网络驱动设备：iSCSI服务器

一. 介绍

- DAS 直接连接存储
- NAS（Network Attached Storage，网络附加存储服务器）实质：一台可以提供大容量文件系统的主机。NAS提供网络协议的文件系统（NFS、SAMBA等）
- SAN（Storage Area Networks，存储局域网）：将SAN视为一个外接式的存储设备。SAN通过某些特殊的接口或信道来提供局域网内的所有机器进行磁盘访问。SAN提供的是磁盘给主机使用。

二. ISCSI接口：（ISCSI）（Internet SCSI）。通过TCP/IP技术，将存储设备端通过ISCSI target功能，做成服务器端；ISCSI initator（ISCSI 初始化用户），做成能够挂载使用的ISCSI target的客户端

三. 软件结构

```
[root@RHEL6 /]# vim /etc/tgt/targets.conf
[root@RHEL6 /]# tgt-admin 在线查询、删除target等功能的设置工具
[root@RHEL6 /]# tgtadm 手动直接管理的管理员工具
[root@RHEL6 /]# tgtd 提供ISCSI target服务的主程序
[root@RHEL6 /]# tgt-setup-lun 建立target以及设置共享的磁盘与可用的客户端等工具
[root@RHEL6 /]# tgtimg 搭建预计共享的映像文件设备的工具（以映像文件仿真磁盘）
```

四. 服务器端配置（RHEL6）

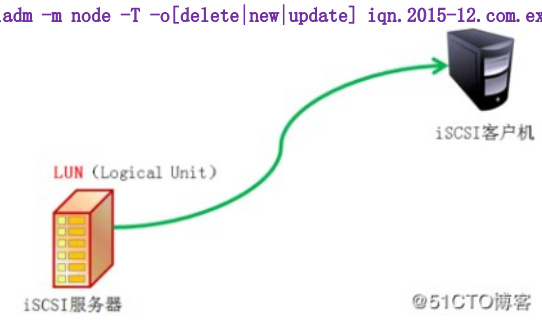
```
[root@RHEL6 /]# yum install scsi\*    安装scsi软件包，让服务器具备scsi驱动
[root@RHEL6 /]# service tgtd restart    启动scsi
[root@RHEL6 /]# chkconfig tgtd on      设置开机自动启动
[root@RHEL6 /]# iptables -I INPUT -p tcp --dport 3260 -j ACCEPT 防火墙放行
[root@RHEL6 /]# service iptables save
 正在更改"/test/iscsi/disk1" 的安全环境
 正在更改"/test/iscsi/" 的安全环境
[root@RHEL6 ~]# dd if=/dev/zero of=/xx/file bs=1M count=500   创建一个文件用于iscsi共享
[root@RHEL6 /]# chcon -Rv -t tgtd_var_lib_t /test/iscsi/ 更改SELinux。参数：-v查看过程
[root@RHEL6 ~]# vgcreate  -s 8  vg0   /dev/sdb1
[root@RHEL6 ~]# lvcreate -n server -L 2G  vg0
[root@RHEL6 ~]# lvscan
  ACTIVE            '/dev/vg0/server' [2.00 GiB] inherit
```

注意：如同一般外接式存储设备（target名称）可以具有多个磁盘。target能够拥有数个磁盘设备。同一个target上的磁盘，可以定义为逻辑单位编号（Logical Unit Number，LUN）

```
[root@RHEL6 /]# vim /etc/tgt/targets.conf
    <target iqn.2008-09.com.example:server.target3>
                    backing-store /dev/
    </target>
[root@RHEL6 /]# service tgtd restart
[root@RHEL6 /]# tgt-admin  -show     //查看共享成功的iscsi设备
```

客户端验证：

```
[root@RHEL6 /]# yum install iscsi\* -y
[root@RHEL6 /]# systemctl restart iscsi
[root@RHEL6 /]# iscsiadm -m discovery -t st -p 192.168.24.244    通过发现命令获取iscsi服务端提供的iscsi名称
[root@RHEL6 /]# iscsiadm -m node -T iqn.2015-12.com.example:disk -p 192.168.24.244 -l    登陆192.168.24.244主机上的共享设备，并挂载到本地
[root@RHEL6 /]# iscsiadm -m node -T iqn.2015-12.com.example:disk -p 192.168.24.244  -  -logout 会显示相关的target名称，注销之后还是看的到
[root@RHEL6 /]# iscsiadm -m node -T -o[delete|new|update] iqn.2015-12.com.example:disk -p 192.168.24.244 只有重新发现，才能继续使用
```



五. 服务器端配置（RHEL7）

```
[root@master /]# yum install target\* -y    //不同于rhel6，rhel7中的iscsi服务端由target取代
[root@master /]# targetcli
```

```
/> ls
o- / ......................................................................... [...]
  o- backstores .............................................................. [...]
  | o- block .................................................. [Storage Objects: 0]
  | o- fileio ................................................. [Storage Objects: 0]
  | o- pscsi .................................................. [Storage Objects: 0]
  | o- ramdisk ................................................ [Storage Objects: 0]
  o- iscsi ............................................................ [Targets: 0]
  o- loopback ......................................................... [Targets: 0]
```

```
/> /backstores/block create name=block1 dev=/dev/sdb  # 创建一个块存储
/> /iscsi create wwn=iqn.2019-07.test.com:block1      # 创建target对象
/> /iscsi/iqn.2019-07.test.com:block1/tpg1/acls create iqn.2019-07.test.com:block1 # 创建ACL允许下面标识的主机访问该存储

/> /iscsi/iqn.2019-07.test.com:block1/tpg1/luns create /backstores/block/block1    # 创建LUN并和存储设备做关联

/> /iscsi/iqn.2019-07.test.com:block1/tpg1/portals/ delete 0.0.0.0 3260 # 配置target监听IP和端口（默认在所有接口IP的3260/tcp监听）
/> /iscsi/iqn.2019-07.test.com:block1/tpg1/portals create 192.168.88.181
```

```
/> /iscsi/iqn.2019-07.test.com:block1/tpg1/acls/iqn.2019-07.test.com:block1/ set auth userid=root password=admin # 设置用户名和密码
[root@master /]# systemctl restart target
```

```
/>
/> ls
o- / ..... [...]
  o- backstores ..... [...]
  | o- block ..... [Storage Objects: 1]
  | | o- block1 ..... [/dev/sdb (20.0GiB) write-thru activated]
  | |   o- alua ..... [ALUA Groups: 1]
  | |     o- default_tg_pt_gp ..... [ALUA state: Active/optimized]
  | o- fileio ..... [Storage Objects: 0]
  | o- pscsi ..... [Storage Objects: 0]
  | o- ramdisk ..... [Storage Objects: 0]
  o- iscsi ..... [Targets: 1]
  | o- iqn.2019-07.test.com:block1 ..... [TPGs: 1]
  |   o- tpg1 ..... [no-gen-acls, no-auth]
  |     o- acls ..... [ACLs: 1]
  |     | o- iqn.2019-07.test.com:block1 ..... [Mapped LUNs: 1]
  |     |   o- mapped_lun0 ..... [lun0 block/block1 (rw)]
  |     o- luns ..... [LUNs: 1]
  |     | o- lun0 ..... [block/block1 (/dev/sdb) (default_tg_pt_gp)]
  |     o- portals ..... [Portals: 1]
  |       o- 192.168.88.181:3260 ..... [OK]
  o- loopback ..... [Targets: 0]
```

六. 客户端配置（RHEL7）

```
[root@client ~]# yum -y install iscsi-initiator-utils //安装客户端工具
[root@client ~]# vim /etc/iscsi/initiatorname.iscsi
InitiatorName=iqn.2019-07.test.com:file1 //修改自己的标识名
[root@client ~]# vim /etc/iscsi/iscsid.conf
```

```
node.session.auth.authmethod = CHAP

node.session.auth.username = root

node.session.auth.password = admin
```

```
[root@client ~]# systemctl start iscsi
[root@client ~]# systemctl enable iscsi
[root@client ~]# iscsiadm -m discovery -t sendtargets -p 192.168.88.183 # 查看存储设备
[root@client ~]# iscsiadm -m node --login # 配置连接到存储
[root@client ~]# iscsiadm -m node  -T iqn.2019-07.test.com:file1 -l

# 分区、格式化

设置客户端自动挂载
[root@client ~]# blkid /dev/sdb1 # 获取分区的uuid
[root@client ~]# vim /etc/fstab  # 设置开机自动挂载
```

```
#
# /etc/fstab
# Created by anaconda on Sun Jun 30 05:41:39 2019
#
# Accessible filesystems, by reference, are maintained under '/dev/disk'
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info
#
/dev/mapper/centos-root /                       xfs     defaults        0 0
UUID=f0bf60d2-f053-4f82-9b4d-5a91cf1a2b70 /boot                   xfs     defaults        0 0
/dev/mapper/centos-home /home                   xfs     defaults        0 0
/dev/mapper/centos-swap swap                    swap    defaults        0 0
UUID=bf86a198-b15b-4605-897f-c1b8c45e834d /mnt  ext4    defaults,_netdev        0       0
~
~
```

```
# 配置卸载存储
[root@client ~]# umount /dev/sdb1
[root@client ~]# iscsiadm -m node -T iqn.2019-07.test.com:block1 -p 192.168.88.181:3260 -u # 删除设备
```

七. 服务器端配置（file）（RHEL7）

```
[root@test ~]# mkdir /iscsi
[root@test ~]# dd if=/dev/zero of=/iscsi/file bs=1M count=1024
[root@test ~]# chcon -Rv -t tgtd_var_lib_t /iscsi/
[root@master /]# chcon -Rv -t tgtd_var_lib_t /test/iscsi/ 更改SELinux。参数：-v查看过程

[root@master /]# targetcli
/> /backstores/fileio create name=file1 file_or_dev=/iscsi/file
/> /iscsi create wwn=iqn.2019-07.test.com:file1
/> /iscsi/iqn.2019-07.test.com:file1/tpg1/acls create iqn.2019-07.test.com:file1
/> /iscsi/iqn.2019-07.test.com:file1/tpg1/luns create /backstores/fileio/file1
/> /iscsi/iqn.2019-07.test.com:file1/tpg1/portals/ delete 0.0.0.0 3260
/> /iscsi/iqn.2019-07.test.com:file1/tpg1/portals/ create 192.168.88.183
/> /iscsi/iqn.2019-07.test.com:file1/tpg1/acls/iqn.2019-07.test.com:file1 set auth userid=root password=admin
[root@master /]# systemctl restart target
```

```
/> ls
o- / ..... [...]
  o- backstores ..... [...]
  | o- block ..... [Storage Objects: 0]
  | o- fileio ..... [Storage Objects: 1]
  | | o- file1 ..... [/iscsi/file (1.0GiB) write-back activated]
  | |   o- alua ..... [ALUA Groups: 1]
  | |     o- default_tg_pt_gp ..... [ALUA state: Active/optimized]
  | o- pscsi ..... [Storage Objects: 0]
  | o- ramdisk ..... [Storage Objects: 0]
  o- iscsi ..... [Targets: 1]
  | o- iqn.2019-07.test.com:file1 ..... [TPGs: 1]
  |   o- tpg1 ..... [no-gen-acls, no-auth]
  |     o- acls ..... [ACLs: 1]
  |     | o- iqn.2019-07.test.com:file1 ..... [Mapped LUNs: 1]
  |     |   o- mapped_lun0 ..... [lun0 fileio/file1 (rw)]
  |     o- luns ..... [LUNs: 1]
  |     | o- lun0 ..... [fileio/file1 (/iscsi/file) (default_tg_pt_gp)]
  |     o- portals ..... [Portals: 1]
  |       o- 192.168.88.183:3260 ..... [OK]
  o- loopback ..... [Targets: 0]
/>
```

八. 客户端配置（RHEL7）

```
[root@client ~]# yum -y install iscsi-initiator-utils //安装客户端工具
[root@client ~]# vim /etc/iscsi/initiatorname.iscsi
InitiatorName=iqn.2019-07.test.com:block1 //修改自己的标识名
[root@client ~]# vim /etc/iscsi/iscsid.conf
node.session.auth.authmethod = CHAP

node.session.auth.username = root

node.session.auth.password = admin
```

```
[root@client ~]# systemctl start iscsi
[root@client ~]# systemctl enable iscsi
[root@client ~]# iscsiadm -m discovery -t sendtargets -p 192.168.88.181 # 查看存储设备
[root@client ~]# iscsiadm -m node  -login # 配置连接到存储
[root@client ~]# iscsiadm -m node -T iqn.2019-07.test.com:block1  -l

# 分区、格式化

设置客户端自动挂载
[root@client ~]# blkid /dev/sdb1 # 获取分区的uuid
[root@client ~]# vim /etc/fstab  # 设置开机自动挂载
```

```
#
# /etc/fstab
# Created by anaconda on Sun Jun 30 05:41:39 2019
#
# Accessible filesystems, by reference, are maintained under '/dev/disk'
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info
#
/dev/mapper/centos-root /                       xfs     defaults        0 0
UUID=f0bf60d2-f053-4f82-9b4d-5a91cf1a2b70 /boot                   xfs     defaults        0 0
/dev/mapper/centos-home /home                   xfs     defaults        0 0
/dev/mapper/centos-swap swap                    swap    defaults        0 0
UUID=bf86a198-b15b-4605-897f-c1b8c45e834d /mnt  ext4    defaults,_netdev        0       0
~
~
```

```
# 配置卸载存储
[root@client ~]# umount /dev/sdb1
[root@client ~]# iscsiadm -m node -T iqn.2019-07.test.com:block1 -p 192.168.88.181:3260  -u # 删除设备
```