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Subject: [PATCH v5] slab: Ignore internal flags in cache creation

Posted by [Glauber Costa](#) on Wed, 17 Oct 2012 11:36:51 GMT

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Some flags are used internally by the allocators for management purposes. One example of that is the `CFLGS_OFF_SLAB` flag that slab uses to mark that the metadata for that cache is stored outside of the slab.

No cache should ever pass those as a creation flags. We can just ignore this bit if it happens to be passed (such as when duplicating a cache in the `kmem memcg` patches).

Because such flags can vary from allocator to allocator, we allow them to make their own decisions on that, defining `SLAB_AVAILABLE_FLAGS` with all flags that are valid at creation time. Allocators that doesn't have any specific flag requirement should define that to mean all flags.

Common code will mask out all flags not belonging to that set.

[ v2: leave the mask out decision up to the allocators ]

[ v3: define flags for all allocators ]

[ v4: move all definitions to slab.h ]

Signed-off-by: Glauber Costa <[glommer@parallels.com](mailto:glommer@parallels.com)>

Acked-by: Christoph Lameter <[cl@linux.com](mailto:cl@linux.com)>

CC: David Rientjes <[rientjes@google.com](mailto:rientjes@google.com)>

CC: Pekka Enberg <[penberg@cs.helsinki.fi](mailto:penberg@cs.helsinki.fi)>

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```
mm/slab.c      | 22 -----
mm/slab.h      | 25 +++++
mm/slab_common.c | 7 +++++
mm/slub.c      | 3 ---
4 files changed, 32 insertions(+), 25 deletions(-)
```

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

```
index 8524923..8c1d447 100644
```

```
--- a/mm/slab.c
```

```
+++ b/mm/slab.c
```

```
@@ -162,23 +162,6 @@
```

```
*/
```

```
static bool pfmemalloc_active __read_mostly;
```

```
/* Legal flag mask for kmem_cache_create(). */
```

```
#if DEBUG
```

```
# define CREATE_MASK (SLAB_RED_ZONE | \
```

```
- SLAB_POISON | SLAB_HWCACHE_ALIGN | \
```

```
- SLAB_CACHE_DMA | \
```

```
- SLAB_STORE_USER | \
```

```

- SLAB_RECLAIM_ACCOUNT | SLAB_PANIC | \
- SLAB_DESTROY_BY_RCU | SLAB_MEM_SPREAD | \
- SLAB_DEBUG_OBJECTS | SLAB_NOLEAKTRACE | SLAB_NOTRACK)
-#else
-# define CREATE_MASK (SLAB_HWCACHE_ALIGN | \
- SLAB_CACHE_DMA | \
- SLAB_RECLAIM_ACCOUNT | SLAB_PANIC | \
- SLAB_DESTROY_BY_RCU | SLAB_MEM_SPREAD | \
- SLAB_DEBUG_OBJECTS | SLAB_NOLEAKTRACE | SLAB_NOTRACK)
-#endif
-
/*
 * kmem_bufctl_t:
 *
@@ -2385,11 +2368,6 @@ __kmem_cache_create (struct kmem_cache *cachep, unsigned long
flags)
    if (flags & SLAB_DESTROY_BY_RCU)
        BUG_ON(flags & SLAB_POISON);
-#endif
- /*
- * Always checks flags, a caller might be expecting debug support which
- * isn't available.
- */
- BUG_ON(flags & ~CREATE_MASK);

/*
 * Check that size is in terms of words. This is needed to avoid
diff --git a/mm/slab.h b/mm/slab.h
index 7deeb44..35b60b7 100644
--- a/mm/slab.h
+++ b/mm/slab.h
@@ -45,6 +45,31 @@ static inline struct kmem_cache *__kmem_cache_alias(const char *name,
size_t siz
-#endif

+/* Legal flag mask for kmem_cache_create(), for various configurations */
+#define SLAB_CORE_FLAGS (SLAB_HWCACHE_ALIGN | SLAB_CACHE_DMA |
SLAB_PANIC | \
+ SLAB_DESTROY_BY_RCU | SLAB_DEBUG_OBJECTS )
+
+#if defined(CONFIG_DEBUG_SLAB)
+#define SLAB_DEBUG_FLAGS (SLAB_RED_ZONE | SLAB_POISON | SLAB_STORE_USER)
+#elif defined(CONFIG_SLUB_DEBUG)
+#define SLAB_DEBUG_FLAGS (SLAB_RED_ZONE | SLAB_POISON | SLAB_STORE_USER | \
+ SLAB_TRACE | SLAB_DEBUG_FREE)
+#else
+#define SLAB_DEBUG_FLAGS (0)

```

```

+#endif
+
+#if defined(CONFIG_SLAB)
+#define SLAB_CACHE_FLAGS (SLAB_MEM_SPREAD | SLAB_NOLEAKTRACE | \
+ SLAB_RECLAIM_ACCOUNT | SLAB_TEMPORARY | SLAB_NOTRACK)
+#elif defined(CONFIG_SLUB)
+#define SLAB_CACHE_FLAGS (SLAB_NOLEAKTRACE | SLAB_RECLAIM_ACCOUNT | \
+ SLAB_TEMPORARY | SLAB_NOTRACK)
+#else
+#define SLAB_CACHE_FLAGS (0)
+#endif
+
+#define CACHE_CREATE_MASK (SLAB_CORE_FLAGS | SLAB_DEBUG_FLAGS |
SLAB_CACHE_FLAGS)
+
int __kmem_cache_shutdown(struct kmem_cache *);

#endif
diff --git a/mm/slab_common.c b/mm/slab_common.c
index 9c21725..0e2b8e3 100644
--- a/mm/slab_common.c
+++ b/mm/slab_common.c
@@ -107,6 +107,13 @@ struct kmem_cache *kmem_cache_create(const char *name, size_t
size, size_t align
    if (!kmem_cache_sanity_check(name, size) == 0)
        goto out_locked;

+ /*
+ * Some allocators will constraint the set of valid flags to a subset
+ * of all flags. We expect them to define CACHE_CREATE_MASK in this
+ * case, and we'll just provide them with a sanitized version of the
+ * passed flags.
+ */
+ flags &= CACHE_CREATE_MASK;

    s = __kmem_cache_alias(name, size, align, flags, ctor);
    if (s)
diff --git a/mm/slub.c b/mm/slub.c
index 2258ed8..7197f141 100644
--- a/mm/slub.c
+++ b/mm/slub.c
@@ -112,9 +112,6 @@
 * the fast path and disables lockless freelists.
 */

-#define SLAB_DEBUG_FLAGS (SLAB_RED_ZONE | SLAB_POISON | SLAB_STORE_USER | \
- SLAB_TRACE | SLAB_DEBUG_FREE)
-

```

```
static inline int kmem_cache_debug(struct kmem_cache *s)
{
#ifdef CONFIG_SLUB_DEBUG
--
1.7.11.7
```

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Subject: Re: [PATCH v5] slab: Ignore internal flags in cache creation  
Posted by [David Rientjes](#) on Wed, 17 Oct 2012 21:07:55 GMT  
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On Wed, 17 Oct 2012, Glauber Costa wrote:

> Some flags are used internally by the allocators for management  
> purposes. One example of that is the CFLGS\_OFF\_SLAB flag that slab uses  
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>  
> Signed-off-by: Glauber Costa <glommer@parallels.com>  
> Acked-by: Christoph Lameter <cl@linux.com>  
> CC: David Rientjes <rientjes@google.com>  
> CC: Pekka Enberg <penberg@cs.helsinki.fi>

Acked-by: David Rientjes <rientjes@google.com>

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Subject: Re: [PATCH v5] slab: Ignore internal flags in cache creation  
Posted by [akpm](#) on Thu, 18 Oct 2012 22:42:03 GMT  
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On Wed, 17 Oct 2012 15:36:51 +0400  
Glauber Costa <glommer@parallels.com> wrote:

> Some flags are used internally by the allocators for management  
> purposes. One example of that is the CFLGS\_OFF\_SLAB flag that slab uses  
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> the kmem memcg patches).

I may be misunderstanding this, but...

If some caller to `kmem_cache_create()` is passing in bogus flags then that's a bug, and it is undesirable to hide such a bug in this fashion?

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> to make their own decisions on that, defining `SLAB_AVAILABLE_FLAGS` with  
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Subject: Re: [PATCH v5] slab: Ignore internal flags in cache creation  
Posted by [Glauber Costa](#) on Fri, 19 Oct 2012 09:32:43 GMT  
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On 10/19/2012 02:42 AM, Andrew Morton wrote:

> On Wed, 17 Oct 2012 15:36:51 +0400  
> Glauber Costa <[glommer@parallels.com](mailto:glommer@parallels.com)> wrote:  
>  
>> Some flags are used internally by the allocators for management  
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> If some caller to `kmem_cache_create()` is passing in bogus flags then  
> that's a bug, and it is undesirable to hide such a bug in this fashion?  
>

Not necessarily.

This part is part of the kmemcg-slab series. In that use case, I copy the flags from the original kmem cache, and create a duplicate. That duplicate need to have the same flags, but only the creation flags.

We had many attempts to mask it out in different places, and after some discussion, it seemed best to independently do it from common code in slab\_common.c at creation time. It gets quite independent from the kmemcg-slab this way, and so I posted independently to reduce my churn

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Subject: Re: [PATCH v5] slab: Ignore internal flags in cache creation

Posted by [Pekka Enberg](#) on Wed, 31 Oct 2012 07:13:49 GMT

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On Thu, Oct 18, 2012 at 12:07 AM, David Rientjes <rientjes@google.com> wrote:

> On Wed, 17 Oct 2012, Glauber Costa wrote:

>

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>

> Acked-by: David Rientjes <rientjes@google.com>

Applied, thanks!

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