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```plaintext
measure target: real

name           | trunk  | built
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loop_whileloop2 | 0.149  | 0.148
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vm_thread_mutex3| 28.227 | 0.881
```

Speedup ratio: compare with the result of `trunk' (greater is better)

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loop_whileloop2 | 1.002
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- thread.c (debug_deadlock_check): update for new struct (rb_check_deadlock): ditto [ruby-core:80913] [Feature #13517]

git-svn-id: svn+ssh://ci.ruby-lang.org/ruby/trunk@58604 b2dd03c8-39d4-4d8f-98ff-823fe69b080e

Revision 58604 - 05/08/2017 12:18 AM - normalperson (Eric Wong)

reduce rb_mutex_t size from 160 to 80 bytes on 64-bit

Instead of relying on a native condition variable and mutex for every Ruby Mutex object, use a doubly linked-list to implement a waiter queue in the Mutex. The immediate benefit of this is reducing the size of every Mutex object, as some projects have many objects requiring synchronization.

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Revision 129a0711 - 07/07/2017 05:59 PM - normal

NEWS: note [Feature #13517] is Linux-only (no side-effects on _nonblock)

git-svn-id: svn+ssh://ci.ruby-lang.org/ruby/trunk@59284 b2dd03c8-39d4-4d8f-98ff-823fe69b080e

02/20/2020
NEWS: note [Feature #13517] is Linux-only (no side-effects on "nonblock"

I'm slightly worried about some external code subclassing
ConditionVariable, Queue, and SizedQueue and relying on them
being Structs. However, they only started being Structs with
Ruby 2.1, and were implemented in pure Ruby before that; so
hopefully nobody notices that implementation detail.

Also, note the Mutex change as it may affect program design
when space can be saved.

bullet NEWS: entries for [Feature #13552] and [Feature #13517]

Revision 59385 - 07/21/2017 07:06 PM - normalperson (Eric Wong)
NEWS: add entries for thread_sync.c changes

I'm slightly worried about some external code subclassing
ConditionVariable, Queue, and SizedQueue and relying on them
being Structs. However, they only started being Structs with
Ruby 2.1, and were implemented in pure Ruby before that; so
hopefully nobody notices that implementation detail.

Also, note the Mutex change as it may affect program design
when space can be saved.

bullet NEWS: entries for [Feature #13552] and [Feature #13517]
For who care about 32-bit, single-core x86, here are my
Pentium M (Centrino) @ 1.6GHz numbers:

Size reduction of Mutex on 32-bit is 112 => 40 bytes
minimum results in each 3 measurements.
Execution time (sec)
name     trunk   built
loop_whileloop2  0.554   0.554
vm2_mutex*    3.136   2.217
vm_thread_mutex1 2.783   2.186
vm_thread_mutex2 2.907   2.174
vm_thread_mutex3 9.740   2.586

Speedup ratio: compare with the result of 'trunk' (greater is better)
name   built
loop_whileloop2  0.999
vm2_mutex*    1.414
vm_thread_mutex1 1.273
vm_thread_mutex2 1.337
vm_thread_mutex3 3.766

In the future, I think the cond_waiting flag can be moved into
a FL_USER flag, too.

But I also want to try similar changes to avoid Array usage in
Queue, SizedQueue, and ConditionVariable classes and rely on
ccan/list + stack for waiters. I will convert from T_STRUCT to
T_DATA.

Feature #13517: [PATCH] reduce rb_mutex_t size from 160 to 80 bytes on 64-bit
https://bugs.ruby-lang.org/issues/13517

Any comment? I would like to commit this, soon.

Thanks.

At a glance, it seems nice.
But I need to time to check deeply.
I'll check with 'Misc #13514'.

Please wait these days. In Japan, now we have holiday week. I'll check on these days.

Thanks,
Koichi

one question.

list_for_each_safe(&mutex->waitq, cur, next, node) {
  list_del_init(&cur->node);
  switch (cur->th->state) {
    case THREAD_KILLED:
      continue;
    case THREAD_STOPPED:
    case THREAD_RUNNABLE:
    case THREAD_STOPPED_FOREVER:
      rb_threadptr_interrupt (cur->th);

rb_mutex_lock() set th->status as THREAD_STOPPED_FOREVER before
native sleep, but the above code quoted from rb_mutex_unlock_th().

What kind of situation do you assume when the thread status is other
than THREAD_STOPPED_FOREVER?

Thanks,
Koichi

--
// SASADA Koichi at atdot dot net

#5 - 05/07/2017 11:11 PM - normalperson (Eric Wong)

SASADA Koichi ko1@atdot.net wrote:

> sorry for late response.
> I have no objection about this patch. thank you.

> one question.

> list_for_each_safe(&mutex->waitq, cur, next, node) {
>   list_del_init(&cur->node);
>   switch (cur->th->state) {

Oops, that should be status, not state:

```ruby
switch (cur->th->status) {
    case THREAD_KILLED:
        continue;
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    case THREAD_STOPPED_FOREVER:
        rb_threadptr_interrupt(cur->th);
        goto found;
    }
```

`rb_mutex_lock()` set `th->status` as `THREAD_STOPPED_FOREVER` before
native sleep, but the above code quoted from `rb_mutex_unlock_th()`.

What kind of situation do you assume when the thread status is other
than `THREAD_STOPPED_FOREVER`?

Back to your original question. THREAD_RUNNABLE is possible
if somebody uses Thread#run:

```ruby
require 'thread'
m = Mutex.new
th = Thread.new do
  sleep 0.1 # wait for main thread to get lock
  m.synchronize do
    sleep
  end
end

m.synchronize do
  sleep 0.2 # wait for th to block on m.synchronize
  th.run
end
```

I am not sure about other statuses. Maybe exit/GC can trigger
THREAD_KILLED, the mutex_free->rb_mutex_unlock_th call chain
looks like it might due to GC ordering. Anyways, I will add
comments here when I commit.

Thanks,
Koichi

Thank you for the review!

#6 - 05/07/2017 11:41 PM - ko1 (Koichi Sasada)

On 2017/05/08 8:08, Eric Wong wrote:

   Back to your original question. THREAD_RUNNABLE is possible if somebody uses Thread#run:

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   m = Mutex.new
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     sleep 0.1  # wait for main thread to get lock
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       sleep
     end
   end

   m.synchronize do
     sleep 0.2  # wait for th to block on m.synchronize
     th.run
   end

I also confirm that this code set THREAD_RUNNABLE. However, th waits locking forever, current Thread#run should be bug. mmmm. But not so serious because it is only small period (maybe as you know). We should modify later.

   I am not sure about other statuses. Maybe exit/GC can trigger THREAD_KILLED, the mutex_free->rb_mutex_unlock_th call chain looks like it might due to GC ordering. Anyways, I will add comments here when I commit.

   I think adding rb_bug[] guard is good to know the flow of such situation.

--
// SASADA Koichi at atdot dot net

#7 - 05/08/2017 12:18 AM - Anonymous

- Status changed from Open to Closed

Applied in changeset trunk|r58604.

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Files

0001-reduce-rb_mutex_t-size-from-160-to-80-bytes-on-64-bi.patch 9.17 KB 04/28/2017 normalperson (Eric Wong)