

It's About Time

by Benjamin Fleischer

A short journey through time with Ruby

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What is Time?

- **For a computer**
- Measured as microseconds from the Unix Epoch
 - **(January 1, 1970 00:00:00 UTC)**
 - Some systems allow it to be negative. (A non-portable feature)
- UTC stands for “Coordinated Universal Time”
 - It replaced the designation of GMT (Greenwich Mean Time)

For Ruby

- Dates can be, starting January 1, 4713 BCE, in the format:
 - civil,
 - ordinal,
 - commercial,
 - Julian, and
 - standard,
- Ruby supports some standard formats (*with require 'time', an extension of Class Time*)
 - rfc2822 (e-mail)
 - Thu Apr 01 16:32:45 CST 2004
 - rfc822
 - Thu, 01 Apr 2004 16:32:45 -0600"
 - httpdate (RFC 2616, rfc1123-date), always UTC
 - Thu Apr 01 16:32:45 UTC 2004
 - iso8601 / xmlschema
 - 2004-04-01T16:32:45-06:00

For Ruby

- Note that iso8601 is the both human-readable and machine, unambiguous, and sortable as a string. It is the format used in the microformats.org specification
- UTC 'timezone' designator is "Z" e.g 1994-11-05T13:15:30Z corresponds to 1994-11-05T08:15:30-05:00
- Use 'tzinfo' gem to work with zone
- **Suggestions**
 - Always store your dates or times as iso8601 xsd:dateTime in UTC see <http://devblog.avdi.org/2009/10/25/iso8601-dates-in-ruby/> and note <http://www.w3.org/TR/NOTE-datetime>

Time is all around

YOU CAN'T STOP TIME...



**But you can turn it back
one hour at 2 a.m. on Oct. 28
when daylight-saving time
ends and standard time begins.**

Gotchas: why we can't have nice things good times

- Daylight savings
 - Spring Forward: On the second Sunday in March 2 a.m. becomes 3 a.m. and daylight time begins. **2 a.m. doesn't exist!**
 - Fall Back: On the first Sunday in November, 2 a.m. becomes 1 a.m. local standard time. **2 a.m. occurs twice!**
- Using localized times in your app, or in a script
 - 12 a.m. Wednesday March 28th in Chicago is Tuesday March 27th in Denver and Palo Alto
- Leap seconds, or other last minute changes
 - (next slide)
- Fuuuuuu! (h/t Peter Cooper ruby19 walkthrough)
 - require 'time';
 - Time.parse("30/12/2001")
 - in 1.9.2 parses as dd/mm/yyyy .. was mm/dd/yyyy in 1.8!

For Ruby, leap second



Zach Holman
@holman

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Ruby was unaffected by the 2012 leap
second crisis because no Ruby code exists
that runs quicker than one second. TOO
SLOW TO FAIL

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2:14 AM - 1 Jul 12 · Embed this Tweet

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Alex Cruise @alexcruise
@holman @thedoc actually it was a threads-related bug,
so... Still sorta funny. ;)

2 Sep

Solutions

- Don't schedule cron jobs between 1 a.m. and 3 a.m. as that time may not exist
- Be careful scheduling cron jobs around midnight that depend on the current date as it changes in different time zones

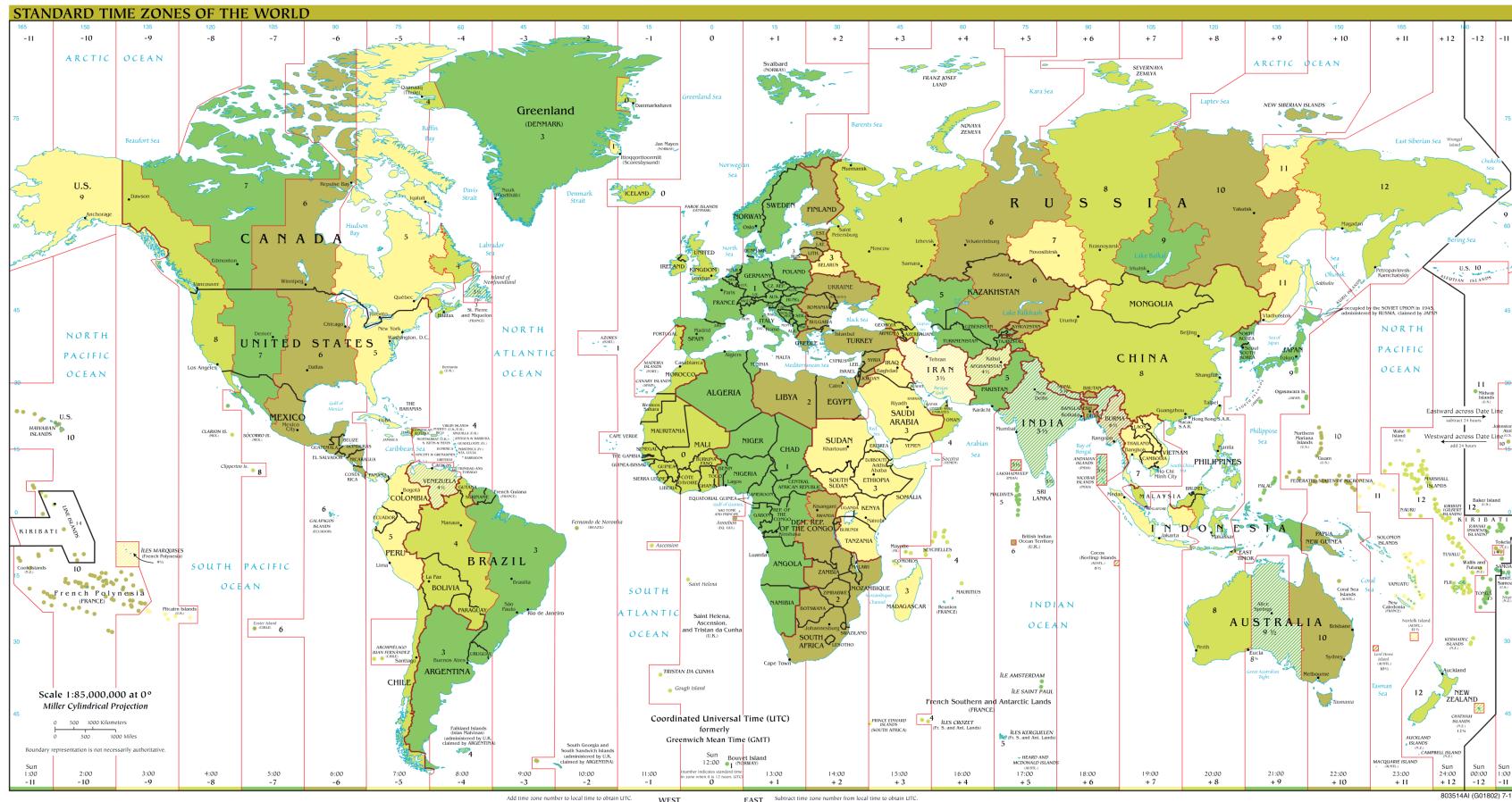
640k ought to be enough for anyone – “Bill Gates”

- A 32-bit machine can only go up to 3:14:07 UTC on Tuesday, 19 January 2038 before there's an integer overflow. Problems began in 2006 in the AOLServer
 - 64-bit machines should be good until *292 billions years from now*
- **Test your machine bits in ruby**
 - Could be useful if you run specs with dates > 2038 on multiple machines
 - `(1.size*8 == 32)`

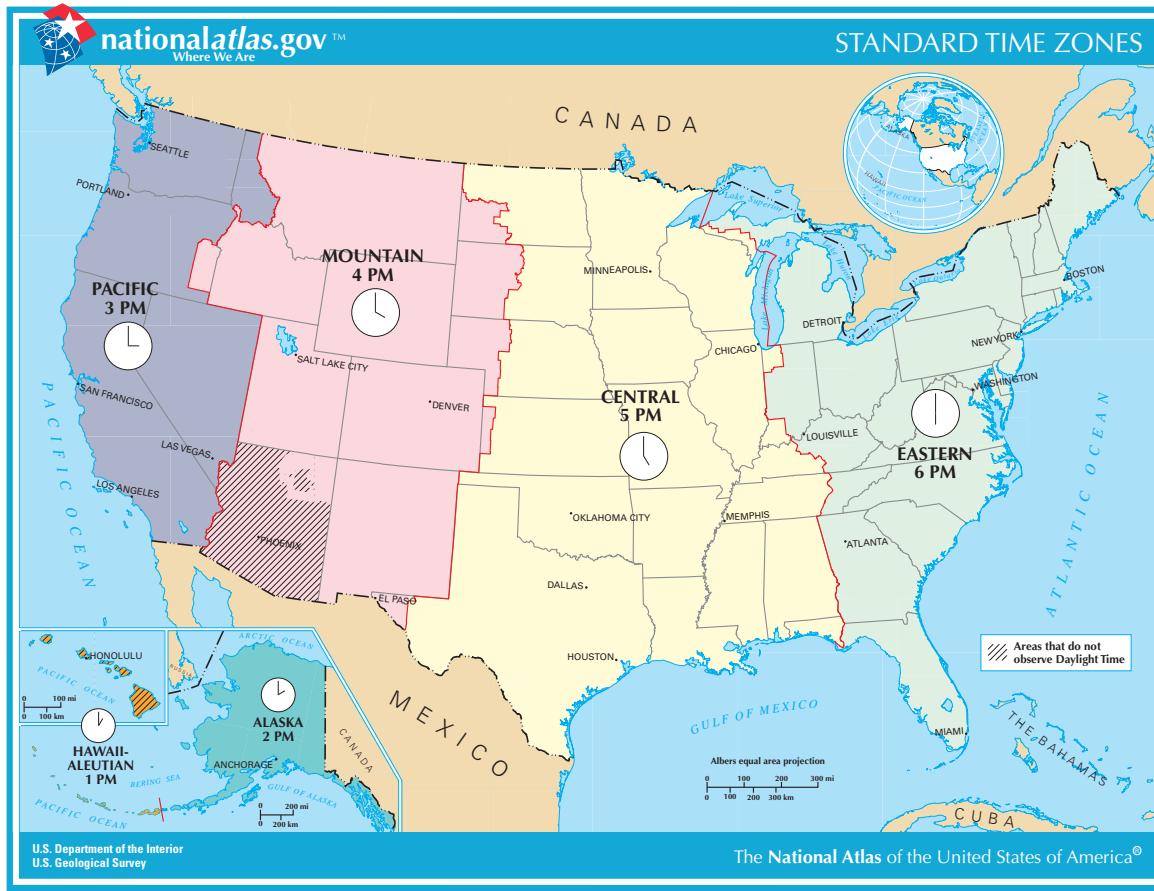
Timezones

- ActiveSupport::Timezone::MAPPING
 - rails_friendly_zone_name = ActiveSupport::TimeZone::MAPPING.detect{|rails_zone_key,tz_info_name| tz_info_name == 'America/Chicago' }.first
 - The TimeZone class serves as a wrapper around TZInfo::Timezone instances. It allows us to do the following
 - Retrieve and display zones with a friendlier name (e.g., “Eastern Time (US & Canada)” instead of “America/New_York”).
 - Adds Time.zone etc
- ActiveSupport::TimeWithZone
 - A Time-like class that can represent a time in any time zone. Necessary because standard Ruby Time instances are limited to UTC and the system’s ENV[‘TZ’] zone.
 - You shouldn’t ever need to create a TimeWithZone instance directly

World Timezones



US Timezone



Citations

- #Timezones
 - * World Map http://en.wikipedia.org/wiki/File:Standard_time_zones_of_the_world.png
 - * US Map <http://nationalatlas.gov/printable/images/pdf/reference/timezones4.pdf>
 - * US 2005 Energy policy act http://www1.eere.energy.gov/femp/pdfs/epact_2005.pdf
 - * TZ database http://en.wikipedia.org/wiki/Tz_database
- # Cartoons
 - * You can't stop time <http://en.wikipedia.org/wiki/File:Daylightsavings.svg>
 - * Sleep Cycle <http://en.wikipedia.org/wiki/File:SpringFwd-FallBack.jpg>
 - * Get your hoes ready <http://en.wikipedia.org/wiki/File:Victory-Cigar-Congress-Passes-DST.jpeg>
- # Time formats
 - * <http://www.w3.org/TR/NOTE-datetime>
- # Quotes
 - * Bill Gates http://en.wikiquote.org/wiki/Bill_Gates
 - * Zach Holman leap second tweet <https://twitter.com/holman/status/219328090021703681>
- # Ruby
 - ##Rails
 - * https://github.com/rails/rails/blob/master/activesupport/lib/active_support/time_with_zone.rb
 - * https://github.com/rails/rails/blob/master/activesupport/lib/active_support/time.rb
 - * https://github.com/rails/rails/blob/master/activesupport/lib/active_support/values/time_zone.rb

Live Coding!!!!!!

- Okay, see gist
 - <https://gist.github.com/3668333>

I've got all the time in the world

- Any Questions?

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<http://bit.ly/bf4-talks>

