Subject: [PATCH v5 10/18] sl[au]b: always get the cache from its page in kfree
Posted by Glauber Costa on Fri, 19 Oct 2012 14:20:34 GMT
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struct page already have this information. If we start chaining
caches, this information will always be more trustworthy than
whatever is passed into the function

A parent pointer is added to the slub structure, so we can make sure
the freeing comes from either the right slab, or from its rightful
parent.

[v3: added parent testing with VM_BUG_ON]
[v4: make it faster when kmemcg not in use]

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---
 include/linux/memcontrol.h | 4 ++++
 mm/slab.c | 17 +++++++++++++++++-
 mm/slab.h | 13 +++++++++++++
 mm/slub.c | 14 +++++++++++++-
 4 files changed, 45 insertions(+), 3 deletions(-)

diff --git a/include/linux/memcontrol.h b/include/linux/memcontrol.h
index 92fc47a..f1ecb4f 100644
--- a/include/linux/memcontrol.h
+++ b/include/linux/memcontrol.h
@@ -534,6 +534,10 @@ static inline void sock_release_memcg(struct sock *sk)
 {
 }

+static inline bool memcg_kmem_enabled(void)
+{
+ return false;
+}
 static inline bool
 memcg_kmem_newpage_charge(gfp_t gfp, struct mem_cgroup **memcg, int order)
 {
diff --git a/mm/slab.c b/mm/slab.c

```
index 98b3460..6f22067 100644
--- a/mm/slab.c
+++ b/mm/slab.c
@@ -3911,9 +3911,24 @@ EXPORT_SYMBOL(__kmalloc);
  * Free an object which was previously allocated from this
  * cache.
  */
-void kmem_cache_free(struct kmem_cache *cachep, void *objp)
+void kmem_cache_free(struct kmem_cache *s, void *objp)
 {
  unsigned long flags;
+ struct kmem_cache *cachep;
+
+ /*
+  * When kmemcg is not being used, both assignments should return the
+  * same value. but we don't want to pay the assignment price in that
+  * case. If it is not compiled in, the compiler should be smart enough
+  * to not do even the assignment. In that case, slab_equal_or_root
+  * will also be a constant.
+  */
+ if (memcg_kmem_enabled()) {
+  cachep = virt_to_cache(objp);
+  VM_BUG_ON(!slab_equal_or_root(cachep, s));
+ } else
+  cachep = s;
+

  local_irq_save(flags);
  debug_check_no_locks_freed(objp, cachep->object_size);
diff --git a/mm/slab.h b/mm/slab.h
index c35ecce..b9b5f1f 100644
--- a/mm/slab.h
+++ b/mm/slab.h
@@ -108,6 +108,13 @@ static inline bool cache_match_memcg(struct kmem_cache *cachep,
  return (is_root_cache(cachep) && !memcg) ||
   (cachep->memcg_params->memcg == memcg);
 }
+
+static inline bool slab_equal_or_root(struct kmem_cache *s,
+      struct kmem_cache *p)
+{
+ return (p == s) ||
+  (s->memcg_params && (p == s->memcg_params->root_cache));
+}
 #else
 static inline bool is_root_cache(struct kmem_cache *s)
 {
@@ -119,5 +126,11 @@ static inline bool cache_match_memcg(struct kmem_cache *cachep,
```

```
 {
  return true;
 }
+
+static inline bool slab_equal_or_root(struct kmem_cache *s,
+      struct kmem_cache *p)
+{
+ return true;
+}
 #endif
 #endif
diff --git a/mm/slub.c b/mm/slub.c
index 05aefe2..6e1a90f 100644
--- a/mm/slub.c
+++ b/mm/slub.c
@@ -2609,9 +2609,19 @@ redo:

 void kmem_cache_free(struct kmem_cache *s, void *x)
 {
- struct page *page;
+ struct page *page = virt_to_head_page(x);

- page = virt_to_head_page(x);
+ /*
+  * When kmemcg is not being used, both assignments should return the
+  * same value. but we don't want to pay the assignment price in that
+  * case. If it is not compiled in, the compiler should be smart enough
+  * to not do even the assignment. In that case, slab_equal_or_root
+  * will also be a constant.
+  */
+ if (memcg_kmem_enabled()) {
+  VM_BUG_ON(!slab_equal_or_root(page->slab, s));
+  s = page->slab;
+ }

  if (kmem_cache_debug(s) && page->slab != s) {
   pr_err("kmem_cache_free: Wrong slab cache. %s but object"
--
1.7.11.7
```