



# Ruby Concurrency

Jerry D'Antonio



```
1 require 'rest_client'
2 require 'json'
3
4 class Finance
5
6   CALLBACK_TOKEN = 'YAHOO.Finance.SymbolSuggest.ssCallback'
7   BASE_URL = 'http://d.yimg.com/autoc.finance.yahoo.com/autoc'
8   BASE_QS = "query=%s&callback=YAHOO.Finance.SymbolSuggest.ssCallback"
9
10 attr_reader :suggested_symbols
11
12 def initialize(query_string)
13   @url = "%s?%s" % [BASE_URL, BASE_QS % query_string.downcase]
14   @suggested_symbols = []
15 end
16
17 def update
18   data = RestClient.get(@url)
19   data = data.gsub(/^#{CALLBACK_TOKEN}\(\s*/, '').gsub(/\)\s*$/, '')
20   data = JSON.parse(data)
21   @suggested_symbols = data['ResultSet']['Result']
22   return self
23 end
24 end
25
26 yahoo = Finance.new('YAHOO')
27 yahoo.update.suggested_symbols #=> [{"symbol"=>"YHOO", "name"=>"Yahoo! Inc."...}
```



```
1 require 'concurrent'
2
3 yahoo = Finance.new('YAHOO')
4 shock = Concurrent::Future.new { yahoo.update.suggested_symbols }
5 shock.state #=> :pending
6 shock.value(0) #=> nil (call blocks for 0 seconds)
7
8 # do important stuff...
9
10 shock.state #=> :fulfilled
11 shock.value #=> [{"symbol"=>"YHOO", "name"=>"Yahoo! Inc."...
12                 #   (call blocks indefinitely)
13
14 bogus = Finance.new('this creates a bogus URL')
15 awe = Concurrent::Future.new { bogus.update.suggested_symbols }
16 awe.state #=> :pending
17 awe.value(0) #=> nil (call blocks for 0 seconds)
18
19 # do important stuff...
20
21 awe.state #=> :rejected
22 awe.reason #=> #<URI::InvalidURIError: bad URI(is not URI?)...
23                 #   (call blocks indefinitely)
```

```
1 require 'concurrent'
2
3 class Ticker
4   Stock = Struct.new(:symbol, :name, :exchange)
5
6   def update(time, value, reason)
7     ticker = value.collect do |symbol|
8       Stock.new(symbol['symbol'], symbol['name'], symbol['exch'])
9     end
10
11   output = ticker.join("\n")
12   print "#{output}\n"
13 end
14 end
15
16 yahoo = Finance.new('YAHOO')
17 future = Concurrent::Future.new { yahoo.update.suggested_symbols }
18 future.add_observer(Ticker.new)
19
20 # do important stuff...
21
22 #>> #<struct Ticker::Stock symbol="YHOO", name="Yahoo! Inc.", exchange="NMS">
23 #>> #<struct Ticker::Stock symbol="YHO.DE", name="Yahoo! Inc.", exchange="GER">
24 #>> #<struct Ticker::Stock symbol="YAH0Y", name="Yahoo Japan Corporation", exchange="PNK">
25 #>> #<struct Ticker::Stock symbol="YAHOF", name="YAHOO JAPAN CORP", exchange="PNK">
26 #>> #<struct Ticker::Stock symbol="YOJ.SG", name="YAHOO JAPAN", exchange="STU">
27 #>> #<struct Ticker::Stock symbol="YHO.SG", name="YAHOO", exchange="STU">
28 #>> #<struct Ticker::Stock symbol="YH00.BA", name="Yahoo! Inc.", exchange="BUE">
29 #>> #<struct Ticker::Stock symbol="YHO.DU", name="YAHOO", exchange="DUS">
30 #>> #<struct Ticker::Stock symbol="YHO.HM", name="YAHOO", exchange="HAM">
31 #>> #<struct Ticker::Stock symbol="YHO.BE", name="YAHOO", exchange="BER">
```



```
1 require 'concurrent'
2
3 ticker = Concurrent::Agent.new([])
4 ticker.value #=> []
5
6 yahoo = Finance.new('YAHOO')
7 ticker.post{|suggested_symbols| suggested_symbols + yahoo.update.suggested_symbols }
8 ticker.value.length #=> 0
9
10 # wait for it...
11 ticker.value.length #=> 10
12
13 ms = Finance.new('Microsoft')
14 ticker.post{|suggested_symbols| ms.update.suggested_symbols + suggested_symbols }
15 ticker.value.count #=> 10
16
17 # wait for it...
18 ticker.value.count #=> 20
19
20 ticker.post{|suggested_symbols| raise StandardError }
21 ticker.value.count #=> 20
22
23 # wait for it...
24 ticker.value.count #=> 20
```





```
1 require 'concurrent'
2 require 'hamster'
3
4 ticker = Concurrent::Agent.new(Hamster.vector)
5 ticker.value #=> []
6
7 yahoo = Finance.new('YAHOO')
8 ticker.post do |suggested_symbols|
9   yahoo.update.suggested_symbols.each do |symbol|
10     suggested_symbols = suggested_symbols.cons(symbol)
11   end
12   suggested_symbols
13 end
14 ticker.value.length #=> 0
15
16 # wait for it...
17 ticker.value.length #=> 10
18
19 # -- or --
20
21 require 'concurrent'
22 require 'thread_safe'
23
24 ticker = Concurrent::Agent.new(ThreadSafe::Array.new)
25 ticker.value #=> []
26
27 yahoo = Finance.new('YAHOO')
28 ticker.post{|suggested_symbols| suggested_symbols + yahoo.update.suggested_symbols }
29 ticker.value.length #=> 0
30
31 # wait for it...
32 ticker.value.length #=> 10
```

A woman with blonde hair tied back in a bun, wearing a yellow dress, is shown from the side, looking down at an open book she is writing in. She holds a quill pen in her right hand and a small ink bottle in her left hand. The book has a yellow cover with some text and a small illustration of a tree on it. The scene is set against a dark purple background.

For all eternity  
signed,  
Alice

unto  
Witch  
e on

```
1 require 'concurrent'
2
3 ticker = Concurrent::Promise.new([]) { |suggested_symbols|
4   suggested_symbols + Finance.new('YAHOO').update.suggested_symbols
5 }.then { |suggested_symbols|
6   suggested_symbols + Finance.new('Microsoft').update.suggested_symbols
7 }
8 ticker.pending? #=> true
9
10 # wait for it...
11 ticker.pending?      #=> false
12 ticker.value.length #=> 20
13
14 # -----
15
16 ticker = Concurrent::Promise.new([]) { |suggested_symbols|
17   suggested_symbols + Finance.new('YAHOO').update.suggested_symbols
18 }.then { |suggested_symbols|
19   raise ArgumentError.new("You're a bad monkey Mojo Jojo")
20 }.rescue(StandardError) { |ex|
21   print ex
22 }
23 ticker.pending? #=> true
24
25 # wait for it...
26 ticker.rejected? #=> true
27 ticker.reason    #=> => #<ArgumentError: You're a bad monkey Mojo Jojo>
```

MISSION TIME

02:19

Guard your HE Cha

00:30



XP +01524

Mills Kautz

Cowley Manson

35  
175



```
1 require 'concurrent'
2
3 task = Concurrent::ScheduledTask.new(2) do
4   'What does the fox say?'
5 end
6 task.pending?      #=> true
7 task.schedule_time #=> 2013-11-07 12:20:07 -0500
8
9 sleep(3) # wait for it...
10
11 task.fulfilled? #=> true
12 task.value       #=> 'What does the fox say?'
13
14 # -----
15
16 t = Time.now + 2
17 task = Concurrent::ScheduledTask.new(t) do
18   raise StandardError.new('Call me maybe?')
19 end
20 task.pending?      #=> true
21 task.schedule_time #=> 2013-11-07 12:22:01 -0500
22
23 sleep(3) # wait for it...
24
25 task.rejected?   #=> true
26 task.reason      #=> #<StandardError: Call me maybe?>
```

```
1 require 'concurrent'
2
3 observer = Class.new{
4   def update(time, value, reason)
5     puts "The task completed at #{time} with value:\n\t#{value}"
6   end
7 }.new
8
9 task = Concurrent::ScheduledTask.new(2) do
10   'What does the fox say?'
11 end
12 task.add_observer(observer)
13 task.pending?      #=> true
14 task.schedule_time #=> 2013-11-07 12:20:07 -0500
15
16 sleep(3) # wait for it...
17
18 #=> The task completed at 2013-11-07 17:30:41 -0500 with value:
19 #=>   'What does the fox say?'
20
21 # -----
22
23 task = Concurrent::ScheduledTask.new(10) do
24   raise StandardError.new('Call me maybe?')
25 end
26 sleep(1)
27 task.cancel #=> true
```



```
1 require 'concurrent'
2
3 task = Concurrent::TimerTask.new(execution: 5, timeout: 5) do
4   print "Boom!\n"
5 end
6
7 task.execution_interval #=> 5; default 60
8 task.timeout_interval   #=> 5; default 30
9 task.run!
10
11 # wait 5 seconds...
12 #=> 'Boom!'
13
14 # wait 5 seconds...
15 #=> 'Boom!'
16
17 # wait 5 seconds...
18 #=> 'Boom!'
19
20 task.stop #=> true
```

```
1 require 'concurrent'
2
3 class TaskObserver
4   def update(time, result, ex)
5     if result
6       print "(#{time}) Execution successfully returned #{result}\n"
7     elsif ex.is_a?(Concurrent::TimeoutError)
8       print "(#{time}) Execution timed out\n"
9     else
10      print "(#{time}) Execution failed with error #{ex}\n"
11    end
12  end
13 end
14
15 task = Concurrent::TimerTask.new(execution_interval: 1){ 42 }
16 task.add_observer(TaskObserver.new)
17 task.run!
18
19 #=> (2013-10-13 19:08:58 -0400) Execution successfully returned 42
20 #=> (2013-10-13 19:08:59 -0400) Execution successfully returned 42
21 #=> (2013-10-13 19:09:00 -0400) Execution successfully returned 42
22 task.stop
```

```
1 require 'concurrent'
2
3 timer_task = Concurrent::TimerTask.new(execution_interval: 1) do |task|
4
5   task.execution_interval.times{ print 'Boom! ' }
6   print "\n"
7   task.execution_interval += 1
8
9   if task.execution_interval > 5
10    puts 'Stopping...'
11    task.stop
12  end
13 end
14
15 timer_task.run # blocking call - this task will stop itself
16 #=> Boom!
17 #=> Boom! Boom!
18 #=> Boom! Boom! Boom!
19 #=> Boom! Boom! Boom! Boom!
20 #=> Boom! Boom! Boom! Boom! Boom!
21 #=> Stopping...
```



```
1 require 'concurrent'
2
3 class EchoActor < Concurrent::Actor
4   def act(*message)
5     puts "#{message} handled by #{self}"
6   end
7 end
8
9 echo = EchoActor.new
10 echo.run!
11
12 echo.post("Don't panic") #=> true
13 #=> ["Don't panic"] handled by #<EchoActor:0x007fc8014d0668>
14
15 # -----
16
17 mailbox, pool = EchoActor.pool(5)
18 pool.each{|echo| echo.run! }
19
20 10.times{|i| mailbox.post(i) }
21 #=> [0] handled by #<EchoActor:0x007fc8014fb8b8>
22 #=> [1] handled by #<EchoActor:0x007fc8014fb890>
23 #=> [2] handled by #<EchoActor:0x007fc8014fb868>
24 #=> [3] handled by #<EchoActor:0x007fc8014fb890>
25 #=> [4] handled by #<EchoActor:0x007fc8014fb840>
26 #=> [5] handled by #<EchoActor:0x007fc8014fb8b8>
27 #=> [6] handled by #<EchoActor:0x007fc8014fb8b8>
28 #=> [7] handled by #<EchoActor:0x007fc8014fb818>
29 #=> [8] handled by #<EchoActor:0x007fc8014fb890>
```

```
1 require 'concurrent'
2
3 class EverythingActor < Concurrent::Actor
4   def act(message)
5     sleep(5)
6     return 42
7   end
8 end
9
10 life = EverythingActor.new
11 life.run!
12
13 universe = life.post?('What do you get when you multiply six by nine?')
14 universe.pending? #=> true
15
16 # wait for it...
17 universe.fulfilled? #=> true
18 universe.value      #=> 42
19
20 life.post!(1, 'Mostly harmless.')
21
22 # wait for it...
23 #=> Concurrent::TimeoutError: Concurrent::TimeoutError
```

```
1 require 'concurrent'
2
3 class ActorObserver
4   def update(time, message, result, ex)
5     if result
6       print "(#{time}) Message #{message} returned #{result}\n"
7     elsif ex.is_a?(Concurrent::TimeoutError)
8       print "(#{time}) Message #{message} timed out\n"
9     else
10      print "(#{time}) Message #{message} failed with error #{ex}\n"
11    end
12  end
13 end
14
15 class SimpleActor < Concurrent::Actor
16   def act(*message)
17     message
18   end
19 end
20
21 actor = SimpleActor.new
22 actor.add_observer(ActorObserver.new)
23 actor.run!
24
25 actor.post(1)
26 #=> (2013-11-07 18:35:33 -0500) Message [1] returned [1]
27
28 actor.post(1,2,3)
29 #=> (2013-11-07 18:35:54 -0500) Message [1, 2, 3] returned [1, 2, 3]
```

```
1 require 'concurrent'
2
3 class Ping < Concurrent::Actor
4
5   def initialize(count, pong)
6     super()
7     @pong = pong
8     @remaining = count
9   end
10
11  def act(msg)
12
13    if msg == :pong
14      print "Ping: pong\n" if @remaining % 1000 == 0
15      @pong.post(:ping)
16
17    if @remaining > 0
18      @pong << :ping
19      @remaining -= 1
20    else
21      print "Ping :stop\n"
22      @pong << :stop
23      self.stop
24    end
25  end
26 end
27 end

1 require 'concurrent'
2
3 class Pong < Concurrent::Actor
4
5   attr_writer :ping
6
7   def initialize
8     super()
9     @count = 0
10  end
11
12  def act(msg)
13
14    if msg == :ping
15      print "Pong: ping\n" if @count % 1000 == 0
16      @ping << :pong
17      @count += 1
18
19    elsif msg == :stop
20      print "Pong :stop\n"
21      self.stop
22    end
23  end
24 end
25
26 pong = Pong.new
27 ping = Ping.new(10000, pong)
28 pong.ping = ping
29
30 t1 = ping.run!
31 t2 = pong.run!
32 sleep(0.1)
33
34 ping << :pong
```



```
1 require 'concurrent'
2
3 QUERIES = %w[YAHOO Microsoft google]
4
5 class FinanceActor < Concurrent::Actor
6   def act(query)
7     finance = Finance.new(query)
8     print "[#{Time.now}] RECEIVED '#{query}' to #{self} returned #{finance.update.suggested_symbols}\n\n"
9   end
10 end
11
12 financial, pool = FinanceActor.pool(5)
13
14 timer_proc = proc do
15   query = QUERIES[rand(QUERIES.length)]
16   financial.post(query)
17   print "[#{Time.now}] SENT '#{query}' from #{self} to worker pool\n\n"
18 end
19
20 t1 = Concurrent::TimerTask.new(execution_interval: rand(5)+1, &timer_proc)
21 t2 = Concurrent::TimerTask.new(execution_interval: rand(5)+1, &timer_proc)
22
23 overlord = Concurrent::Supervisor.new
24
25 overlord.add_worker(t1)
26 overlord.add_worker(t2)
27 pool.each{|actor| overlord.add_worker(actor)}
28
29 overlord.run! # the #run method blocks, #run! does not
30
31 #>> [2013-10-18 09:35:28 -0400] SENT 'YAHOO' from main to worker pool
32 #>> [2013-10-18 09:35:28 -0400] RECEIVED 'YAHOO' to #<FinanceActor:0x0000010331af70>...
33 #>> [2013-10-18 09:35:30 -0400] SENT 'google' from main to worker pool
34 #>> [2013-10-18 09:35:30 -0400] RECEIVED 'google' to #<FinanceActor:0x0000010331ae58>...
35
36 overlord.stop #=> true
```

# Write Code!

[github.com/jdantonio](https://github.com/jdantonio)  
@jerrydantonio