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Subject: [PATCH][ just for review] memory controller enhancements [1/5] force empty

Posted by [KAMEZAWA Hiroyuki](#) on Thu, 11 Oct 2007 09:51:28 GMT

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This patch adds an interface "memory.force\_empty".  
Any write to this file will drop all charges in this cgroup if there is no task under.

```
%echo 1 > /...../memory.force_empty
```

will drop all charges of memory cgroup if cgroup's tasks is empty.

This is useful to invoke rmdir() against memory cgroup successfully.

Tested and worked well on x86\_64/fake-NUMA system.

Changelog v2 -> v3:

- changed the name from force\_reclaim to force\_empty.
- fixed wrong usage of css\_put() bug.

Changelog v1 -> v2:

- added a new interface force\_reclaim.
- changes spin\_lock to spin\_lock\_irqsave().

Signed-off-by: KAMEZAWA Hiroyuki <kamezawa.hiroyu@jp.fujitsu.com>

mm/memcontrol.c | 102 ++++++-----  
1 file changed, 95 insertions(+), 7 deletions(-)

Index: devel-2.6.23-rc8-mm2/mm/memcontrol.c

=====

--- devel-2.6.23-rc8-mm2.orig/mm/memcontrol.c

+++ devel-2.6.23-rc8-mm2/mm/memcontrol.c

@@ -469,6 +469,7 @@ void mem\_cgroup\_uncharge(struct page\_cgr

page = pc->page;

/\*

\* get page->cgroup and clear it under lock.

+ \* force-empty can drop page->cgroup without checking refcnt.

\*/

if (clear\_page\_cgroup(page, pc) == pc) {

mem = pc->mem\_cgroup;

@@ -478,13 +479,6 @@ void mem\_cgroup\_uncharge(struct page\_cgr

list\_del\_init(&pc->lru);

spin\_unlock\_irqrestore(&mem->lru\_lock, flags);

kfree(pc);

```

- } else {
- /*
-  * Note: This will be removed when force-empty patch is
-  * applied. just show warning here.
-  */
- printk(KERN_ERR "Race in mem_cgroup_uncharge() ?");
- dump_stack();
- }
- }
- }
@@ -532,6 +526,70 @@ retry:
    return;
}

+/*
+ * This routine traverse page_cgroup in given list and drop them all.
+ * This routine ignores page_cgroup->ref_cnt.
+ * *And* this routine doesn't reclaim page itself, just removes page_cgroup.
+ */
+static void
+mem_cgroup_force_empty_list(struct mem_cgroup *mem, struct list_head *list)
+{
+ struct page_cgroup *pc;
+ struct page *page;
+ int count = SWAP_CLUSTER_MAX;
+ unsigned long flags;
+
+ spin_lock_irqsave(&mem->lru_lock, flags);
+
+ while (!list_empty(list)) {
+ pc = list_entry(list->prev, struct page_cgroup, lru);
+ page = pc->page;
+ /* Avoid race with charge */
+ atomic_set(&pc->ref_cnt, 0);
+ if (clear_page_cgroup(page, pc) == pc) {
+ css_put(&mem->css);
+ res_counter_uncharge(&mem->res, PAGE_SIZE);
+ list_del_init(&pc->lru);
+ kfree(pc);
+ } else
+ count = 1; /* being uncharged ? ...do relax */
+
+ if (--count == 0) {
+ spin_unlock_irqrestore(&mem->lru_lock, flags);
+ cond_resched();
+ spin_lock_irqsave(&mem->lru_lock, flags);
+ count = SWAP_CLUSTER_MAX;
+ }
+ }

```

```

+ }
+ spin_unlock_irqrestore(&mem->lru_lock, flags);
+}
+
+/*
+ *
+ *
+ */
+
+int mem_cgroup_force_empty(struct mem_cgroup *mem)
+{
+ int ret = -EBUSY;
+ css_get(&mem->css);
+ while (!list_empty(&mem->active_list) ||
+        !list_empty(&mem->inactive_list)) {
+ if (atomic_read(&mem->css.cgroup->count) > 0)
+ goto out;
+ /* drop all page_cgroup in active_list */
+ mem_cgroup_force_empty_list(mem, &mem->active_list);
+ /* drop all page_cgroup in inactive_list */
+ mem_cgroup_force_empty_list(mem, &mem->inactive_list);
+ }
+ ret = 0;
+out:
+ css_put(&mem->css);
+ return ret;
+}
+
+
+
+
+int mem_cgroup_write_strategy(char *buf, unsigned long long *tmp)
+{
+ *tmp = memparse(buf, &buf);
@@ -617,6 +675,31 @@ static ssize_t mem_control_type_read(str
+ ppos, buf, s - buf);
+ }
+
+
+
+static ssize_t mem_force_empty_write(struct cgroup *cont,
+ struct cftype *cft, struct file *file,
+ const char __user *userbuf,
+ size_t nbytes, loff_t *ppos)
+{
+ struct mem_cgroup *mem = mem_cgroup_from_cont(cont);
+ int ret;
+ ret = mem_cgroup_force_empty(mem);
+ if (!ret)
+ ret = nbytes;

```

```

+ return ret;
+}
+
+static ssize_t mem_force_empty_read(struct cgroup *cont,
+ struct cftype *cft,
+ struct file *file, char __user *userbuf,
+ size_t nbytes, loff_t *ppos)
+{
+ char buf[2] = "0";
+ return simple_read_from_buffer((void __user *)userbuf, nbytes,
+ ppos, buf, strlen(buf));
+}
+
+
+static struct cftype mem_cgroup_files[] = {
+ {
+ .name = "usage_in_bytes",
@@ -639,6 +722,11 @@ static struct cftype mem_cgroup_files[]
+ .write = mem_control_type_write,
+ .read = mem_control_type_read,
+ },
+ {
+ .name = "force_empty",
+ .write = mem_force_empty_write,
+ .read = mem_force_empty_read,
+ },
+ };

static struct mem_cgroup init_mem_cgroup;

```

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Containers mailing list  
Containers@lists.linux-foundation.org  
<https://lists.linux-foundation.org/mailman/listinfo/containers>

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