu# echo "Copied the required netboot files"
Copied the required netboot files
root@ns2:~/.mnt/ubuntu#
root@ns2:~/mnt/ubuntu# echo "Now to netboot a client and see what happens"
Now to netboot a client and see what happens
root@ns2:~/mnt/ubuntu#
jfrancom@desdemona:~$ citv createvm
A machine name, RAM(MB) size, disk size(GB), VLAN(number) must be specified.
A CPU count may be specified.
jfrancom@desdemona:~$ citv createvm mojojojo_netboot 512 10 2018
/qemu/bin/qemu-new-image jfrancom-mojojojo_netboot 10 /qemu/images;
Formatting '/qemu/images/jfrancom-mojojojo_netboot.img', fmt=raw size=10737418240
User jfrancom has created the machine mojojojo_netboot : 1389 with 512 memory
jfrancom@desdemona:~$ citv bootvm mojojojo_netboot
/usr/bin/ssh -q cordelia "'/qemu/bin/qemu-boot 1389 'jfrancom-mojojojo_netboot' 5 12 '52:54:00:08:05:6C' '' '' 'n' 1 1 2018 '/qemu/images';"
User(jfrancom) has booted machine(mojojojo_netboot) on server(cordelia:1389) with 512 memory.
jfrancom@desdemona:~$
root@ns2:~:/mnt/ubuntu# echo "wasn't that so very exciting. But realize, the install media was booted over the network"
root@ns2:~:/mnt/ubuntu#