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Subject: [RFC][PATCH 0/3] Kernel memory accounting container  
Posted by [Pavel Emelianov](#) on Thu, 30 Aug 2007 09:32:22 GMT  
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Long time ago we decided to start memory control with the user memory container. Now this container in -mm tree and I think we can start with (at least discussion of) the kmem one.

First of all - why do we need this kind of control. The major "pros" is that kernel memory control protects the system from DoS attacks by processes that live in container. As our experience shows many exploits simply do not work in the container with limited kernel memory.

I can split the kernel memory container into 4 parts:

1. kmalloc-ed objects control
2. vmalloc-ed objects control
3. buddy allocated pages control
4. kmem\_cache\_alloc-ed objects control

the control of first tree types of objects has one peculiarity: one need to explicitly point out which allocations he wants to account and this becomes not-configurable and is to be discussed.

On the other hands such objects as anon\_vma-s, file-s, sighangds, vfsmounts, etc are created by user request always and should always be accounted. Fortunately they are allocated from their own caches and thus the whole kmem cache can be accountable.

This is exactly what this patchset does - it adds the ability to account for the total size of kmem-cache-allocated objects from specified kmem caches.

This is based on the SLUB allocator, Paul's containers and the resource counters I made for RSS controller and which are in -mm tree already.

To play with it, one need to mount the container file system with -o kmem and then mark some caches as accountable via /sys/slab/<cache\_name>/cache\_account.

As I have already told kmalloc caches cannot be accounted easily so turning the accounting on for them will fail with -EINVAL. Turning the accounting off is possible only if the cache has no objects. This is done so because turning accounting off implies unaccounting of all the objects in the cache, but due

to full-pages in slub are not stored in any lists (usually) this is impossible to do so, however I'm open for discussion of how to make this work.

I know it's maybe too late, since some of you may be preparing for the Summit or LinuxConf, but I think that we can go on discussing these on LinuxConf.

The patches are applicable to the latest Morton's tree (that without the RSS controll) with the resource counters patch Andrew committed recently.

I've made some minimal testing for that and the similar code (without the containers interface but with the kmalloc accounting) is already in our 2.6.22 OpenVZ tree, so testing is going on.

Thanks,  
Pavel

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