二.制作kickstart无人部署安装CentOS7.5镜像系统
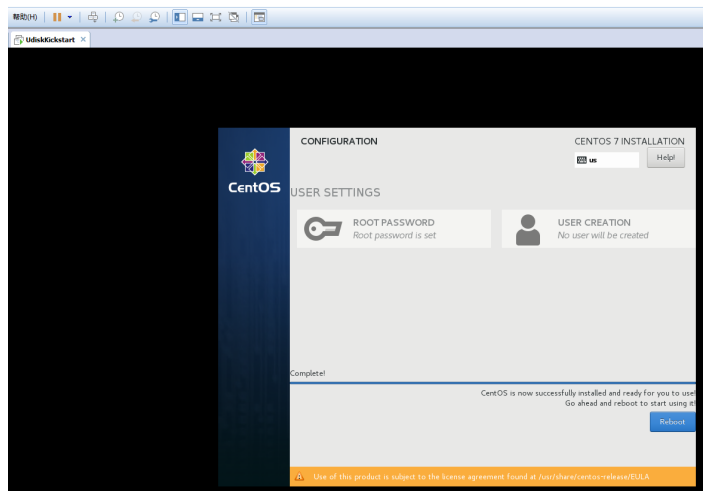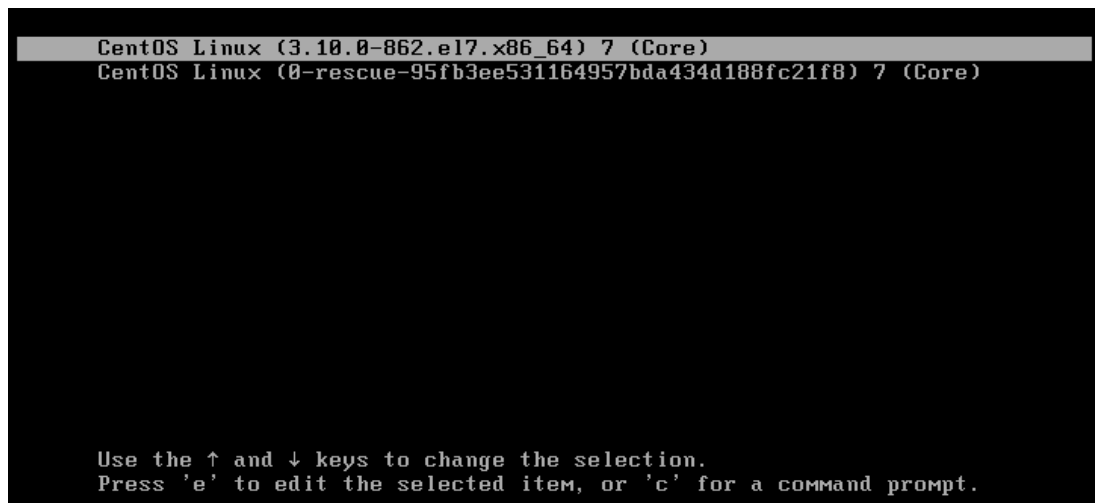
7前言: 基于第一步的基础上，开始第二大步骤的操作，完成官方原版系统的全自动/无人部署镜像的制作，免去人为的操作

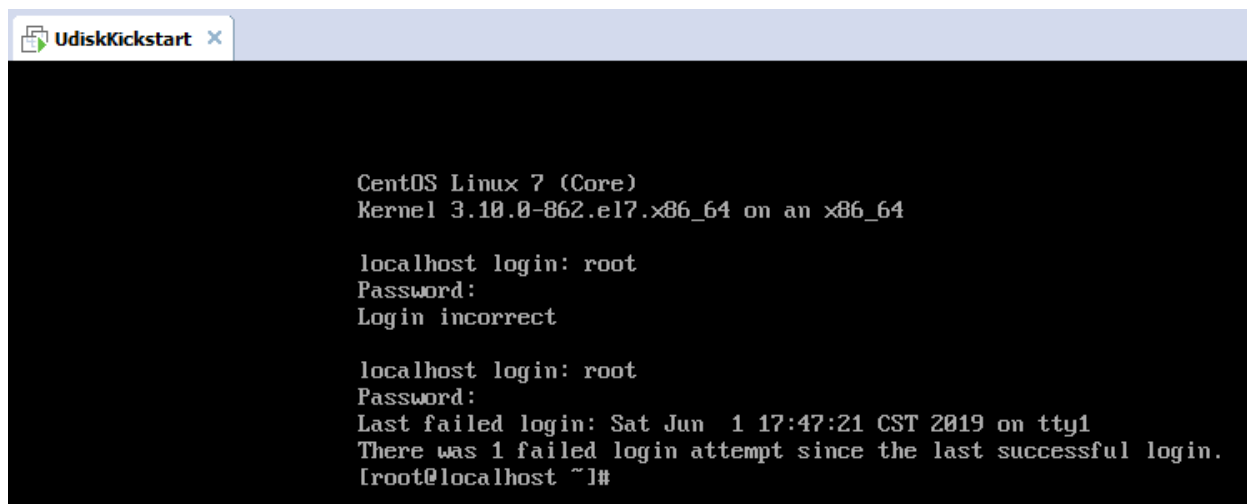1.准备阶段

1>右下角处点击"reboot"按钮，重启刚才配置的系统

2>点击下方处的第一项

3>输入账号/密码登入

二.制作kickstart无人部署安装CentOS7.5镜像系统

7前言: 基于第一步的基础上，开始第二大步骤的操作，完成官方原版系统的全自动/无人部署镜像的制作，免去人为的操作

4>获取ip，用于xshell连接，方便命令行的操作

```
[root@localhost ~]# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: ens33: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 00:0c:29:61:35:14 brd ff:ff:ff:ff:ff:ff
    inet 10.0.5.247/24 brd 10.0.5.255 scope global noprefixroute dynamic ens33
       valid_lft 86312sec preferred_lft 86312sec
    inet6 fe80::bc45:c94a:222f:626/64 scope link noprefixroute
       valid_lft forever preferred_lft forever
[root@localhost ~]# hostnamectl set-hostname UdiskKickstart
[root@localhost ~]# ping -c 2 www.baidu.com
PING www.a.shifen.com (14.215.177.38) 56(84) bytes of data.
64 bytes from 14.215.177.38 (14.215.177.38): icmp_seq=1 ttl=55 time=6.63 ms
64 bytes from 14.215.177.38 (14.215.177.38): icmp_seq=2 ttl=55 time=6.99 ms

--- www.a.shifen.com ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1003ms
rtt min/avg/max/mdev = 6.632/6.813/6.995/0.199 ms
```

5>使用xshell软件登入系统

```
1 10.0.5.247:22    +
[E:\~]$ ssh 10.0.5.247


Connecting to 10.0.5.247:22...
Connection established.
To escape to local shell, press Ctrl+Alt+].

WARNING! The remote SSH server rejected X11 forwarding request.
Last failed login: Sat Jun  1 17:51:40 CST 2019 from 10.0.5.127 on ssh:notty
There was 1 failed login attempt since the last successful login.
Last login: Sat Jun  1 17:49:33 2019 from 10.0.5.127
[root@udiskkickstart ~]#
[root@udiskkickstart ~]# cat /etc/redhat-release
CentOS Linux release 7.5.1804 (Core)
```
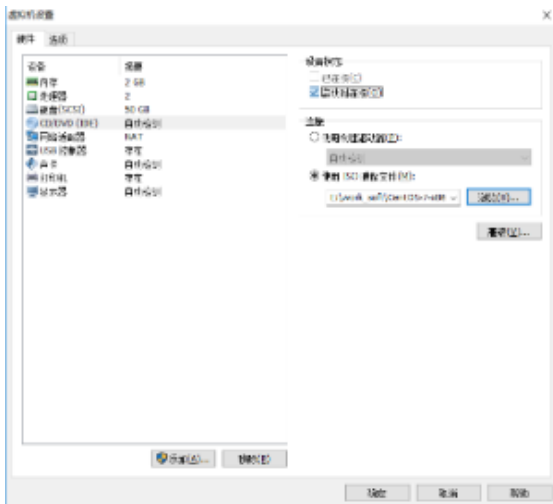
2.开启正式制作流程

1>全量拷贝系统镜像文件

```
mkdir /mnt/cdrom
mount /dev/cdrom /mnt/cdrom
mkdir -p /data/iso
yum -y install rsync
rsync -a /mnt/cdrom/ /data/iso/
```

注意：如出现以下问题

```
[root@udiskkickstart ~]# mount /dev/cdrom /mnt/cdrom
mount: no medium found on /dev/sr0
```

确保右上角处"CD/DVD(IDE)"处的右上角的"设备状态"为"启动时连接(O)"方框处为√，请务必保持正确的操作，否则执行mount/挂载异常

无误后，请重新系统，如配置正确，执行1-2次还不能挂载成功，请执行多次，如执行多次后，还未成功，请重新查阅技术文档，保证一致性。

2>制作kickstart文件

```
cd /data/iso/isolinux/
vi ks.cfg
```

```
# Kickstart file for CentOS 7.5
# Fixed Vulnerabilities: GHOST,Heartbleed,Shellshock,POODLE


# install os instead of upgrade
install

# use specific usb installation media
cdrom

# Run the Setup Agent on first boot
firstboot --enable

# Keyboard layouts
keyboard --vckeymap=us --xlayouts='us'

# System language
lang en_US.UTF-8 --addsupport=zh_CN.UTF-8

# System timezone
timezone Asia/Shanghai --isUtc

# user setup, application user should be added in %post section for more options
rootpw  --iscrypted $1$Kaufmann$LnNl5eh.dM2eW.dIyY9UM0
authconfig --enableshadow --passalgo=sha512

# firewall / selinux configuration
firewall --disabled

# SELinux configuration
selinux --disabled

# reboot after installation
reboot

#-----------------------------------------------------------------------------
# The %pre sections
#-----------------------------------------------------------------------------
%include /tmp/part-include
%pre
```

```sh
#!/bin/sh


#--------------------------------------------------------------------------------
# RAID
#
#--------------------------------------------------------------------------------
function get_osdisk() {
    disk_count=$(fdisk -l | grep "Disk /dev/${osdisk_prefix}" | wc -l)
    if [ ${disk_count} -eq 1 ]; then
        osdisk=$(fdisk -l | grep "Disk /dev/${osdisk_prefix}" | cut -d: -f1 | cut -d/ -f3)
    else
        osdisk=$(fdisk -l | grep "Disk /dev/${osdisk_prefix}" | awk '{if ($3 >=50 && $3 < 4000) print $0}' |
cut -d: -f1 | cut -d/ -f3)
    fi
}

#--------------------------------------------------------------------------------
# swapmem<=2Gswap
# 2G<mem<=16Gswap=8G mem>16Gswap=16G
# /proc/meminfokbkickstartsswapmb
#--------------------------------------------------------------------------------
function get_swap() {
    act_mem=$(cat /proc/meminfo | grep MemTotal | awk '{print $2}')
    if [ ${act_mem} -le $((2*1024*1024)) ]; then
        swap_size=$((2*1024))
    elif [ ${act_mem} -gt $((2*1024*1024)) ] && [ ${act_mem} -le $((16*1024*1024)) ]; then
        swap_size=$((8*1024))
    else
        swap_size=$((16*1024))
    fi
}

#--------------------------------------------------------------------------------
# RAID(BIOS RAID set)
# RAID 1Volume0Volume0_0/dev/md126
# SATADOMSATASCSIIDEsdx
# IDEhdx
#--------------------------------------------------------------------------------
if $(grep -q 'md.*$' /proc/partitions); then
    osdisk="Volume0_0"
    get_swap
elif $(grep -q 'sd.*$' /proc/partitions); then
    osdisk_prefix='sd'
    get_osdisk
    get_swap
elif $(grep -q 'hd.*$' /proc/partitions); then
    osdisk_prefix='hd'
    get_osdisk
    get_swap
else
    print "Lost disks, please install disks first!"
    exit 1
fi

#--------------------------------------------------------------------------------
# /tmp/part-include
#--------------------------------------------------------------------------------
cat >> /tmp/part-include << EOF
# System bootloader configuration
bootloader --location=mbr --boot-drive=${osdisk}
# Partition clearing information
clearpart --all --initlabel
# Clear the Master Boot Record
zerombr
# Disk partitioning information
part biosboot --fstype="biosboot" --ondisk=${osdisk} --size=1                  # 2TBIOSCentOSGPT1MBbiosboot
part /boot --fstype="xfs" --ondisk=${osdisk} --size=500
part /boot/efi --fstype="xfs" --ondisk=${osdisk} --size=500
part pv.01 --fstype="lvmpv" --ondisk=${osdisk} --size=1 --grow
volgroup centos --pesize=4096 pv.01
```

```
logvol swap --fstype="swap" --size=${swap_size} --name=swap --vgname=centos
logvol /  --fstype="xfs" --size=51200 --name=root --vgname=centos                    #/data;logvol
/  --fstype="xfs" --grow --size=1024 --name=root --vgname=centos
logvol /data  --fstype="xfs" --grow --size=1024 --name=data --vgname=centos          #/data/data
EOF

%end



#-------------------------------------------------------------------------------
# The %packages section
#-------------------------------------------------------------------------------
# software packages to install (packages preceded with @ are yum packages)
%packages
@core
kexec-tools

%end
```

注：

a. 含中文注释内容可去除，未去除，方便阅读者理解

b. 为检查ks.cfg文件是否有语法错误，可安装pykickstart软件包检查，具体操作如下：

```
yum -y install pykickstart
ksvalidator ks.cfg
```

c. kickstart文件的%pre和%post前后不能有空格，否则会报错Unable to open input kickstart file


```
anaconda 21.48.22.56-1 for CentOS 7 started.
 * installation log files are stored in /tmp during the installation
 * shell is available on TTY2
 * when reporting a bug add logs from /tmp as separate text/plain attachments
13:55:53 Running pre-installation scripts
The following problem occurred on line 0 of the kickstart file:

Unable to open input kickstart file: curl#37 - "Couldn't open file /tmp/part-include"

Exception AttributeError: "'NoneType' object has no attribute 'udev_unref'" in <bound method Context
.__del__ of <pyudev.core.Context object at 0x7fb59ca1dc90>> ignored
```

d. 取消网络的相关配置，此需要技术支持部门到达项目所在地后，根据实际情况配置网络

3>提供启动菜单Boot Memu

a. MBR引导方式

```
rm -rf /data/iso/isolinux/isolinux.cfg
vi /data/iso/isolinux/isolinux.cfg
```

```
default vesamenu.c32
timeout 100

display boot.msg

# Clear the screen when exiting the menu, instead of leaving the menu displayed.
# For vesamenu, this means the graphical background is still displayed without
# the menu itself for as long as the screen remains in graphics mode.
menu clear
menu background splash.png
menu title CentOS Linux 7
menu vshift 8
#menu hidden
menu helpmsgrow 15
menu tabmsgrow 13
```

```
# Border Area
menu color border * #00000000 #00000000 none

# Selected item
menu color sel 0 #ffffffff #00000000 none


# Press [Tab] message
menu color tabmsg 0 #ff3a6496 #00000000 none


# Selected hotkey
menu color hotsel 0 #84b8ffff #00000000 none

# Unselected hotkey
menu color hotkey 0 #ffffffff #00000000 none

# Help text
menu color help 0 #ffffffff #00000000 none

# A scrollbar of some type? Not sure.
menu color scrollbar 0 #ffffffff #ff355594 none

# Timeout msg
menu color timeout 0 #ffffffff #00000000 none
menu color timeout_msg 0 #ffffffff #00000000 none

# Command prompt text
menu color cmdmark 0 #84b8ffff #00000000 none
menu color cmdline 0 #ffffffff #00000000 none

# Do not display the actual menu unless the user presses a key. All that is displayed is a timeout message.

menu tabmsg Press Tab for full configuration options on menu items.

menu separator # insert an empty line
menu separator # insert an empty line

label Install CentOS 7.5 BasicWebServer with Kickstart
  menu label ^Install CentOS 7.5 BasicWebServer with Kickstart
  menu default
  kernel vmlinuz
  append initrd=initrd.img inst.stage2=hd:LABEL=CentOS7 inst.ks=hd:LABEL=CentOS7:/isolinux/ks.cfg

label Install CentOS 7.5 BasicWebServer with 4U4Node Kickstart
  menu label ^Install CentOS 7.5 BasicWebServer with 4U4Node Kickstart
  kernel vmlinuz
  append initrd=initrd.img inst.stage2=hd:LABEL=CentOS7 inst.ks=hd:LABEL=CentOS7:/isolinux/ks-4U4Node.cfg

label Install CentOS 7.5 Manual
  menu label ^Install CentOS 7.5 Manual
  kernel vmlinuz
  append initrd=initrd.img inst.stage2=hd:LABEL=CentOS7 quiet

label rescue
  menu indent count 5
  menu label ^Rescue a CentOS system
  text help
  If the system will not boot, this lets you access files
  and edit config files to try to get it booting again.
  endtext
  kernel vmlinuz
  append initrd=initrd.img inst.stage2=hd:LABEL=CentOS7 rescue quiet

label local
  menu label Boot from ^local drive
  localboot 0xffff

menu end
```

注:
①背景图片splash.png已定制!

②inst.ks=hd:LABEL=CentOS7:/isolinux/ks.cfg，通过LABEL指定kickstart文件位置的方式，制作的ISO文件可以用于U盘启动（注意别少冒号）

inst.ks=cdrom:/isolinux/ks.cfgkickstartISO

无法制作成U盘安装，因为U盘安装时，U盘不是光盘而被当作一个磁盘,安装系统时汇报如下错误

```
[    7.837748] sd 2:0:0:0: [sda] 209715200 512-byte logical blocks: (107 GB/100
GiB)
[    7.838000] sd 2:0:0:0: [sda] Write Protect is off
[    7.838217] sd 2:0:0:0: [sda] Cache data unavailable
[    7.838326] sd 2:0:0:0: [sda] Assuming drive cache: write through
[    7.839898]  sda: unknown partition table
[    7.840301] sd 2:0:0:0: [sda] Attached SCSI disk
[    7.840733] sd 2:0:1:0: [sdb] 31299696 512-byte logical blocks: (16.0 GB/14.9
 GiB)
[    7.840969] sd 2:0:1:0: [sdb] Write Protect is off
[    7.841157] sd 2:0:1:0: [sdb] Cache data unavailable
[    7.841266] sd 2:0:1:0: [sdb] Assuming drive cache: write through
[    7.842504]  sdb: sdb1
[    7.842965] sd 2:0:1:0: [sdb] Attached SCSI disk
[    7.867712] alg: No test for crc32 (crc32-pclmul)
[    7.874386] fbcon: svgadrmfb (fb0) is primary device
[    7.883916] Console: switching to colour frame buffer device 100x37
[    7.886728] [drm] Initialized vmwgfx 2.6.1 20140704 for 0000:00:0f.0 on minor 0
[    7.965596] sr 1:0:0:0: [sr0] scsi3-mmc drive: 1x/1x writer dvd-ram cd/rw xa/form2 cdda tray
[    7.965696] cdrom: Uniform CD-ROM driver Revision: 3.20
[    8.626189] loop: module loaded
```

卡在loop: module loaded，表示无法找到kickstart文件

b.EFIMBR

```
rm -rf /data/iso/EFI/BOOT/grub.cfg
vi /data/iso/EFI/BOOT/grub.cfg
```

```
set default="0"

function load_video {
  insmod efi_gop
  insmod efi_uga
  insmod video_bochs
  insmod video_cirrus
  insmod all_video
}

load_video
set gfxpayload=keep
insmod gzio
insmod part_gpt
insmod ext2

set timeout=10
### END /etc/grub.d/00_header ###

search --no-floppy --set=root -l 'CentOS 7 x86_64'

### BEGIN /etc/grub.d/10_linux ###

menuentry 'Install CentOS 7.5 BasicWebServer with Kickstart' --class fedora --class gnu-linux --class gnu --
class os {
  linuxefi /images/pxeboot/vmlinuz inst.stage2=hd:LABEL=CentOS7 inst.ks=hd:LABEL=CentOS7:/isolinux/ks.cfg
  initrdefi /images/pxeboot/initrd.img
}

menuentry 'Install CentOS 7.5 Manual' --class fedora --class gnu-linux --class gnu --class os {
  linuxefi /images/pxeboot/vmlinuz inst.stage2=hd:LABEL=CentOS7 quiet
  initrdefi /images/pxeboot/initrd.img
}

submenu 'Troubleshooting -->' {
  menuentry 'Install CentOS 7 in basic graphics mode' --class fedora --class gnu-linux --class gnu --class os {
    linuxefi /images/pxeboot/vmlinuz inst.stage2=hd:LABEL=CentOS7 xdriver=vesa nomodeset quiet
    initrdefi /images/pxeboot/initrd.img
  }
  menuentry 'Rescue a CentOS system' --class fedora --class gnu-linux --class gnu --class os {
    linuxefi /images/pxeboot/vmlinuz inst.stage2=hd:LABEL=CentOS7 rescue quiet
    initrdefi /images/pxeboot/initrd.img
  }
}
```

注：

须要ks.cfg磁盘分区增加此条信息：

```
part /boot/efi --fstype="xfs" --ondisk=${osdisk} --size=500
```

展示磁盘分区的相关信息，如下所示：

```
#-------------------------------------------------------------------------------
# /tmp/part-include
#-------------------------------------------------------------------------------
cat >> /tmp/part-include << EOF
# System bootloader configuration
bootloader --location=mbr --boot-drive=${osdisk}
# Partition clearing information
clearpart --all --initlabel
# Clear the Master Boot Record
zerombr
# Disk partitioning information
part biosboot --fstype="biosboot" --ondisk=${osdisk} --size=1
part /boot --fstype="xfs" --ondisk=${osdisk} --size=500
part /boot/efi --fstype="xfs" --ondisk=${osdisk} --size=500                    #---
part pv.01 --fstype="lvmpv" --ondisk=${osdisk} --size=1 --grow
volgroup centos --pesize=4096 pv.01
logvol swap --fstype="swap" --size=${swap_size} --name=swap --vgname=centos
logvol /  --fstype="xfs" --size=51200 --name=root --vgname=centos                              #/data;logvol
/  --fstype="xfs" --grow --size=1024 --name=root --vgname=centos
logvol /data  --fstype="xfs" --grow --size=1024 --name=data --vgname=centos              #/data/data
EOF


%end
```

4>生成新的ISO镜像

```
yum -y install genisoimage
cd /data/iso
genisoimage -o /root/CentOS-7.5-All-AutoInstall.iso -R -J -T -V CentOS7 -v -cache-inodes -joliet-long -b
isolinux/isolinux.bin -c isolinux/boot.cat -no-emul-boot -boot-load-size 4 -boot-info-table -eltorito-alt-boot -
e images/efiboot.img -no-emul-boot /data/iso/
```
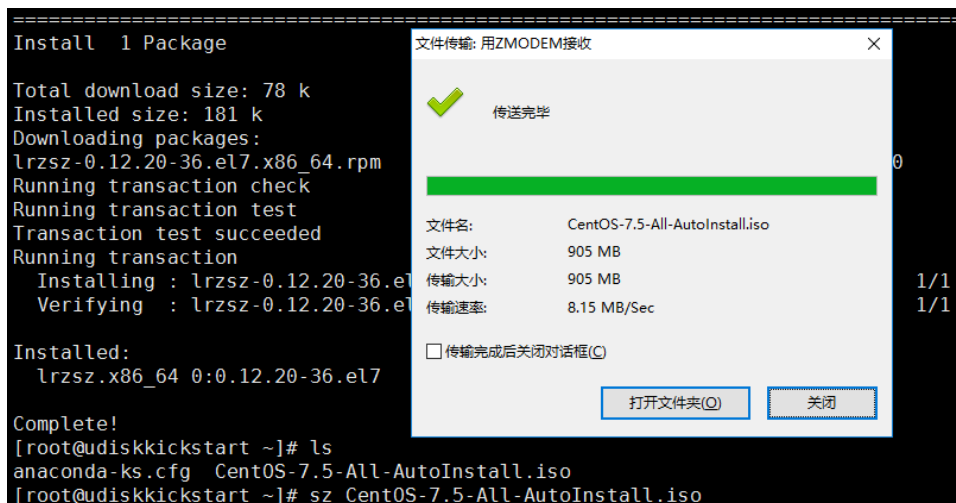
#genisoimage命令参数说明：

> -o 指定映像文件的名称
> -b 指定在制作可开机光盘时所需的开机映像文件
> -c 制作可开机光盘时，会将开机映像文件中的no-eltorito-catalog全部内容作成一个文件
> -no-emul-boot 非模拟模式启动
> -boot-load-size 4 设置载入部分的数量
> -boot-info-table 在启动的图像中现实信息
> -joliet-long 使用joliet格式的目录与文件名称，长文件名支持
> -R或-rock 使用Rock RidgeExtensions
> -J或-joliet 使用Joliet格式的目录与文件名称
> -v或-verbose 执行时显示详细的信息
> -T或-translation-table 建立文件名的转换表，适用于不支持Rock Ridge Extensions的系统上
> -V CentOS7 指定光盘的label，对应isolinux.cfg中的LABEL

注:如下信息为生成镜像成功

```
 94.90% done, estimate finish Sat Jun  1 20:19:53 2019
 95.98% done, estimate finish Sat Jun  1 20:19:53 2019
 97.06% done, estimate finish Sat Jun  1 20:19:52 2019
 98.14% done, estimate finish Sat Jun  1 20:19:52 2019
 99.22% done, estimate finish Sat Jun  1 20:19:53 2019
Total translation table size: 121691
Total rockridge attributes bytes: 53900
Total directory bytes: 90112
Path table size(bytes): 140
Done with: The File(s)                         Block(s)    463386
Writing:   Ending Padblock                      Start Block 463495
Done with: Ending Padblock                      Block(s)    150
Max brk space used a1000
463645 extents written (905 MB)
[root@udiskkickstart iso]#
```

3. 生成的镜像通过lrzsz输出至PC/真实机上

```
cd
yum -y install lrzsz
sz CentOS-7.5-All-AutoInstall.iso
```

```
====================================================================
Install  1 Package

Total download size: 78 k
Installed size: 181 k
Downloading packages:
lrzsz-0.12.20-36.el7.x86_64.rpm
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
  Installing : lrzsz-0.12.20-36.el                                  1/1
  Verifying  : lrzsz-0.12.20-36.el                                  1/1

Installed:
  lrzsz.x86_64 0:0.12.20-36.el7

Complete!
[root@udiskkickstart ~]# ls
anaconda-ks.cfg  CentOS-7.5-All-AutoInstall.iso
[root@udiskkickstart ~]# sz CentOS-7.5-All-AutoInstall.iso
```

就此成功制作镜像，并完成镜像的输出，给下一步刻录镜像提供操作准备

注:详细的kickstart配置细节，可查看:http://blog.chinaunix.net/uid-30936525-id-5719207.html