## Make `$SAFE` process global state and allow to set 0 again

12/27/2017 05:01 PM - ko1 (Koichi Sasada)

<table>
<thead>
<tr>
<th>Status:</th>
<th>Closed</th>
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<tr>
<td>Priority:</td>
<td>Normal</td>
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<td>Assignee:</td>
<td>ko1 (Koichi Sasada)</td>
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<td>Target version</td>
<td>2.6</td>
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### Description

$SAFE > 1 is removed from Ruby 2.3 and there are some opinion to remove $SAFE feature ([Feature #5455](#5455)). There are several reason, but the biggest reason I think is nobody use $SAFE correctly.

Also current $SAFE is thread/proc local information and it hurts performance (we need to restore $SAFE information just after returning proc, even if returning by exception).

Matz said $SAFE == 1 is similar to warning and it is not a security feature, but one of the programming tool we can use to improve our program ($SAFE == 3 was for sandbox, security feature).

From this perspective, Matz approved us the followings:

- $SAFE is process global, not a Proc local state.
- We can set $SAFE == 0 when $SAFE == 1.

I think we can't make big project with the above changes (how to make multi-thread programming with this $SAFE?), but $SAFE seems for small project (so-called scripting). Anyway if nobody use it, no problem on these changes.

I will commit this change soon.

Please try new spec and point out any problem you got.

Thanks,

Koichi

### Related issues:

- Related to Ruby master - Feature #14256: Deprecate $SAFE support in ERB and l...
  - Closed
- Related to Ruby master - Bug #14353: $SAFE should stay at least thread-local ...  
  - Closed

### Associated revisions

Revision c39bdb79 - 12/28/2017 08:09 PM - ko1 (Koichi Sasada)

$SAFE as a process global state. [Feature #14250]

- `vm_core.h (rb_vm_t)`: move `rb_execution_context_t::safe_level` to `rb_vm_t::safe_level_` because $SAFE is a process (VM) global state.
- `vm_core.h (rb_proc_t)`: remove `rb_proc_t::safe_level` because Proc objects don't need to keep $SAFE at the creation. Also make `is_from_method` and `is_lambda` as 1 bit fields.
- `cont.c (cont_restore_thread)`: no need to keep $SAFE for Continuation.
- `eval.c (ruby_cleanup)`: use `rb_set_safe_level_force()` instead of access `vm->safe_level_directly`.
- `eval_jump.c`: `End procs END[]` doesn't keep $SAFE.
- `proc.c (proc_dup)`: removed and introduce `rb_proc_dup` in `vm.c`.
- `safe.c (rb_set_safe_level)`: don't check $SAFE 1 -> 0 changes.
- `safe.c (safe_setter)`: use `rb_set_safe_level()`.
- `thread.c (rb_thread_safe_level)`: `Thread#safe_level` returns $SAFE. It should be obsolete.
- `transcode.c (load_transcoder_entry)`: `rb_safe_level()` only returns
0 or 1 so that this check is not needed.

- `vm.c (vm_proc_create_from_captured):` don't need to keep $SAFE for Proc.
- `vm.c (rb_proc_create):` renamed to proc_create.
- `vm.c (rb_proc_dup):` moved from proc.c.
- `vm.c (vm_invoke_proc):` do not need to set and restore $SAFE for Proc#call.
- `vm_eval.c (rb_eval_cmd):` rename a local variable to represent clearer meaning.
- `lib/drb/drb.rb: restore $SAFE.
- `lib/erb.rb: restore $SAFE, too.
- `test/lib/leakchecker.rb: check $SAFE == 0 at the end of tests.
- `bootstrap/test/test_proc.rb: catch up this change.
- `spec/ruby/optional/capi/string_spec.rb: ditto.
- `test/bigdecimal/test_bigdecimal.rb: ditto.
- `test/fiddle/test_func.rb: ditto.
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- `test/pathname/test_pathname.rb: ditto.
- `test/readline/test_readline.rb: ditto.
- `test/ruby/test_optimization.rb: ditto.
- `test/ruby/test_proc.rb: ditto.
- `test/ruby/test_require.rb: ditto.
- `test/ruby/test_thread.rb: ditto.
- `test/rubygems/test_gem_specification.rb: ditto.
- `test/test_tempfile.rb: ditto.
- `test/test_tmpdir.rb: ditto.

```
git-svn-id: svn+ssh://ci.ruby-lang.org/ruby/trunk@61510 b2dd03c8-39d4-4d8f-98ff-823fe69b080e
Revision 61510 - 12/28/2017 08:09 PM - ko1 (Koichi Sasada)
```

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- `cont.c (cont_restore_thread):` no need to keep $SAFE for Continuation.
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### History

#### #1 - 12/27/2017 05:41 PM - shevegen (Robert A. Heiler)

Can not comment on $SAFE but I personally have not used $SAFE so far in
like +10 years or so. I can only remember the pickaxe mentioning it, but
I have not used it in any of my ruby code.

A bit off-topic but does anyone remember if _why’s old ruby sandbox (the
online irb, I think), made use of it? For such projects, trivial ways
to control how "safe" the ruby is, may be more useful. E. g. in any
restricted environment such as that.

#### #2 - 12/28/2017 02:32 AM - mame (Yusuke Endoh)

- File gems-using-safe.txt added

FYI: by using gem-codesearch, I have briefly searched the gems using $SAFE:

```bash
$ csearch -f '.*\.rb' '^\s*\[\s*\*\S+\S*\]\.\*\$SAFE *=.*' | wc -l
147
```

Much less than I thought... The full list is attached.

#### #3 - 12/28/2017 05:37 AM - k0kubun (Takashi Kokubun)

- Related to Feature #14255: Deprecate $SAFE support in ERB added

#### #4 - 12/28/2017 05:53 AM - k0kubun (Takashi Kokubun)

- Related to deleted (Feature #14255: Deprecate $SAFE support in ERB)

#### #5 - 12/28/2017 05:54 AM - k0kubun (Takashi Kokubun)

- Related to Feature #14256: Deprecate $SAFE support in ERB and let ERB.new take keyword arguments for it added

#### #6 - 12/28/2017 08:09 PM - ko1 (Koichi Sasada)

- Status changed from Open to Closed

Applied in changeset trunk|r61510.

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[05/24/2021]
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#7 - 01/13/2018 08:00 PM - Eregon (Benoit Daloze)
- Related to Bug #14353: $SAFE should stay at least thread-local for compatibility added