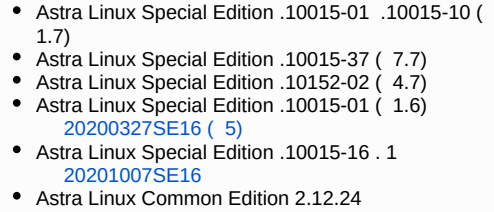
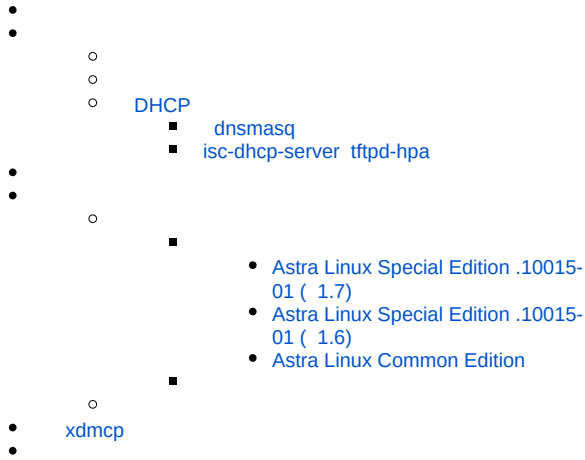


LTSP (ltsp-server-standalone) Astra Linux



Linux Terminal Server Project (LTSP) — , () (). , , (X-), , , . , , , .

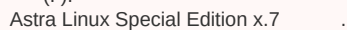
(IP- IP-,) **DHCP**. , Astra Linux:

- dnsmasq - DHCP, LTSP, TFTP, ;
- isc-dhcp-server - DHCP. . isc-dhcp-server TFTP.

(, DHCP,).

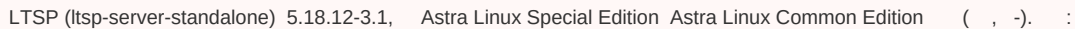
SSH (), xRDP.

Astra Linux LTSP :



- " — . , . . . (), . , . ;
- " — . , (). () . , , ().

```
''' (fly-wm). , LTSP_FATCLIENT=true/false ( ) /var/lib/tftpboot/ltsp/amd64/ltsp.conf ( . https://manpages.ubuntu.com/manpages/trusty/man5/ltsp.conf.5.html ).
```



- Astra Linux Special Edition x.7 — ([Astra Linux Special Edition x.7:](#) ,);
- Astra Linux Special Edition 10015-01 (1.6) [20200327SE16 \(5\)](#) Astra Linux Special Edition .10015-16 . 1 [20201007SE16](#) — ;
- Astra Linux Special Edition Astra Linux Common Edition — Astra Linux Common Edition.

$$\begin{array}{ccc} & & \cdot \\ & & \cdot \\ \cdot & \cdot & \cdot \end{array}$$

- 192.168.56.0;
- eth0;
- (192.168.56.10/24).

, , [Network Manager](#).

, ().



Astra Linux Special Edition :

- Astra Linux Special Edition x.7:
 - ([Astra Linux Special Edition x.7](#): ,);
- Astra Linux Special Edition .10015-01 (1.6):
 - ;
 - ;
 - (update-iso);
 - (update-dev-iso);
- Astra Linux Common Edition .

:

```
sudo apt install ltsp-server-standalone xrdp ssh
```

ltsp-server-standalone :

- ltsp-server — ;
- dnsmasq — DHCP/TFTP .

xrdp , xRDP SSH.

ssh:

```
sudo systemctl status ssh
```

, , :

```
sudo systemctl enable ssh
sudo systemctl start ssh
```

DHCP



DHCP, , .

, DHCP, :

- IP- TFTP-;
- , . ;
- , (PXE). :
 - /ltsp/amd64/pxelinux.0 — ;
 - /ltsp/amd64/nbi.img — Etherboot NetBoot. .

isc-dhcp-server :

```
subnet <> netmask <_> {
    next-server <IP-_TFTP_>;
    option root-path "<_>";
    if substring( option vendor-class-identifier, 0, 9 ) = "PXEclient" {
        # PXE
        filename "/ltsp/amd64/pxelinux.0";
    } else {
        filename "/ltsp/amd64/nbi.img";
    }
}
```

DHCP.

DHCP (, DHCP), . DHCP , , .

. [LTSP-c](#) [Astra Linux](#) [Windows-DHCP](#).



DHCP - dnsmasq isc-dhcp-server

, . :

- dnsmasq DHCP, TFTP. isc-dhcp-server TFTP (tftpd-hpa);
- dnsmasq, . isc-dhcp-server tftpd-hpa.

dnsmasq

1. dnsmasq ltsp-server-standalone. :

```
sudo apt install dnsmasq
```

2. /etc/dnsmasq.d/ltsp-server-dnsmasq.conf dnsmasq :

```
sudo ltsp-config --overwrite dnsmasq
```

3. /etc/dnsmasq.d/ltsp-server-dnsmasq.conf:



, , proxy:

```
dhcp-range=192.168.56.0,proxy
```

(,). proxy . man dnsmasq.

```
:
- , DHCP ( );
- , , interface.
:
```

Configures dnsmasq for PXE client booting.
 # All the files in /etc/dnsmasq.d/ override the main dnsmasq configuration in
 # /etc/dnsmasq.conf.
 # You may modify this file to suit your needs, or create new ones in dnsmasq.d/.

```
#interface=eth0
# Log lots of extra information about DHCP transactions.
#log-dhcp
# IP ranges to hand out.
dhcp-range=192.168.56.20,192.168.56.250,8h
# The rootpath option is used by both NFS and NBD.
dhcp-option=17,/opt/ltsp/amd64
# Define common netboot types.
dhcp-vendorclass=etherboot,Etherboot
dhcp-vendorclass=pxe,PXEClient
dhcp-vendorclass=ltsp,"Linux ipconfig"
# Set the boot filename depending on the client vendor identifier.
# The boot filename is relative to tftp-root.
dhcp-boot=net:pxe,/ltsp/amd64/pxelinux.0
dhcp-boot=net:etherboot,/ltsp/amd64/nbi.img
dhcp-boot=net:ltsp,/ltsp/amd64/ltsp.conf
# Kill multicast.
dhcp-option=vendor:pxe,6,2b
# Disable re-use of the DHCP servername and filename fields as extra
# option space. That's to avoid confusing some old or broken DHCP clients.
dhcp-no-override
# The known types are x86PC, PC98, IA64_EFI, Alpha, Arc_x86,
# Intel_Lean_Client, IA32_EFI, BC_EFI, Xscale_EFI and X86-64_EFI
pxe-service=X86PC, "Boot from network", /ltsp/amd64/pxelinux
# Comment the following to disable the TFTP server functionality of dnsmasq.
enable-tftp
# The TFTP directory. Sometimes /srv/tftp is used instead.
tftp-root=/var/lib/tftpboot/
# Disable the DNS server functionality of dnsmasq by setting port=0
4. dnsmasq :
```

```
sudo systemctl restart dnsmasq
```

isc-dhcp-server tftpd-hpa

1. dnsmasq :

```
sudo systemctl stop dnsmasq
sudo systemctl mask dnsmasq
```

2. :

```
sudo apt install isc-dhcp-server tftpd-hpa
```

3. :

```
sudo ltsp-config --overwrite isc-dhcp-server
```

```
/etc/ltsp/dhcpd.conf isc-dhcp-server :
```

```
#
# Default LTSP dhcpd.conf config file.
#

authoritative;

subnet 192.168.67.0 netmask 255.255.255.0 {
    range 192.168.67.20 192.168.67.250;
    option domain-name "example.com";
    option domain-name-servers 192.168.67.1;
    option broadcast-address 192.168.67.255;
    option routers 192.168.67.1;
    next-server 192.168.67.1;
# get-lease-hostnames true;
    option subnet-mask 255.255.255.0;
    option root-path "/opt/ltsp/amd64";
    if substring( option vendor-class-identifier, 0, 9 ) = "PXEClient" {
        filename "/ltsp/amd64/pxelinux.0";
    } else {
        filename "/ltsp/amd64/nbi.img";
    }
}
```

```
) . isc-dhcp-server . DHCP;
```

4. DHCP, DHCP , isc-dhcp-server, /etc/dhcp/:

```
sudo mv /etc/dhcp/dhcpd.conf /etc/dhcp/dhcpd.bak
sudo cp /etc/ltsp/dhcpd.conf /etc/dhcp/dhcpd.conf
```

```
DHCP ( , , isc-dhcp-server), next-server, option root-path if substring( option vendor-class-identifier,
0, 9 ) = "PXEClient" /etc/ltsp/dhcpd.conf ;
```

5. tftpd-hpa /etc/default/tftpd-hpa :

```
TFTP_DIRECTORY="/var/lib/tftpboot"
```

6. :

```
sudo systemctl restart isc-dhcp-server tftpd-hpa
```

BIOS () . Video, Virtio .

ltsp-build-client. (Common Edition Special Edition).

SSH, .

Astra Linux Special Edition .10015-01 (1.7)

Astra Linux Special Edition .10015-01 (1.7) - [Astra Linux Special Edition x.7.](#) --:

```
sudo ltsp-build-client --dist 1.7_x86-64 --mirror "https://dl.astralinux.ru/astra/stable/1.7_x86-64/repository-main" \
--early-mirror "https://dl.astralinux.ru/astra/stable/1.7_x86-64/repository-base" \
--extra-mirror "https://dl.astralinux.ru/astra/stable/1.7_x86-64/repository-extended" \
--purge-chroot --components contrib,main,non-free --early-packages dpkg --
mode 2 \
--kernel-packages linux-image-5.4-generic
```

(--extra-mirror "https://dl.astralinux.ru/astra/stable/1.7_x86-64/repository-extended") , , , (Astra Linux Special Edition x.7: , ,).

ltsp-build-client:

- --mirror — ();
- --early-mirror — , , ;
- --extra-mirror — , , Astra Linux Special Edition x.7 , (--extra-mirror "https://dl.astralinux.ru/astra/stable/1.7_x86-64/repository-extended"). Astra Linux Special Edition x.7: , ,);
- --early-packages — dpkg. , (chroot-). fly-all-main ();
- --purge-chroot — , chroot- ();
- --components contrib,main,non-free — , , ;
- --kernel-packages linux-image-5.4-generic — .



- --mode — . . Astra Linux Special Edition x.7. (0, 1 2). Astra Linux Special Edition (x.7):).

:

- — amd64,
- /opt/ltsp/amd64 chroot- (chroot- --chroot, /opt/ltsp. "").
- /opt/ltsp/images . - chroot- .img.



nbd-server:

```
sudo systemctl restart nbd-server
```

Astra Linux Special Edition .10015-01 (1.6)

Astra Linux Special Edition () Astra Linux Special Edition. , smolensk-1.6-20.06.2018_15.56.iso

```
sudo mount smolensk-1.6-20.06.2018_15.56.iso /media/cdrom
```

:

- ;
- ;
- (update-iso);
- (update-dev-iso).

Astra Linux Special Edition 1.6 - Astra Linux Special Edition .10015-01 (1.6):

```
sudo ltsp-build-client --dist smolensk --mirror "https://dl.astralinux.ru/astra/stable/1.6_x86-64/repository" \
--early-mirror "https://dl.astralinux.ru/astra/stable/1.6_x86-64/repository-dev" \
--update-bin /opt/iso/1.06.main.iso --update-dev /opt/iso/1.06.base.iso \
--purge-chroot --components contrib,main,non-free --early-packages dpkg
```





, Astra Linux Common Edition, Astra Linux Special Edition 1.6 :

```
--update-bin — ISO- smolensk;
--update-dev — ISO- smolensk-devel.
```

--mirror, --early-mirror --extra-mirror, (). , --update-bin --update-dev, ISO- .

, fly-all-main (--early-packages).

Astra Linux Special Edition Astra Linux Common Edition parsec linux-astra-modules. / /media/cdrom.

Astra Linux Common Edition

Astra Linux Common Edition / , :

```
sudo ltsp-build-client
```

, dpkg:

```
sudo ltsp-build-client --early-packages dpkg
```

chroot- , , :

```
[ -d /parsecfs ] && [ -d /opt/ltsp/amd64/parsecfs ] && sudo mount --bind
/parsecfs /opt/ltsp/amd64/parsecfs
sudo ltsp-chroot -m
apt update
useradd -g adm -G sudo -s /bin/bash -m <_>
passwd <_>
exit
[ -d /parsecfs ] && [ -d /opt/ltsp/amd64/parsecfs ] && sudo umount /opt/ltsp
/amd64/parsecfs
```

(/parsecfs) () Astra Linux Special Edition Astra Linux Special Edition. Astra Linux Common Edition Astra Linux Common Edition . ,
chroot-, (/opt/ltsp/amd64/), , .

fly-all-main (-), :

```
sudo ltsp-chroot -m apt install <_>
```

-m , .

ltsp-chroot -a <_>, (--chroot ltsp-build-client);

ltsp-chroot chroot- , () :

```
sudo ltsp-update-image
```



ltsp-update-image chroot- (,).

, (/opt/ltsp/amd64/etc/ltsp.conf).

LTSP :

```
sudo ltsp-config --overwrite ltsp.conf
```

/var/lib/tftpboot/ltsp/amd64/ltsp.conf.



"" , . , , . LTSP , , :

```
sudo ltsp-update-image
```

:

1. , --fat-client-desktop, - :

```
sudo ltsp-build-client --fat-client-desktop fly-wm ...
```

--fat-client-desktop Astra Linux — fly-wm (fly-dm fly-fm);

Astra Linux Special Edition 1.7 :

```
sudo ltsp-build-client --fat-client-desktop fly-wm --late-packages sudo,
mc --mirror "https://dl.astralinux.ru/astra/stable/1.7_x86-64
/repository-main" \
    --early-mirror "https://dl.astralinux.ru/astra/stable/1.7_x86-64
/repository-base" \
    --extra-mirror "https://dl.astralinux.ru/astra/stable/1.7_x86-64
/repository-extended" \
    --purge-chroot --mode 2 \
    --kernel-packages linux-image-5.4-generic
```

2. , Fly:

```
sudo ltsp-chroot -m apt install fly-all-main
```

-m , .
ltsp-chroot -a <>, (--chroot ltsp-build-client);

3. , ltsp-chroot -m apt install ():
 - fly-all-optional — : ark, clementine, compton, fly-admin-iso, fly-fm-crypt, gparted, guvcview, kpgg, librsvg2-bin, qapt-deb-installer, qbat, recoll, speedcrunch, synaptic, vlc, vlc-astra, vlc-l10n, vlc-plugin-access-extra, xca, yelp;
 - fly-all-games — () klines, kmnes, kpat, supertux, warzone2100, xonotic;
 - libreoffice — , ;
 - ;

4. fly-dm (fly-wm fly-fm), :

```
sudo ltsp-chroot -m systemctl disable fly-dm
```

ltsp-chroot -a <>, (--chroot ltsp-build-client);

5. chroot- , :

```
sudo ltsp-update-kernels <_> && sudo ltsp-update-image <_>
```

, (/opt/ltsp/). - amd64, .. , — /opt/ltsp/amd64/)

xdmcp

1. :


```
sudo ltsp-chroot -m
astra-modeswitch set 2
exit
sudo ltsp-update-image
```

2. xrdp:

```
sudo apt install xrdp
```

3. , /opt/ltsp/amd64/usr/share/ltsp/screen.d/xdmcp :

```
X_ARGS="$X_ARGS -query ${XDM_SERVER}"
```

```
X_ARGS="$X_ARGS -query ${XDM_SERVER} -displayID 0:63:0x0:0x0"
```

4. :

```
sudo ltsp-update-image
sudo ltsp-config --overwrite lts.conf
```

5. /var/lib/tftpboot/ltsp/amd64/lts.conf (IP-):

```
[default]
LTSP_CONFIG=True
LOCALDEV=True
HOTPLUG=True
DNS_SERVER=192.168.56.100
SOUND=True
MIC_VOLUME=0
CAPTURE_VOLUME=100
CAPTURE_SWITCH=toggle
TIMEZONE=Europe/Moscow
TIMESERVER=192.168.56.100
SYSLOG_HOST=192.168.56.100
NBD_SWAP=False
#NBD_SWAP_SERVER=192.168.56.100
#CONFIGURE_X=False
SCREEN_07=xdmcp
PRINTER_0_DEVICE=/dev/usb/lp0
PRINTER_0_TYPE=U
```

6. .

1. , IP- , . , Astra Linux. , VNC vino (vino), ;

2. , . , , , chroot- ;

. [Astra Linux Windows](#);