
Subject: [PATCH v5 07/14] mm: Allocate kernel pages to the right memcg

Posted by [Glauber Costa](#) on Tue, 16 Oct 2012 10:16:44 GMT

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When a process tries to allocate a page with the `__GFP_KMEMCG` flag, the page allocator will call the corresponding memcg functions to validate the allocation. Tasks in the root memcg can always proceed.

To avoid adding markers to the page - and a kmem flag that would necessarily follow, as much as doing `page_cgroup` lookups for no reason, whoever is marking its allocations with `__GFP_KMEMCG` flag is responsible for telling the page allocator that this is such an allocation at `free_pages()` time. This is done by the invocation of `__free_accounted_pages()` and `free_accounted_pages()`.

[v2: inverted test order to avoid a memcg_get leak,
free_accounted_pages simplification]

[v4: test for TIF_MEMDIE at newpage_charge]

Signed-off-by: Glauber Costa <glommer@parallels.com>

Acked-by: Michal Hocko <mhocko@suse.cz>

Acked-by: Mel Gorman <mgorman@suse.de>

Acked-by: Kamezawa Hiroyuki <kamezawa.hiroyu@jp.fujitsu.com>

CC: Christoph Lameter <cl@linux.com>

CC: Pekka Enberg <penberg@cs.helsinki.fi>

CC: Johannes Weiner <hannes@cmpxchg.org>

CC: Suleiman Souhlal <suleiman@google.com>

CC: Tejun Heo <tj@kernel.org>

```
include/linux/gfp.h | 3 +++
mm/page_alloc.c     | 35 +++++++++++++++++++++++++++++++++++++
2 files changed, 38 insertions(+)
```

```
diff --git a/include/linux/gfp.h b/include/linux/gfp.h
```

```
index 9289d46..8f6fe34 100644
```

```
--- a/include/linux/gfp.h
```

```
+++ b/include/linux/gfp.h
```

```
@@ -362,6 +362,9 @@ extern void free_pages(unsigned long addr, unsigned int order);
```

```
extern void free_hot_cold_page(struct page *page, int cold);
```

```
extern void free_hot_cold_page_list(struct list_head *list, int cold);
```

```
+extern void __free_accounted_pages(struct page *page, unsigned int order);
```

```
+extern void free_accounted_pages(unsigned long addr, unsigned int order);
```

```
+
```

```
#define __free_page(page) __free_pages((page), 0)
```

```
#define free_page(addr) free_pages((addr), 0)
```

```
diff --git a/mm/page_alloc.c b/mm/page_alloc.c
```

```

index feddc7f..dcf33ad 100644
--- a/mm/page_alloc.c
+++ b/mm/page_alloc.c
@@ -2595,6 +2595,7 @@ __alloc_pages_nodemask(gfp_t gfp_mask, unsigned int order,
    int migratetype = allocflags_to_migratetype(gfp_mask);
    unsigned int cpuset_mems_cookie;
    int alloc_flags = ALLOC_WMARK_LOW|ALLOC_CPUSET;
+ struct mem_cgroup *memcg = NULL;

    gfp_mask &= gfp_allowed_mask;

@@ -2613,6 +2614,13 @@ __alloc_pages_nodemask(gfp_t gfp_mask, unsigned int order,
    if (unlikely(!zonelist->_zonerefs->zone))
        return NULL;

+ /*
+  * Will only have any effect when __GFP_KMEMCG is set. This is
+  * verified in the (always inline) callee
+  */
+ if (!memcg_kmem_newpage_charge(gfp_mask, &memcg, order))
+ return NULL;
+
    retry_cpuset:
        cpuset_mems_cookie = get_mems_allowed();

@@ -2648,6 +2656,8 @@ out:
    if (unlikely(!put_mems_allowed(cpuset_mems_cookie) && !page))
        goto retry_cpuset;

+ memcg_kmem_commit_charge(page, memcg, order);
+
    return page;
}
EXPORT_SYMBOL(__alloc_pages_nodemask);
@@ -2700,6 +2710,31 @@ void free_pages(unsigned long addr, unsigned int order)

EXPORT_SYMBOL(free_pages);

+/*
+ * __free_accounted_pages and free_accounted_pages will free pages allocated
+ * with __GFP_KMEMCG.
+ *
+ * Those pages are accounted to a particular memcg, embedded in the
+ * corresponding page_cgroup. To avoid adding a hit in the allocator to search
+ * for that information only to find out that it is NULL for users who have no
+ * interest in that whatsoever, we provide these functions.
+ *
+ * The caller knows better which flags it relies on.

```

