Testing for Resignature of SR for VDI-per-LUN

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1 Introduction

This Xenserver supplemental pack allows the functionality to resignature a given LVMoISCSI SR which allows the SR to be reattached to the pool. This pack is targeted towards Xenserver 6.5.

The primary objective of this project was to enable the ability to do QoS per VM. This leveraged the QoS capabilities provided by storages like SolidFire/Equalogic etc. This QoS capability can be achieved by assigning a single LUN to a VDI. This LUN would be introduced to Xenserver as a single SR. So essentially, we are doing a single VDI per LUN.

The main drawback of this approach is that users cannot leverage the fast-snapshot/clone functionality offered by the backend storages as any snapshot taken on the backend storage is unaware of the underlying VDI(s) and metadata, and would copy the LUN block-by-block. Any attempt to attach this cloned LUN onto Xenserver will result in an error as there will be metadata conflicts.

The plugin provided here will resignature the UUIDs during a create of the cloned SR so there are no UUID conflicts. The resignature process is invoked when an `sr-create` with `type=relvmoiscsi` is called.

2 Test Setup

We have a Dell PowerEdge R410 which has a Quad Core Xeon CPU with 32GB of RAM. The server runs Xenserver 6.5. We have an Equallogic as our backend storage. We create a simple LVMoISCSI SR with a single VDI which will be used in our tests.

```
[root@coe-hq-xen09 ~]# echo $IQN
iqn.2001-05.com.equallogic:0-8a0906-fd4f8b402-662000002ba565f2-syed-clone-sr
[root@coe-hq-xen09 ~]# echo $SCSIid
36090a028408b4ffdf265a52b00002066
[root@coe-hq-xen09 ~]# xe sr-create name-label=vdi-test-1 type=lvmoiscsi device-config:target=172.31.255.200 \
         device-config:targetIQN=$IQN device-config:SCSIid=$SCSIid
e24124e4-3594-671b-7f78-887995194e2c
[root@coe-hq-xen09 ~]# xe vdi-create sr-uuid=e24124e4-3594-671b-7f78-887995194e2c name-label=test-vdi \
        type=user  virtual-size=100000000
0c2476e0-08cf-4db6-9726-d1a14f345062
[root@coe-hq-xen09 ~]# xe vdi-list uuid=0c2476e0-08cf-4db6-9726-d1a14f345062
uuid ( RO)                : 0c2476e0-08cf-4db6-9726-d1a14f345062
          name-label ( RW): test-vdi
    name-description ( RW):
             sr-uuid ( RO): e24124e4-3594-671b-7f78-887995194e2c
        virtual-size ( RO): 100663296
            sharable ( RO): false
           read-only ( RO): false
```

3 Testing

3.1 Creation of an SR with `type=relvmoiscsi` should resignature the SR

In this test we take a LUN which has an SR that contains a single VDI in it. We call the `sr-create` with `type=relvmoiscsi` to resignature the SR and the VDI. We then attach this SR back again using `sr-create` but with type `lvmoiscsi`. This is the most common use case that is going to be used with the resignature plugin.

```
[root@coe-hq-xen09 ~]# xe sr-create name-label=vdi-test-1 type=relvmoiscsi \
       device-config:target=172.31.255.200 device-config:targetIQN=$IQN device-config:SCSIid=$SCSIid
Error code: SR_BACKEND_FAILURE_1
Error parameters: , Error reporting error, unknown key The SR has been successfully resigned. Use the lvmoiscsi type to attach it,
[root@coe-hq-xen09 ~]#

[root@coe-hq-xen09 ~]# xe sr-probe type=lvmoiscsi device-config:target=172.31.255.200 device-config:targetIQN=$IQN device-config:SCSIid=$SCSIid<?x
<SRlist>
        <SR>
                <UUID>
                        5f616adb-6a53-7fa2-8181-429f95bff0e7
                </UUID>
                <Devlist>
                        /dev/disk/by-id/scsi-36090a028408b3feba66af52e0000a0e6
                </Devlist>
                <size>
                        5364514816
                </size>
        </SR>
</SRlist>

[root@coe-hq-xen09 ~]# xe sr-introduce name-label=vdi-test-resign type=lvmoiscsi  \
       uuid=5f616adb-6a53-7fa2-8181-429f95bff0e7
5f616adb-6a53-7fa2-8181-429f95bff0e7
[root@coe-hq-xen09 ~]# xe pbd-create sr-uuid=5f616adb-6a53-7fa2-8181-429f95bff0e7 \
       host-uuid=768d7b65-bb4b-48b6-aabc-e010bc27a4f8 device-config:target=172.31.255.200 \
        device-config:targetIQN=$IQN device-config:SCSIid=$SCSIid uuid=5f616adb-6a53-7fa2-8181-429f95bff0e7
23682678-8368-a671-1e8e-d4bb367482ab
[root@coe-hq-xen09 ~]# xe pbd-plug uuid=23682678-8368-a671-1e8e-d4bb367482ab
[root@coe-hq-xen09 ~]# xe pbd-list uuid=23682678-8368-a671-1e8e-d4bb367482ab
uuid ( RO)                  : 23682678-8368-a671-1e8e-d4bb367482ab
             host-uuid ( RO): 768d7b65-bb4b-48b6-aabc-e010bc27a4f8
               sr-uuid ( RO): 5f616adb-6a53-7fa2-8181-429f95bff0e7
        device-config (MRO): target: 172.31.255.200; targetIQN: iqn.2001-05.com.equallogic:0-8a0906-eb3f8b402-e6a000002ef56aa6-vdi-lun-test-vol; S
    currently-attached ( RO): true
[root@coe-hq-xen09 ~]#
[root@coe-hq-xen09 ~]# xe sr-list uuid=5f616adb-6a53-7fa2-8181-429f95bff0e7
uuid ( RO)                : 5f616adb-6a53-7fa2-8181-429f95bff0e7
          name-label ( RW): vdi-test-resign
    name-description ( RW):
                host ( RO): coe-hq-xen09
                type ( RO): lvmoiscsi
        content-type ( RO):


[root@coe-hq-xen09 ~]# xe vdi-list sr-uuid=5f616adb-6a53-7fa2-8181-429f95bff0e7
uuid ( RO)                : 9c260b27-2a8f-4af2-8e8f-e045910b63c0
          name-label ( RW):
    name-description ( RW):
             sr-uuid ( RO): 5f616adb-6a53-7fa2-8181-429f95bff0e7
        virtual-size ( RO): 100663296
            sharable ( RO): false
          read-only ( RO): false


[root@coe-hq-xen09 ~]#
```

3.2 Any operation other than create with `type=relvmoiscsi` on the SR should fail

`probe` and `introduce` were the only commands that we found could reach our code (apart from create). Both return error as expected

```
[root@coe-hq-xen09 ~]# xe sr-probe type=relvmoiscsi
There was an SR backend failure.
status: Operation 'sr_probe' not supported by this SR type
stdout:
stderr:

[root@coe-hq-xen09 ~]# xe sr-introduce name-label=test type=relvmoiscsi uuid=fcd415f5-ffbf-739b-f451-87af36198d74
```

```
[root@coe-hq-xen09 ~]# xe pbd-create sr-uuid=fcd415f5-ffbf-739b-f451-87af36198d74 \
        host-uuid=768d7b65-bb4b-48b6-aabc-e010bc27a4f8 device-config:target=172.31.255.200 \
        device-config:targetIQN=$IQN device-config:SCSIid=$SCSIid
[root@coe-hq-xen09 ~]# xe pbd-plug uuid=67afb035-886f-b409-0f39-80d36e36aa57
The server failed to handle your request, due to an internal error.  The given message may give details useful for debugging the problem.
message: Storage_interface.Internal_error("Smint.Not_implemented_in_backend")
```

3.3 If the LUN does not contain an SR, it should fail

```
[root@coe-hq-xen09 ~]# echo $EMPTY_SCSIid
36090a028408b7f82a76a252f000080e8
[root@coe-hq-xen09 ~]# echo $EMPTY_LUN
iqn.2001-05.com.equallogic:0-8a0906-827f8b402-e88000002f256aa7-vdi-lun-empty-volume
[root@coe-hq-xen09 ~]# xe sr-create name-label=vdi-test-resign type=relvmoiscsi \
        device-config:target=172.31.255.200 device-config:targetIQN=$EMPTY_LUN device-config:SCSIid=$EMPTY_SCSIid
Error code: SR_BACKEND_FAILURE_202
Error parameters: , General backend error [opterr=Command ['/usr/sbin/pvdisplay', '/dev/disk/by-id/scsi-36090a028408b7f82a76a252f000080e8'] failed
  Failed to read physical volume "/dev/disk/by-id/scsi-36090a028408b7f82a76a252f000080e8"): Input/output error],
[root@coe-hq-xen09 ~]#
```

3.4 If the LUN has one VDI and multiple snapshots, the plugin should delete the snapshots and resign the VDI

Here we create an SR with a VDI and attach the VDI to a VM and take a snapshot. As you can see, there are 3 VDIs

```
[root@coe-hq-xen09 ~]# xe vdi-list sr-uuid=087f1217-9d89-f45e-3369-eea70991a78d
uuid ( RO)                : 13b3937d-f9dc-4b6a-87c2-6620b0b6f992
          name-label ( RW): vdi1
    name-description ( RW):
             sr-uuid ( RO): 087f1217-9d89-f45e-3369-eea70991a78d
        virtual-size ( RO): 1073741824
            sharable ( RO): false
           read-only ( RO): false


uuid ( RO)                : 808dc343-25b7-4e0f-a15d-5b7043bcc0ae
          name-label ( RW): base copy
    name-description ( RW):
             sr-uuid ( RO): 087f1217-9d89-f45e-3369-eea70991a78d
        virtual-size ( RO): 1073741824
            sharable ( RO): false
           read-only ( RO): true


uuid ( RO)                : c22ab057-3bee-44d6-b8f7-17a363ef2575
          name-label ( RW): vdi1
    name-description ( RW):
             sr-uuid ( RO): 087f1217-9d89-f45e-3369-eea70991a78d
        virtual-size ( RO): 1073741824
            sharable ( RO): false
           read-only ( RO): false
```

Next we create a clone on the backed, resign it using the commands shown earlier and attach it back

```
[root@coe-hq-xen09 ~]# xe sr-list name-label=iSCSI\ virtual\ disk\ storage
uuid ( RO)                : 9515966a-026a-52d6-1ad5-8b4fdfd158bf
          name-label ( RW): iSCSI virtual disk storage
    name-description ( RW): iSCSI SR [172.31.255.200 (iqn.2001-05.com.equallogic:0-8a0906-1eef8b402-2860000033156aab-c2; LUN 0: 6090A028408BEF1EAB
                host ( RO): coe-hq-xen09
                type ( RO): lvmoiscsi
        content-type ( RO):


[root@coe-hq-xen09 ~]# xe vdi-list sr-uuid=9515966a-026a-52d6-1ad5-8b4fdfd158bf
uuid ( RO)                : 33c2afdc-3891-4f97-877a-370b9b0c70ac
          name-label ( RW): vdi1
    name-description ( RW):
             sr-uuid ( RO): 9515966a-026a-52d6-1ad5-8b4fdfd158bf
        virtual-size ( RO): 1073741824
            sharable ( RO): false
           read-only ( RO): false
```

This has only 1 VDI.

3.5 Resignature functionality should work when multipath is enabled

We verified the resignature by enabling multipath on the Xenserver and found no errors.

4 Other notes

We have also tested this over the Java SDK using Cloudstack and SolidFire. We have not seen any problems yet.