
Subject: [PATCH v3 07/13] mm: Allocate kernel pages to the right memcg
Posted by [Glauber Costa](#) on Tue, 18 Sep 2012 14:04:04 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]

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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 d8eae4d..029570f 100644
--- a/include/linux/gfp.h
+++ b/include/linux/gfp.h
@@ -370,6 +370,9 @@ 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 b0c5a52..897d8e2 100644
--- a/mm/page_alloc.c
```

```

+++ b/mm/page_alloc.c
@@ -2573,6 +2573,7 @@ __alloc_pages_nodemask(gfp_t gfp_mask, unsigned int order,
    struct page *page = NULL;
    int migratetype = allocflags_to_migratetype(gfp_mask);
    unsigned int cpuset_mems_cookie;
+ struct mem_cgroup *memcg = NULL;

    gfp_mask &= gfp_allowed_mask;

@@ -2591,6 +2592,13 @@ __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();

@@ -2624,6 +2632,8 @@ 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);
@@ -2676,6 +2686,31 @@ 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.
+ */
+void __free_accounted_pages(struct page *page, unsigned int order)

```

