

## Ruby master - Feature #13077

### [PATCH] introduce String#fstring method

12/27/2016 01:50 AM - normalperson (Eric Wong)

<b>Status:</b> Closed	
<b>Priority:</b> Normal	
<b>Assignee:</b>	
<b>Target version:</b>	
<b>Description</b>	
introduce String#fstring method	
<p>This exposes the rb_fstring internal function to return a deduped and frozen string. This is useful for writing all sorts of record processing key values maybe stored, but certain keys and values are often duplicated at a high frequency, so memory savings can noticeable.</p>	
<p>Use cases are many:</p>	
<ul style="list-style-type: none"><li>• email/NNTP header processing</li></ul>	
<p>There are some standard header keys everybody uses (From/To/Cc/Date/Subject/Received/Message-ID/References/In-Reply-To), as well as common ones specific to a certain lists: (ruby-core has X-Redmine-* headers)</p>	
<p>It is also useful to dedupe values, as most inboxes have multiple messages from the same sender, or MUA.</p>	
<ul style="list-style-type: none"><li>• package management systems - things like RubyGems stores identical strings for licenses, dependency names, author names/emails, etc</li><li>• HTTP headers/trailers - standard headers (Host/Accept/Accept-Encoding/User-Agent/...) are common, but there are also uncommon ones. Values may be deduped, as well, as it is likely a user agent will make multiple/parallel requests to the same server.</li><li>• version control systems - this can be useful for deduplicating names of frequent committers (like "nobu" :)</li></ul>	
<p>In linux.git and git.git, there are also common trailers such as Signed-Off-By/Acked-by/Reviewed-by/Fixes/... as well as less common ones.</p>	
<ul style="list-style-type: none"><li>• audio metadata -</li></ul>	
<p>There are commonly used tags (Artist/Album/Title/Tracknumber), but Vorbis comments allows arbitrary key values to be stored. Music collections contain songs by the same artist or mutiple songs from the same album, so deduplicating values will be helpful there, too.</p>	
<ul style="list-style-type: none"><li>• JSON, YAML, XML, HTML processing</li></ul>	
<p>certain fields, tags and attributes are commonly used across the same and multiple documents</p>	
<b>Related issues:</b>	
Has duplicate Ruby master - Feature #17147: New method to get frozen strings ...	
<b>Feedback</b>	

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## Associated revisions

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### Revision 4e90dcc9 - 02/24/2017 01:01 AM - normal

string.c (str\_uminus): deduplicate strings

This exposes the `rb_fstring` internal function to return a deduped and frozen string when a non-frozen string is given. This is useful for writing all sorts of record processing key values maybe stored, but certain keys and values are often duplicated at a high frequency, so memory savings can be noticeable.

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Certain fields, tags and attributes are commonly used across the same and multiple documents

There is no security concern in this being a DoS vector by causing immortal strings. The `fstring` table is not a GC-root and not walked during the mark phase. GC-able dynamic symbols since Ruby 2.2 are handled in the same manner, and that implementation also relies on the non-immortality of `fstrings`.

[Feature #13077] [ruby-core:79663]

git-svn-id: svn+ssh://ci.ruby-lang.org/ruby/trunk@57698 b2dd03c8-39d4-4d8f-98ff-823fe69b080e

### Revision 57698 - 02/24/2017 01:01 AM - normalperson (Eric Wong)

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[Feature #13077] [ruby-core:79663]

#### **Revision 15ef28a9 - 02/25/2017 02:31 AM - normal**

NEWS: document String#-@ change

- test/ruby/test\_string.rb (test\_uplus\_minus): test deduplication [ruby-core:79747] [Feature #13077]

git-svn-id: svn+ssh://ci.ruby-lang.org/ruby/trunk@57710 b2dd03c8-39d4-4d8f-98ff-823fe69b080e

#### **Revision 57710 - 02/25/2017 02:31 AM - normalperson (Eric Wong)**

NEWS: document String#-@ change

- test/ruby/test\_string.rb (test\_uplus\_minus): test deduplication [ruby-core:79747] [Feature #13077]

#### **Revision 57710 - 02/25/2017 02:31 AM - normal**

NEWS: document String#-@ change

- test/ruby/test\_string.rb (test\_uplus\_minus): test deduplication [ruby-core:79747] [Feature #13077]

#### **Revision 57710 - 02/25/2017 02:31 AM - normal**

NEWS: document String#-@ change

- test/ruby/test\_string.rb (test\_uplus\_minus): test deduplication [ruby-core:79747] [Feature #13077]

## **History**

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### **#1 - 12/27/2016 03:54 PM - shevegen (Robert A. Heiler)**

I have no particular pro or con opinion on the proposal in itself so feel free to ignore this.

The only comment I have is that the name .fstring() is a bit strange. On first read, I assumed that it was short for "format\_string" like % on class String or sprintf.

In the proposal I read that it is for frozen\_string e. g. rb\_fstring. While I don't have anything against the functionality, and I also don't fully mind a method called fstring(), I think that at the least a longer alias name to it would be nice to have too such as frozen\_string or something that is more readable on a first look. (I can't comment on whether the functionality in itself is useful or not but I assume that Eric has had a good reason which he described too, so I have no qualms at all with the functionality in itself, only the method-name part.)

### **#2 - 12/27/2016 06:41 PM - normalperson (Eric Wong)**

[shevegen@gmail.com](mailto:shevegen@gmail.com) wrote:

The only comment I have is that the name `.fstring()` is a bit strange. On first read, I assumed that it was short for "format\_string" like `%` on class `String` or `sprintf`.

Yeah, the name isn't final, of course; naming is the hardest problem in computer science :<

Maybe "dedup" is better and still short (I would expect the user to know deduplication implicitly requires a frozen string)

### #3 - 12/27/2016 10:15 PM - Eregon (Benoit Daloze)

So this is essentially like Java's `String.intern()`?

There is already `String#intern` in Ruby but it returns a `Symbol`. Depending on the use-case, I guess this might be less convenient than getting a de-duplicated `String`. `String#dedup` or sounds better than `#fstring`.

### #4 - 12/27/2016 11:41 PM - normalperson (Eric Wong)

[eregontp@gmail.com](mailto:eregontp@gmail.com) wrote:

So this is essentially like Java's `String.intern()`?

There is already `String#intern` in Ruby but it returns a `Symbol`. Depending on the use-case, I guess this might be less convenient than getting a de-duplicated `String`.

Yeah, I considered using `intern/to_sym` for my use case; but the problem is it that still creates a new string object whenever it needs to be written/printed/concatenated.

And I also feel using symbol like this is ugly (just a gut feeling), despite having GC-able symbols since 2.2.

`String#dedup` or sounds better than `#fstring`.

Yes. Lets wait for Matz to comment.

### #5 - 12/28/2016 12:08 AM - nobu (Nobuyoshi Nakada)

Why not `String#-@`?

### #6 - 12/28/2016 03:03 AM - normalperson (Eric Wong)

[nobu@ruby-lang.org](mailto:nobu@ruby-lang.org) wrote:

Why not `String#-@`?

As in the following? (short patch, full below)

```
--- a/string.c
+++ b/string.c
@@ -10002,7 +9989,7 @@ Init_String(void)
     rb_define_method(rb_cString, "scrub!", str_scrub_bang, -1);
     rb_define_method(rb_cString, "freeze", rb_str_freeze, 0);
     rb_define_method(rb_cString, "+@", str_uplus, 0);
-    rb_define_method(rb_cString, "-@", str_uminus, 0);
+    rb_define_method(rb_cString, "-@", rb_fstring, 0);

     rb_define_method(rb_cString, "to_i", rb_str_to_i, -1);
     rb_define_method(rb_cString, "to_f", rb_str_to_f, 0);
```

Changing existing behavior method might break compatibility; but test-all and test-rubyspec seems to pass...

full: <https://80x24.org/spew/20161228024937.9345-1-e@80x24.org/raw>

### #7 - 02/22/2017 07:34 AM - matz (Yukihiro Matsumoto)

For the time being, let us make `-@` to call `rb_fstring`. If users want more descriptive name, let's discuss later. In my opinion, `fstring` is not acceptable.

Matz.

**#8 - 02/22/2017 09:41 AM - normalperson (Eric Wong)**

[matz@ruby-lang.org](mailto:matz@ruby-lang.org) wrote:

For the time being, let us make `-@` to call `rb_fstring`.  
If users want more descriptive name, let's discuss later.  
In my opinion, `fstring` is not acceptable.

OK, I think the following is always backwards compatible,  
unlike my previous [ruby-core:78884]:

```
--- a/string.c
+++ b/string.c
@@ -2530,7 +2530,7 @@ str_uminus(VALUE str)
     return str;
   }
   else {
-   return rb_str_freeze(rb_str_dup(str));
+   return rb_fstring(str);
   }
 }
```

Will commit in a day or two.

**#9 - 02/23/2017 12:51 AM - shyouhei (Shyouhei Urabe)**

A bit of security consideration:

Am I correct that `rb_vm_fstring_table()` is never GCed? If so feeding user-generated strings to that table needs extra care. Malicious user input might let memory exhausted.

**#10 - 02/23/2017 01:00 AM - nobu (Nobuyoshi Nakada)**

Shyouhei Urabe wrote:

Am I correct that `rb_vm_fstring_table()` is never GCed?

That table is not a GC-root, and registered strings get GCed as usual.

**#11 - 02/23/2017 09:20 AM - shyouhei (Shyouhei Urabe)**

Nobuyoshi Nakada wrote:

Shyouhei Urabe wrote:

Am I correct that `rb_vm_fstring_table()` is never GCed?

That table is not a GC-root, and registered strings get GCed as usual.

So this is a kind of weak reference? No security concern then.

**#12 - 02/24/2017 01:01 AM - Anonymous**

*- Status changed from Open to Closed*

Applied in changeset r57698.

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[Feature [#13077](#)] [ruby-core:79663]

**#13 - 02/24/2017 01:05 AM - normalperson (Eric Wong)**

[shyouhei@ruby-lang.org](mailto:shyouhei@ruby-lang.org) wrote:

Nobuyoshi Nakada wrote:

Shyouhei Urabe wrote:

Am I correct that `rb_vm_fstring_table()` is never GCed?

That table is not a GC-root, and registered strings get GCed as usual.

So this is a kind of weak reference? No security concern then.

Right. Also, keep in mind that dynamic GC-able symbols from 2.2+ also stores symbol names as fstrings. Thus GC-able symbols would not work if fstrings could not be GC-ed.

Anyways, committed as r57698

**#14 - 02/24/2017 10:28 AM - Eregon (Benoit Daloze)**

Eric Wong wrote:

Anyways, committed as r57698

This should have a NEWS entry and tests since it changes the semantics.

BTW, should `my_string.freeze` behave similarly to `String#@-?`?  
Otherwise `String#freeze` only dedup if the `String` is a literal.  
Always deduping for `String#freeze` would make the semantics more consistent.

**#15 - 02/25/2017 02:11 AM - normalperson (Eric Wong)**

[eregontp@gmail.com](mailto:eregontp@gmail.com) wrote:

Eric Wong wrote:

Anyways, committed as r57698

This should have a NEWS entry and tests since it changes the semantics.

Sorry, I forgot; will do. Thanks for the reminder.

BTW, should `my_string.freeze` behave similarly to `String#@-?`?  
Otherwise `String#freeze` only dedup if the `String` is a literal.  
Always deduping for `String#freeze` would make the semantics more consistent.

No. There is existing code which assumes `#freeze` always returns the same object as its caller. Changing `#freeze` will break existing code.

We can only cheat with `String` literals (`opt_str_freeze`) because literals are not assigned to user-visible variables, yet.

**#16 - 02/25/2017 08:53 PM - Eregon (Benoit Daloze)**

Eric Wong wrote:

No. There is existing code which assumes `#freeze` always returns the same object as its caller. Changing `#freeze` will break existing code.

We can only cheat with `String` literals (`opt_str_freeze`) because literals are not assigned to user-visible variables, yet.

Oh indeed, that slipped my mind, thanks for the explanation.

**#17 - 09/04/2020 09:58 AM - naruse (Yui NARUSE)**

- Has duplicate Feature #17147: New method to get frozen strings from `String` objects added

**Files**

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0001-introduce-String-fstring-method.patch	3.47 KB	12/27/2016	normalperson (Eric Wong)
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