ZPOOL: Add a mirror to a concat zpool

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ZPOOL: Add a mirror to a concat zpool

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# Tested on RHEL 6 & 7

# Even if ZFS can use individual slices or partitions, it is
recommended to use whole disks.


# Having a concat zpool like following one

POOLNAME=my_pool

zpool status $POOLNAME
     pool: my_pool
    state: ONLINE
    scan: none requested
   config:

           NAME        STATE     READ WRITE CKSUM
           my_pool     ONLINE       0     0     0
             sdb       ONLINE       0     0     0
             sdc       ONLINE       0     0     0

   errors: No known data errors


zpool list
   NAME      SIZE  ALLOC   FREE    CAP  DEDUP  HEALTH  ALTROOT
   my_pool  19.9G   104K  19.9G     0%  1.00x  ONLINE  -
```

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# we would like to add a mirror

DEVICE01_ORIG=/dev/sdb
DEVICE02_ORIG=/dev/sdc

DEVICE01_MIRR=/dev/sdd
DEVICE02_MIRR=/dev/sde


# We add one by one the new devices to the existing ones to form the
new mirrors

zpool attach $POOLNAME $DEVICE01_ORIG $DEVICE01_MIRR

# If you have an error like this one:

   invalid vdev specification
   use '-f' to override the following errors:
   /dev/sdd does not contain an EFI label but it may contain
partition
   information in the MBR.

# you should use '-f' option to create the pool - first ensure that
disk(s) are the
# right one(s):

# zpool attach -f $POOLNAME $DEVICE01_ORIG $DEVICE01_MIRR



# Check

zpool status $POOLNAME
     pool: my_pool
    state: ONLINE
    scan: resilvered 36.5K in 0h0m with 0 errors on Tue Sep  1
```

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15:18:06 2015
   config:

          NAME        STATE     READ WRITE CKSUM
          my_pool     ONLINE       0     0     0
            mirror-0  ONLINE       0     0     0
              sdb     ONLINE       0     0     0
              sdd     ONLINE       0     0     0   <----
            sdc       ONLINE       0     0     0

   errors: No known data errors



zpool attach $POOLNAME $DEVICE02_ORIG $DEVICE02_MIRR

# If you have an error like this one:

   invalid vdev specification
   use '-f' to override the following errors:
   /dev/sde does not contain an EFI label but it may contain
partition
   information in the MBR.

# you should use '-f' option to create the pool - first ensure that
disk(s) are the
# right one(s):

# zpool attach -f $POOLNAME $DEVICE02_ORIG $DEVICE02_MIRR



# Check

zpool status $POOLNAME
     pool: my_pool
    state: ONLINE
    scan: resilvered 64K in 0h0m with 0 errors on Tue Sep  1 15:18:45
2015
```

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   config:

          NAME        STATE     READ WRITE CKSUM
          my_pool     ONLINE       0     0     0
            mirror-0  ONLINE       0     0     0
              sdb     ONLINE       0     0     0
              sdd     ONLINE       0     0     0   <----
            mirror-1  ONLINE       0     0     0
              sdc     ONLINE       0     0     0
              sde     ONLINE       0     0     0   <----

   errors: No known data errors


zpool list
   NAME      SIZE  ALLOC   FREE    CAP  DEDUP  HEALTH  ALTROOT
   my_pool  19.9G   116K  19.9G     0%  1.00x  ONLINE  -







# ------------------------------------------------------------------
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# Adding a mirror to a concat zpool using disks of different sizes
# ------------------------------------------------------------------
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# I will use two asymmetric disk partitions with the aim of giving an
example:

lvmdiskscan | egrep "sdb1|sdc1"
     /dev/sdb1           [       5.00 GiB]
     /dev/sdc1           [      10.00 GiB]


# 1.- If we try to mirror a pool using a disk that is smaller than
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the existing one, this
# is what happens:

zpool create my_pool sdc1

zpool list my_pool
   NAME      SIZE  ALLOC   FREE    CAP  DEDUP  HEALTH  ALTROOT
   my_pool  9.94G  77.5K  9.94G     0%  1.00x  ONLINE  -

zpool attach my_pool sdc1 sdb1
   cannot attach sdb1 to sdc1: device is too small

# No problem so far: System prevents us from creating a mirror in a
wrong way; that's all




# 2.- When adding a mirror using a disk that is larger than the
existing one, we have to
# use the "autoexpand" property, that must be enabled for the whole
size of the new disk
# to be used instead of limiting the pool to the original size. This
will happens once
# the original disk has been removed from the pool, otherwise we
would have an "asymmetric"
# mirror.

# Create a simple pool

zpool create my_pool sdb1

zpool list my_pool
   NAME      SIZE  ALLOC   FREE    CAP  DEDUP  HEALTH  ALTROOT
   my_pool  4.97G   109K  4.97G     0%  1.00x  ONLINE  -



# Enable "autoexpand"
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zpool set autoexpand=on my_pool


# Add the mirror (new disk bigger than existing one)

zpool attach my_pool sdb1 sdc1


# Size remains constant...

zpool list my_pool
   NAME      SIZE  ALLOC   FREE    CAP  DEDUP  HEALTH  ALTROOT
   my_pool  4.97G   159K  4.97G     0%  1.00x  ONLINE  -


# ... until I detach the original disk. At that moment the pool is
"autoexpanded"

zpool detach my_pool sdb1

zpool list my_pool
   NAME      SIZE  ALLOC   FREE    CAP  DEDUP  HEALTH  ALTROOT
   my_pool  9.97G   168K  9.97G     0%  1.00x  ONLINE  -




# If we had forgotten to enable auto-expansion before detaching the
original disk, pool's
# size is not expanded even if we change "autoexpand" property
afterwards. To get to
# expand the pool we have to run a "zpool online" command on the new
disk(s)

zpool create my_pool sdb1

zpool attach -f my_pool sdb1 sdc1
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```
zpool list my_pool
   NAME      SIZE  ALLOC   FREE    CAP  DEDUP  HEALTH  ALTROOT
   my_pool  4.97G   156K  4.97G     0%  1.00x  ONLINE  -

zpool detach my_pool sdb1

zpool list my_pool
   NAME      SIZE  ALLOC   FREE    CAP  DEDUP  HEALTH  ALTROOT
   my_pool  4.97G   156K  4.97G     0%  1.00x  ONLINE  -


# Ooops, I forgot to enable the autoexpand property, I will do it
now...

zpool get autoexpand my_pool
   NAME     PROPERTY    VALUE   SOURCE
   my_pool  autoexpand  off     default

zpool set autoexpand=on my_pool

# No way, it doesn't work:

zpool list my_pool
   NAME      SIZE  ALLOC   FREE    CAP  DEDUP  HEALTH  ALTROOT
   my_pool  4.97G   172K  4.97G     0%  1.00x  ONLINE  -

# No problem, let's run an "online" on the new disk (even if it is
already online)

zpool online my_pool sdc1

# and voilà!, the pool has been expanded:

zpool list my_pool
   NAME      SIZE  ALLOC   FREE    CAP  DEDUP  HEALTH  ALTROOT
   my_pool  9.97G   153K  9.97G     0%  1.00x  ONLINE  -
```