

\Create XCAT Statefull image

You can find statefull image by just typing command `lsdef -t osimage` where you will see three images.

```
[root@master ~]# lsdef -t osimage
centos7.6-x86_64-install-compute (osimage)
centos7.6-x86_64-netboot-compute (osimage)
centos7.6-x86_64-statelite-compute (osimage)
[root@master ~]#
```

you can use “centos7.6-x86_64-install-compute” for statefull installation.

To check contains of image run following command:

```
#lsdef -t osimage centos7.6-x86_64-install-compute
```

```
[root@master ~]# lsdef -t osimage centos7.6-x86_64-install-compute
Object name: centos7.6-x86_64-install-compute
  imagetype=linux
  osarch=x86_64
  osdistrname=centos7.6-x86_64
  osname=Linux
  osvers=centos7.6
  otherpkgdir=/install/post/otherpkgs/centos7.6/x86_64
  otherpkglist=/install/custom/netboot/centos/otherpkgs.pkglist
  pkgdir=/install/centos7.6/x86_64
  pkglist=/opt/xcat/share/xcat/install/centos/compute.centos7.pkglist
  profile=compute
  provmethod=install
  synclist=/install/custom/netboot/centos/login.synclist
  template=/opt/xcat/share/xcat/install/centos/compute.centos7.tpl
[root@master ~]#
```

To add additional rpms that you also want installed, make a directory to hold them, create a list of the rpms you want installed, and add that information to the osimage definition:

- **Create Other package directory**

Create a directory to hold the additional rpms:

```
# mkdir -p /install/post/otherpkgs/centos7.6/x86_64
```

```
#cd /install/post/otherpkgs/centos7.6/x86_64
```

Copy rpms into /install/post/otherpkgs/centos7.6/x86_64 and create repo.

```
#createrepo .
```

- **Create Otherpackage file**

Create a file that lists the additional rpms that should be installed. For example, in

```
# mkdir /install/custom/netboot/centos/
```

```
# vim /install/custom/netboot/centos/otherpkgs.pkglist
```

```
[root@master ~]# cat /install/custom/netboot/centos/otherpkgs.pkglist
slurm
slurm-contribs
slurm-devel
slurm-example-configs
slurm-libpmi
slurm-openlava
slurm-pam_slurm
slurm-perlapi
slurm-torque
perl-Switch
munge
munge-libs
munge-devel
lmod-ohpc
openldap-clients
nss-pam-ldapd
figlet
```

List of packages:

Slurm,slurm-contribs,slurm-devel,slurm-example-configs,slurm-libpmi,slurm-openlava,slurm-pam_slurm,slurm-perlapi,slurm-torque,perl-Switch,munge,munge-libs,munge-devel,lmod-ohpc,openldap-clients,nss-pam-ldapd,figlet,lmodohpc,prelink,aide,iftop,fail2ban,rkhunter,mod_ssl,beegfs-common,beegfs-helperd,beegfs-utils,beegfs-client

Add both the directory and the file to the osimage definition:

```
# Chdef -t osimage centos7.9-x86_64-install-compute otherpkgdir=/install/post/otherpkgs/centos7.9/x86_64
otherpkglist=/install/custom/netboot/centos/otherpkgs.pkglist
```

- **Create Partition File**

Vim /install/custom/partitionfile :

```
clearpart --all --initlabel --drives=sda,sdb
volgroup data_vg --pesize=4096 pv.1005
volgroup os_vg --pesize=4096 pv.452
part pv.1005 --fstype="lvmpv" --ondisk=sdb --size=5720638
part /boot/efi --fstype="efi" --ondisk=sda --size=1024 --fsoptions="umask=0077,shortname=winnt"
part /boot --fstype="xfs" --ondisk=sda --size=10240
part pv.452 --fstype="lvmpv" --ondisk=sda --size=1132862
logvol /var --fstype="xfs" --size=614400 --name=var --vgname=data_vg
logvol /opt --fstype="xfs" --size=204800 --name=opt --vgname=data_vg
logvol /var/log/audit --fstype="xfs" --size=512000 --name=var_log_audit --vgname=data_vg
logvol swap --fstype="swap" --size=49152 --name=swap --vgname=os_vg
logvol / --fstype="xfs" --size=1083707 --name=root --vgname=os_vg
logvol /var/log --fstype="xfs" --size=4184631 --name=var_log --vgname=data_vg
logvol /tmp --fstype="xfs" --size=204800 --name=tmp --vgname=data_vg
```

You can set the partitionfile path using the following command:

```
# chdef -t osimage -o centos7.9-x86_64-install-compute partitionfile=/install/custom/partitionfile
```

- **Create Synclist File**

In the installation process, xCAT needs to figure out the location of the synclist file automatically, so the synclist should be put into the specified place with the proper name.

You can set the synclist path using the following command:

```
# chdef -t osimage -o centos7.9-x86_64-install-compute synclists=/install/custom/netboot/centos/login.synclist
```

Edit template file

```
Vim /opt/xcat/share/xcat/install/centos/compute.centos7.tmpl
```

Search for the `skipx` parameter and comment it

Search for the `text` and comment it

Add your password:

```
auth --enablesshadow --passlog=sha512rootpw --iscrypted  
$1$/JUDobnI$NgEGjG.wOIolo75nWoJ5o/
```

- **Postscripts**

Add following lines at the end of this file

```
# vim /install/postscripts/remoteshell:
```

```
#!/bin/bash  
wget http://172.10.0.1:80/install/post/otherpkgs/centos7.9/x86_64/pam_captcha.so -P /usr/lib64/security/  
sed -i "/#%PAM-1.0/a\\auth    required    pam_captcha.so randomstring" /etc/pam.d/sshd  
sed -i 's/^ChallengeResponseAuthentication.*\/ChallengeResponseAuthentication yes/g' /etc/ssh/sshd_config  
service sshd restart  
systemctl set-default graphical.target
```

```
export SLURMUSER=900  
groupadd -g $SLURMUSER slurm  
useradd -m -c "SLURM workload manager" -d /var/lib/slurm -u $SLURMUSER -g slurm -s /bin/bash slurm
```

```
mkdir /var/log/munge/  
touch /var/log/munge/munged.log  
chown -R munge:munge /var/log/munge  
chown -R munge:munge /run/munge  
chown -R munge:/etc/munge  
chown -R munge:munge /etc/munge/ /var/log/munge/ /var/lib/munge/ /run/munge/  
chmod 0700 /etc/munge/ /var/log/munge/ /var/lib/munge/ /run/munge/  
chmod 0700 /etc/munge/ /var/log/munge/ /var/lib/munge/ /run/munge/  
chmod 755 /run/munge
```

*note : copy `pam_captcha.so` file to this path `/install/post/otherpkgs/centos7.9/x86_64/`

- **Setup of mellanox in stateful image**

For mellanox installation copy mellanox iso to the following path

`/install/custom/MLNX_OFED_LINUX-5.5-1.0.3.2-rhel7.9-x86_64.iso`

- **Setup Postbootscripts**

`vim /install/postscripts/otherpkgs`

add following lines in the starting

`#enable debug`

`#set -x`

`mkdir /etc/yum.repos.d/yum.bk`

`mv /etc/yum.repos.d/CentOS-* /etc/yum.repos.d/yum.bk`

```
#enable debug
#set -x
mkdir /etc/yum.repos.d/yum.bk
mv /etc/yum.repos.d/CentOS-* /etc/yum.repos.d/yum.bk
```

add following lines at the ending

`mv /etc/yum.repos.d/yum.bk/* /etc/yum.repos.d/`

`rm -rf /etc/yum.repos.d/yum.bk`

```

    fi

    op_index=$((op_index+1))
done

mv /etc/yum.repos.d/yum.bk/* /etc/yum.repos.d/
rm -rf /etc/yum.repos.d/yum.bk

exit $RETURNVAL

```

- Create node definition

```
# mkdef -t node cn00 groups=compute,all ip=192.168.20.12 mac=00:0c:29:c4:50:25 netboot=xnba
```

```
# chdef cn00 postscripts=syslog,remoteshell,syncfiles,mlnxofed_ib_install -p
```

```
"/install/custom/MLNX_OFED_LINUX-5.4-3.1.0.0-rhel7.9-x86_64.iso","confignetwork -s",ssh_captcha
```

```
#chdef cn00 postbootscripts=otherpkgs
```