
Subject: ploop, simfs, and disk space
Posted by [kir](#) on Fri, 06 Apr 2012 21:33:15 GMT
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I want to summarise some facts about simfs, ploop, and disk quota.

== simfs case ==

If container is on simfs, it is using host file system, usually /vz.

Because many containers share one file system, per-container limits are needed for both disk space used and disk i-nodes (roughly number of files/directories) used. These two limits are called vzquota, and are controlled by --diskspace and --diskinodes parameters for vzctl set command.

For both diskspace and diskinodes, there are two values -- soft limit and hard limit, you can specify those using sss:hhh syntax. For example, "vzctl set 333 --diskspace 10G:11G --save" command sets the soft disk space limit to 10 GB and the hard disk space limit to 11G. The difference between soft and hard limit is that the soft limit can be temporary exceeded, while soft limit can not be exceeded. Here "temporary" is defined by the third parameter, --quotatime, which sets the time (in seconds) during which soft limit can be exceeded. This value is otherwise known as the grace period. Once the grace period has expired, the soft limit is enforced as a hard limit.

Example: admin sets disk limits in the following way:

```
vzctl set 333 --diskspace 10G:11G --diskinodes 1M:1.1M --quotatime 3600 --save
```

Now, a container root can use 10G of disk space, and have about 1 million files inside his CT. He can have 11G of disk space and about 1.1 million files, but for no longer than 1 hour. If he uses more than 10G of disk space, during the first hour (and only during the first hour) he will still be able to use 11th gigabyte.

This dimensional system of space, inodes, soft limits, hard limits and grace period is nothing new, it's the same as traditional UNIX per-user and per-group disk quotas. The only major difference is in this case quotas are per-CT (per simfs mount point).

There is a --diskquota parameter (and DISK_QUOTA config file parameter) which is used to enable/disable per-CT disk quotas. If you set DISK_QUOTA=no in /etc/vz/vz.conf, no per-CT disk quotas will be initialized. If you set DISK_QUOTA=no in CT configuration file (e.g. /etc/vz/conf/333.conf), no disk quotas for this CT will be initialized.

NOTE that as with any other disk quota, if you will write to the file system bypassing the quota (such as directly to VE_PRIVATE, e.g. /vz/private/333), current quota usage values will be incorrect. In that

case, you need to stop the CT and run `vzctl quotainit`, to recalculate quota usage. In some cases (such as after incorrect system shutdown caused by power outage) quota files are marked dirty, and such recalculation is happening automatically during CT start.

For the sake of completeness, there is `vzctl quotaon` and `vzctl quotaoff` commands, but usually you don't have to use those two, because `quotaon` is performed during `vzctl mount` (and `vzctl start`), and `quotaoff` is performed during `vzctl stop` (and `vzctl umount`).

From inside the CT, utilities such as `df` are showing those quota limits instead of actual available disk space and inodes (this is implemented in the kernel by having a special version of `statfs()` syscall for `simfs` which looks into `vzquota`). Sometimes it gets complicated, so if you see something strange in `df` output, it is either incorrect quota values (and you need to recalculate quota usage, see above), or perhaps the filesystem disk space available is less than quota limits. For lots of gory details on this stuff, please see http://wiki.openvz.org/Disk_quota,_df_and_stat_weird_behavior

Also, you can check `/proc/vz/vzquota` to see for which containers quota is on, as well as its current limits and usage values.

I am leaving more advanced topics such as using `vzquota` utility directly as a (highly optional) exercise for (highly) advanced users.

== ploop case ==

In ploop case, there is an image file and the underlying file system, so there is no shared file system and `vzquota` is naturally not required. Therefore, options `--diskquota` (and `DISK_QUOTA` parameter), `--diskinodes` and `--quotatime` are silently ignored.

Option `--diskspace` is not ignored, but instead of changing `vzquota` disk space limit, it initiates the resize of the CT ploop image file and the filesystem which resides on top of that image.

NOTE that image and file system resize, especially in case when the CT is running (so-called online resize) is quite tricky, and in worst case scenario can lead to image or filesystem damage that is beyond repair. So exercise it a lot in testing environment, but do not abuse it in production*.

NOTE that specifying two values for `--diskspace` in case of ploop makes no sense. Only one value (hard limit) is used (and as with other parameters, if you only specify one value, second one becomes equal to the first one). So using `--diskspace 1G:1.1G` is the same as `--diskspace 1.1G` (or `--diskspace 0:1.1G`). Easy rule: do not use two numbers for

diskspace, just one.

* NOTE ploop is not yet ready for production, and will not be for at least a few more months.
