Subject: Re: [RFC] kernel/pid.c pid allocation wierdness
Posted by xemul on Fri, 16 Mar 2007 11:58:57 GMT
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Eric Dumazet wrote:
> On Friday 16 March 2007 11:57, Pavel Emelianov wrote:
>> Oleg Nesterov wrote:
>>> On 03/14, Eric W. Biederman wrote:
>>>> Pavel Emelianov <xemul@sw.ru> writes:
>>>>> Hi.
>>>>>
>>>>> I'm looking at how alloc_pid() works and can't understand
>>>>> one (simple/stupid) thing.
>>>>>
>>>>> It first kmem_cache_alloc()-s a strct pid, then calls
>>>>> alloc_pidmap() and at the end it taks a global pidmap_lock()
>>>>> to add new pid to hash.
>>> We need some global lock. pidmap_lock is already here, and it is
>>> only used to protect pidmap->page allocation. Iow, it is almost
>>> unused. So it was very natural to re-use it while implementing
>>> pidrefs.
>>>
>>>>> The question is - why does alloc_pidmap() use at least
>>>>> two atomic ops and potentially loop to find a zero bit
>>>>> in pidmap? Why not call alloc_pidmap() under pidmap_lock
>>>>> and find zero pid in pidmap w/o any loops and atomics?
>>> Currently we search for zero bit lockless, why do you want
>>> to do it under spin_lock ?
>> Search isn't lockless. Look:
>>
>> while (1) {
>>   if (!test_and_set_bit(...)) {
>>   atomic_dec(&nr_free);
>>   return pid;
>>   }
>>   ...
>> }
>>
>> we use two atomic operations to find and set a bit in a map.
>
> The finding of the zero bit is done without lock. (Search/lookup)
>
> Then , the reservation of the found bit (test_and_set_bit) is done, and
> decrement of nr_free. It may fail because the search was done lockless.

:\ I do understand how this algorithm works. What I don't
understand is why it is done so, if we take a global lock anyway.

> Finding a zero bit in a 4096 bytes array may consume about 6000 cycles on
> modern hardware. Much more on SMP/NUMA machines, or on machines where
> PAGE_SIZE is 64K instead of 4K :)
>
> You don't want to hold pidmad_lock for so long period.

OK, thanks. That's explanations looks good.

> -
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