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Subject: [PATCH] remove BUG() in possible but rare condition  
Posted by [Glauber Costa](#) on Wed, 11 Apr 2012 18:10:24 GMT  
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---

While stressing the kernel with with failing allocations today,  
I hit the following chain of events:

```
alloc_page_buffers():
```

```
    bh = alloc_buffer_head(GFP_NOFS);  
    if (!bh)  
        goto no_grow; <= path taken
```

```
grow_dev_page():  
    bh = alloc_page_buffers(page, size, 0);  
    if (!bh)  
        goto failed; <= taken, consequence of the above
```

and then the failed path BUG()s the kernel.

The failure is inserted a litte bit artificially, but even then,  
I see no reason why it should be deemed impossible in a real box.

Even though this is not a condition that we expect to see  
around every time, failed allocations are expected to be handled,  
and BUG() sounds just too much. As a matter of fact, grow\_dev\_page()  
can return NULL just fine in other circumstances, so I propose we just  
remove it, then.

Signed-off-by: Glauber Costa <glommer@parallels.com>  
CC: Linus Torvalds <torvalds@linux-foundation.org>  
CC: Andrew Morton <akpm@linux-foundation.org>

---

```
fs/buffer.c | 1 -  
1 files changed, 0 insertions(+), 1 deletions(-)
```

```
diff --git a/fs/buffer.c b/fs/buffer.c  
index 36d6665..351e18e 100644
```

```
--- a/fs/buffer.c
```

```
+++ b/fs/buffer.c
```

```
@ @ -985,7 +985,6 @ @ grow_dev_page(struct block_device *bdev, sector_t block,  
    return page;
```

```
failed:  
- BUG();  
  unlock_page(page);  
  page_cache_release(page);  
  return NULL;
```

--  
1.7.7.6

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Subject: Re: [PATCH] remove BUG() in possible but rare condition  
Posted by [Michal Hocko](#) on Wed, 11 Apr 2012 18:48:45 GMT  
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On Wed 11-04-12 15:10:24, Glauber Costa wrote:  
> While stressing the kernel with with failing allocations today,  
> I hit the following chain of events:  
>  
> alloc\_page\_buffers():  
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I am not familiar with the code much but a trivial call chain walk up to  
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from \_\_getblk so we would nullptr and there might be more.  
I guess these need some treat before the BUG might be removed, right?

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> Signed-off-by: Glauber Costa <glommer@parallels.com>  
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>  return page;
>
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>  page_cache_release(page);
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> 1.7.7.6
>
> --
> To unsubscribe, send a message with 'unsubscribe linux-mm' in
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> see: http://www.linux-mm.org/ .
> Fight unfair telecom internet charges in Canada: sign http://stopthemeter.ca/
> Don't email: <a href=mailto:"dont@kvack.org"> email@kvack.org </a>
```

--  
Michal Hocko  
SUSE Labs  
SUSE LINUX s.r.o.  
Lihovarska 1060/12  
190 00 Praha 9  
Czech Republic

---

Subject: Re: [PATCH] remove BUG() in possible but rare condition  
Posted by [Linus Torvalds](#) on Wed, 11 Apr 2012 18:57:56 GMT  
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On Wed, Apr 11, 2012 at 11:48 AM, Michal Hocko <[mhocko@suse.cz](mailto:mhocko@suse.cz)> wrote:  
>  
> I am not familiar with the code much but a trivial call chain walk up to  
> write\_dev\_supers (in btrfs) shows that we do not check for the return value  
> from \_\_getblk so we would nullptr and there might be more.  
> I guess these need some treat before the BUG might be removed, right?

Well, realistically, isn't BUG() as bad as a NULL pointer dereference?

Do you care about the exact message on the screen when your machine dies?

Linus

Subject: Re: [PATCH] remove BUG() in possible but rare condition  
Posted by [Glauber Costa](#) on Wed, 11 Apr 2012 18:59:35 GMT  
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---

On 04/11/2012 03:48 PM, Michal Hocko wrote:

> On Wed 11-04-12 15:10:24, Glauber Costa wrote:

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>> I hit the following chain of events:

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> write\_dev\_supers (in btrfs) shows that we do not check for the return value

> from \_\_getblk so we would nullptr and there might be more.

> I guess these need some treat before the BUG might be removed, right?

You might very well be right, but if this is the case, this function is probably wrong already.

find\_or\_create\_page() failing will make it return NULL as well, and that won't trigger the BUG() path.

At least in ext4 in my test case, the filesystem seems consistent after a couple of runs triggering this

---

Subject: Re: [PATCH] remove BUG() in possible but rare condition

Posted by [Glauber Costa](#) on Wed, 11 Apr 2012 19:02:19 GMT

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---

On 04/11/2012 03:57 PM, Linus Torvalds wrote:

> On Wed, Apr 11, 2012 at 11:48 AM, Michal Hocko<mhocko@suse.cz> wrote:  
>>  
>> I am not familiar with the code much but a trivial call chain walk up to  
>> write\_dev\_supers (in btrfs) shows that we do not check for the return value  
>> from \_\_getblk so we would nullptr and there might be more.  
>> I guess these need some treat before the BUG might be removed, right?  
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> Well, realistically, isn't BUG() as bad as a NULL pointer dereference?  
>  
> Do you care about the exact message on the screen when your machine dies?  
Not particular, but I don't see why (I might be wrong) it would  
necessarily lead to a NULL pointer dereference.

At least in my test cases, after turning this to a WARN (to make sure it  
was still being hit), the machine could go on just fine.

I was running this in a container system, with restricted memory. After  
killing the container - at least in my ext4 system - everything seemed  
as happy as ever.

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Subject: Re: [PATCH] remove BUG() in possible but rare condition

Posted by [Michal Hocko](#) on Wed, 11 Apr 2012 19:20:52 GMT

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On Wed 11-04-12 11:57:56, Linus Torvalds wrote:

> On Wed, Apr 11, 2012 at 11:48 AM, Michal Hocko <mhocko@suse.cz> wrote:  
>>  
>> I am not familiar with the code much but a trivial call chain walk up to  
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> Well, realistically, isn't BUG() as bad as a NULL pointer dereference?  
>  
> Do you care about the exact message on the screen when your machine dies?

I personally do not care as I do not allow anything to map at that area.

It just seems that there are some callers who do not expect that the  
allocation fails. BUG at the allocation failure which dates back when it  
replaced buffer\_error might have let to some assumptions (not good of  
course but we should better fix them.

That being said I am not against the patch. BUG on an allocation failure just doesn't feel right...

>  
>           Linus  
>  
> --  
> To unsubscribe, send a message with 'unsubscribe linux-mm' in  
> the body to majordomo@kvack.org. For more info on Linux MM,  
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--  
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---

Subject: Re: [PATCH] remove BUG() in possible but rare condition  
Posted by [Michal Hocko](#) on Wed, 11 Apr 2012 19:25:54 GMT  
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On Wed 11-04-12 16:02:19, Glauber Costa wrote:  
> On 04/11/2012 03:57 PM, Linus Torvalds wrote:  
> > On Wed, Apr 11, 2012 at 11:48 AM, Michal Hocko<[mhocko@suse.cz](mailto:mhocko@suse.cz)> wrote:  
> > >  
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> > Well, realistically, isn't BUG() as bad as a NULL pointer dereference?  
> >  
> > Do you care about the exact message on the screen when your machine dies?  
> Not particular, but I don't see why (I might be wrong) it would  
> necessarily lead to a NULL pointer dereference.

Ahh, OK scratch that. I have misread \_\_getblk\_slow which returns NULL only if grow\_buffers returned with < 0 which doesn't happen for the allocation failure.

Sorry about noise  
--  
Michal Hocko

---

Subject: Re: [PATCH] remove BUG() in possible but rare condition

Posted by [akpm](#) on Wed, 11 Apr 2012 20:26:35 GMT

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On Wed, 11 Apr 2012 15:10:24 -0300

Glauber Costa <[glommer@parallels.com](mailto:glommer@parallels.com)> wrote:

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> While stressing the kernel with with failing allocations today,
> I hit the following chain of events:
>
> alloc_page_buffers():
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> bh = alloc_buffer_head(GFP_NOFS);
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>     goto no_grow; <= path taken
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> The failure is inserted a litte bit artificially, but even then,
> I see no reason why it should be deemed impossible in a real box.
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> Even though this is not a condition that we expect to see
> around every time, failed allocations are expected to be handled,
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> can return NULL just fine in other circumstances, so I propose we just
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> Signed-off-by: Glauber Costa <glommer@parallels.com>
> CC: Linus Torvalds <torvalds@linux-foundation.org>
> CC: Andrew Morton <akpm@linux-foundation.org>
> ---
> fs/buffer.c | 1 -
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> diff --git a/fs/buffer.c b/fs/buffer.c
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> return page;
>
> failed:
> - BUG();
> unlock_page(page);
> page_cache_release(page);
> return NULL;
```

Cute.

AFAICT what happened was that in my April 2002 rewrite of this code I put a non-fatal `buffer_error()` warning in that case to tell us that something bad happened.

Years later we removed the temporary `buffer_error()` and mistakenly replaced that warning with a `BUG()`. Only it *can* happen.

We can remove the `BUG()` and fix up callers, or we can pass `retry=1` into `alloc_page_buffers()`, so `grow_dev_page()` "cannot fail". Immortal functions are a silly fiction, so we should remove the `BUG()` and fix up callers.

---

Subject: Re: [PATCH] remove `BUG()` in possible but rare condition

Posted by [Glauber Costa](#) on Wed, 11 Apr 2012 20:51:57 GMT

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On 04/11/2012 05:26 PM, Andrew Morton wrote:

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>> > failed:
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>> > unlock_page(page);
>> > page_cache_release(page);
>> > return NULL;
> Cute.
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> AFAICT what happened was that in my April 2002 rewrite of this code I
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> something bad happened.
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> Years later we removed the temporary buffer_error() and mistakenly
> replaced that warning with a BUG(). Only itcan happen.
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> We can remove the BUG() and fix up callers, or we can pass retry=1 into
> alloc_page_buffers(), so grow_dev_page() "cannot fail". Immortal
```

> functions are a silly fiction, so we should remove the BUG() and fix up  
> callers.  
>  
Any particular caller you are concerned with ?

As I mentioned, this function already returns NULL for other reason -  
that seem even more probable than this specific failure. So whoever is  
not checking this return value, is already broken without this patch as  
well.

---

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Subject: Re: [PATCH] remove BUG() in possible but rare condition  
Posted by [akpm](#) on Wed, 11 Apr 2012 21:12:44 GMT  
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On Wed, 11 Apr 2012 17:51:57 -0300  
Glauber Costa <[glommer@parallels.com](mailto:glommer@parallels.com)> wrote:

> On 04/11/2012 05:26 PM, Andrew Morton wrote:  
> >>  
> >> > failed:  
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> > callers.  
> >  
> Any particular caller you are concerned with ?

Didn't someone see a buggy caller in btrfs?

I'm thinking that we should retain some sort of assertion (a WARN\_ON)  
if the try\_to\_free\_buffers() failed. This is a weird case which I  
assume handles the situation where a blockdev's blocksize has changed.  
The code tries to throw away the old wrongly-sized buffer\_heads and to  
then add new correctly-sized ones. If that discarding of buffers

fails then the kernel is in rather a mess.

It's quite possible that this code is never executed - we `_should_` have invalidated all the pagecache for that device when changing blocksize. Or maybe it *\*is\** executed, I dunno. It's one of those things which has hung around for decades as code in other places has vastly changed.

---

Subject: Re: [PATCH] remove BUG() in possible but rare condition

Posted by [Michal Hocko](#) on Wed, 11 Apr 2012 21:26:22 GMT

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On Wed 11-04-12 14:12:44, Andrew Morton wrote:

> On Wed, 11 Apr 2012 17:51:57 -0300

> Glauber Costa <glommer@parallels.com> wrote:

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> > On 04/11/2012 05:26 PM, Andrew Morton wrote:

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> > > callers.

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> > Any particular caller you are concerned with ?

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> Didn't someone see a buggy caller in `btrfs`?

No I missed that `__getblk` (`__getblk_slow`) returns `NULL` only if `grow_buffers < 0` while it returns 0 for the allocation failure.

Sorry for confusion.

--

Michal Hocko

SUSE Labs

SUSE LINUX s.r.o.  
Lihovarska 1060/12  
190 00 Praha 9  
Czech Republic

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Subject: Re: [PATCH] remove BUG() in possible but rare condition  
Posted by [Jiri Kosina](#) on Wed, 11 Apr 2012 21:33:07 GMT  
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On Wed, 11 Apr 2012, Linus Torvalds wrote:

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> > I guess these need some treat before the BUG might be removed, right?  
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> Well, realistically, isn't BUG() as bad as a NULL pointer dereference?

Well, there still could be weirdos out there not setting  
sys.vm.mmap\_min\_addr to something sane. For those, NULL pointer  
dereference could have worse consequences than BUG (unlikely in this  
particular case, yes).

--

Jiri Kosina  
SUSE Labs

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Subject: Re: [PATCH] remove BUG() in possible but rare condition  
Posted by [Michal Hocko](#) on Thu, 12 Apr 2012 09:24:15 GMT  
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> and BUG() sounds just too much. As a matter of fact, grow\_dev\_page()  
> can return NULL just fine in other circumstances, so I propose we just  
> remove it, then.

I had to be blind yesterday. I have double checked the call chain and this is safe already because \_\_getblk\_slow tries to free some memory and then retry the allocation if it gets allocation failure from grow\_buffers (grow\_dev\_page).

>  
> Signed-off-by: Glauber Costa <glommer@parallels.com>  
> CC: Linus Torvalds <torvalds@linux-foundation.org>  
> CC: Andrew Morton <akpm@linux-foundation.org>

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

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> Fight unfair telecom internet charges in Canada: sign <http://stopthemetre.ca/>

> Don't email: <a href=mailto:"dont@kvack.org"> email@kvack.org </a>

--

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