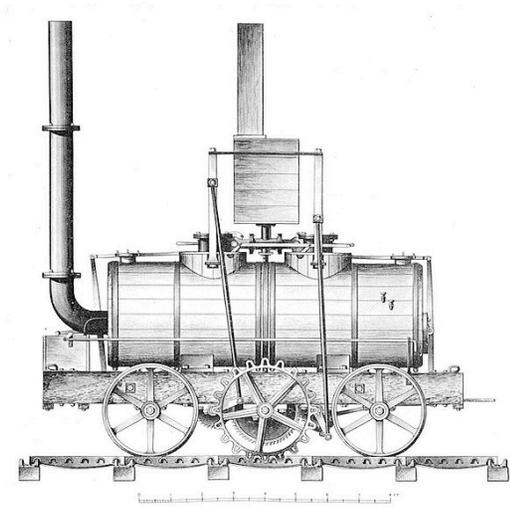# A brief history of Time(Zones) and the TZ Database

Eliot Lear

Standard Time

- Clock towers provided local time time since antiquity

- British Railways began carrying chronometers around 1847

- This de facto standard became known as Railway Time

Joseph V. Noble; Derek J. de Solla Price: *The Water Clock in the Tower of the Winds*, *American Journal of Archaeology*, Vol. 72, No. 4 (1968), pp. 345-355 (353)
Big Ben Copyright C Zaduck 2002. Permission granted under Creative Commons
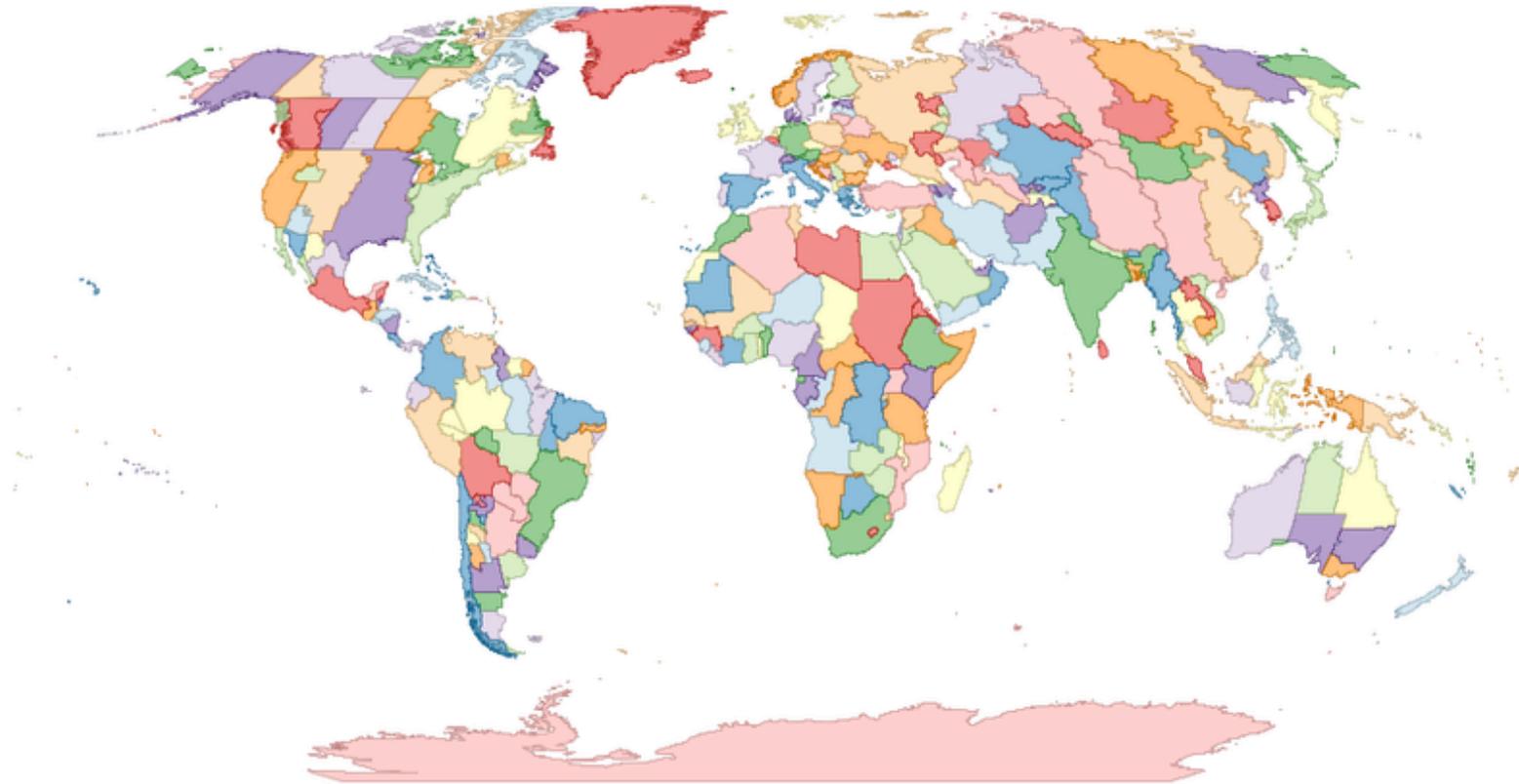
The First Official Time Zone?

Great Britain (1880)

New Zealand (1868)

Meanwhile Back in the United States…
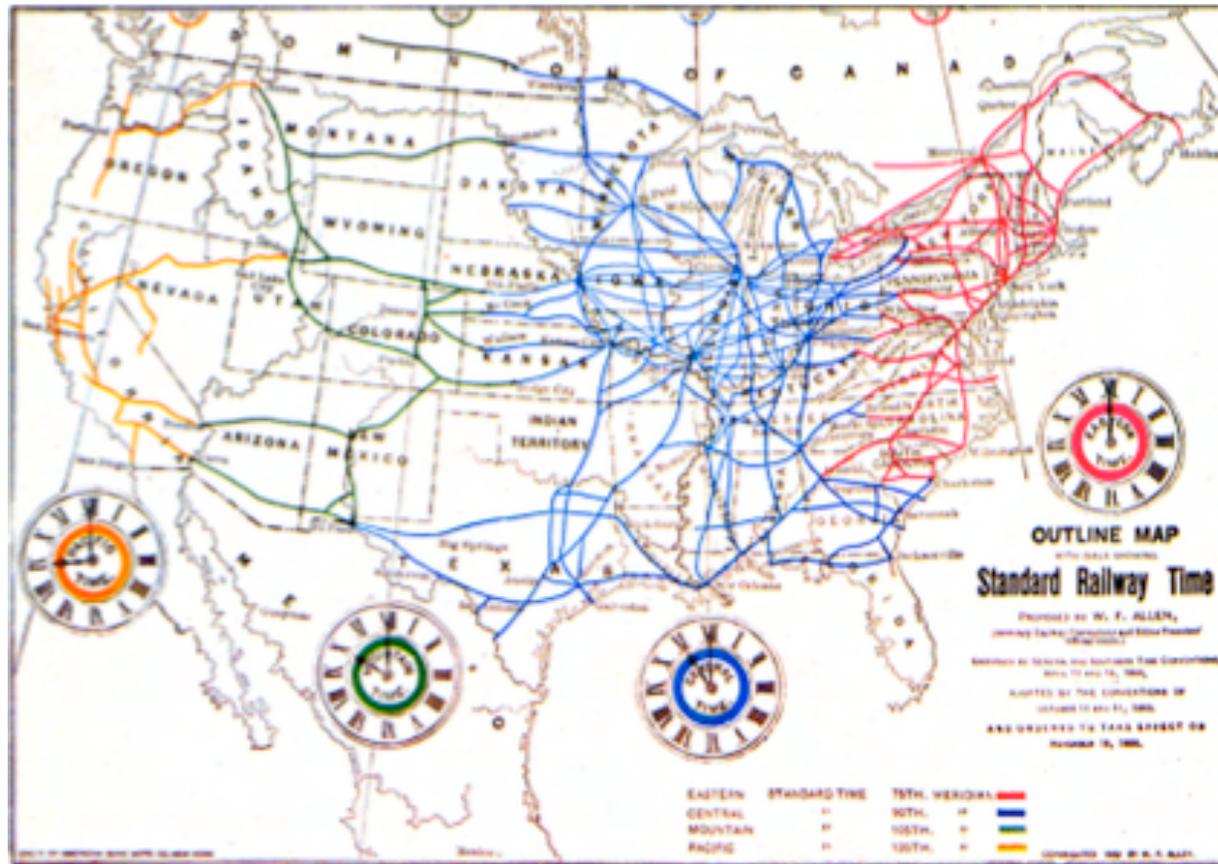
William F. Allen's 1883 time zone map

The TZ Database, Pictorally

Courtesy: Eric Muller

Why should anyone care?

- Many events are synchronized across a network

  Meetings, room availability, people availability

  Recording devices need local time

- Access controls use local time

  "Don't allow little Johnny to watch TV past 10pm"

- Some laws talk about time of day

 Noise regulations

  Content restrictions

Time zones

A **time zone** is a region of the earth that has uniform standard time, usually referred to as the **local time**.

Source: Wikipedia

Daylight Savings Time

- A seasonal one hour increase in local time

- Originally proposed by G.V. Hudson of New Zealand in 1895

- Independently developed and professed by William Willett from 1904

- First implemented by Germany and her Allies on April 30, 1916
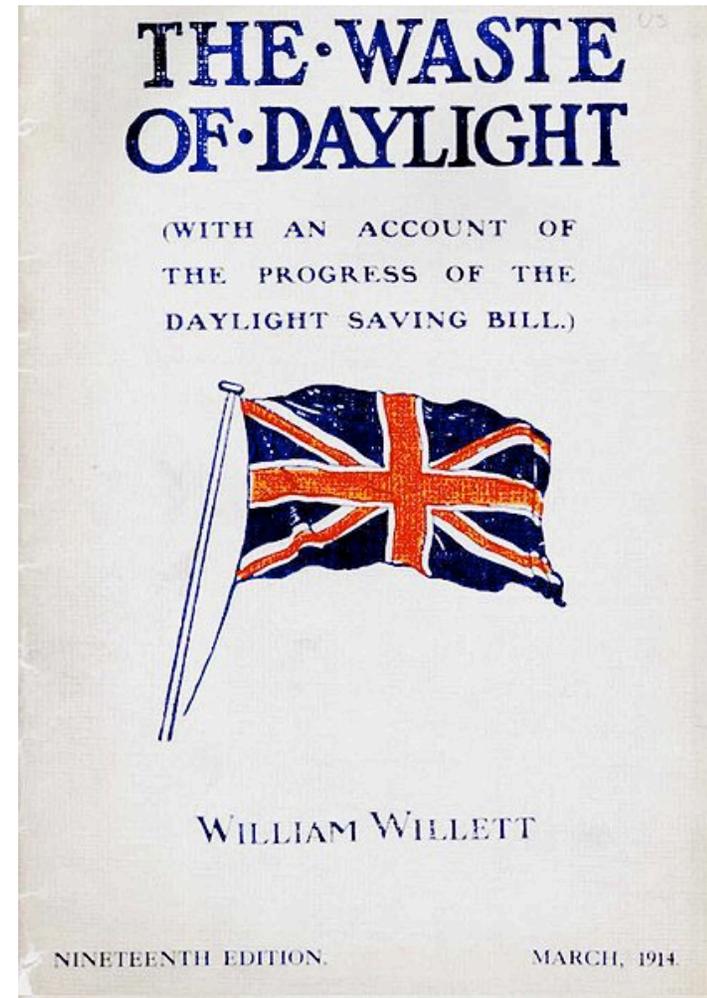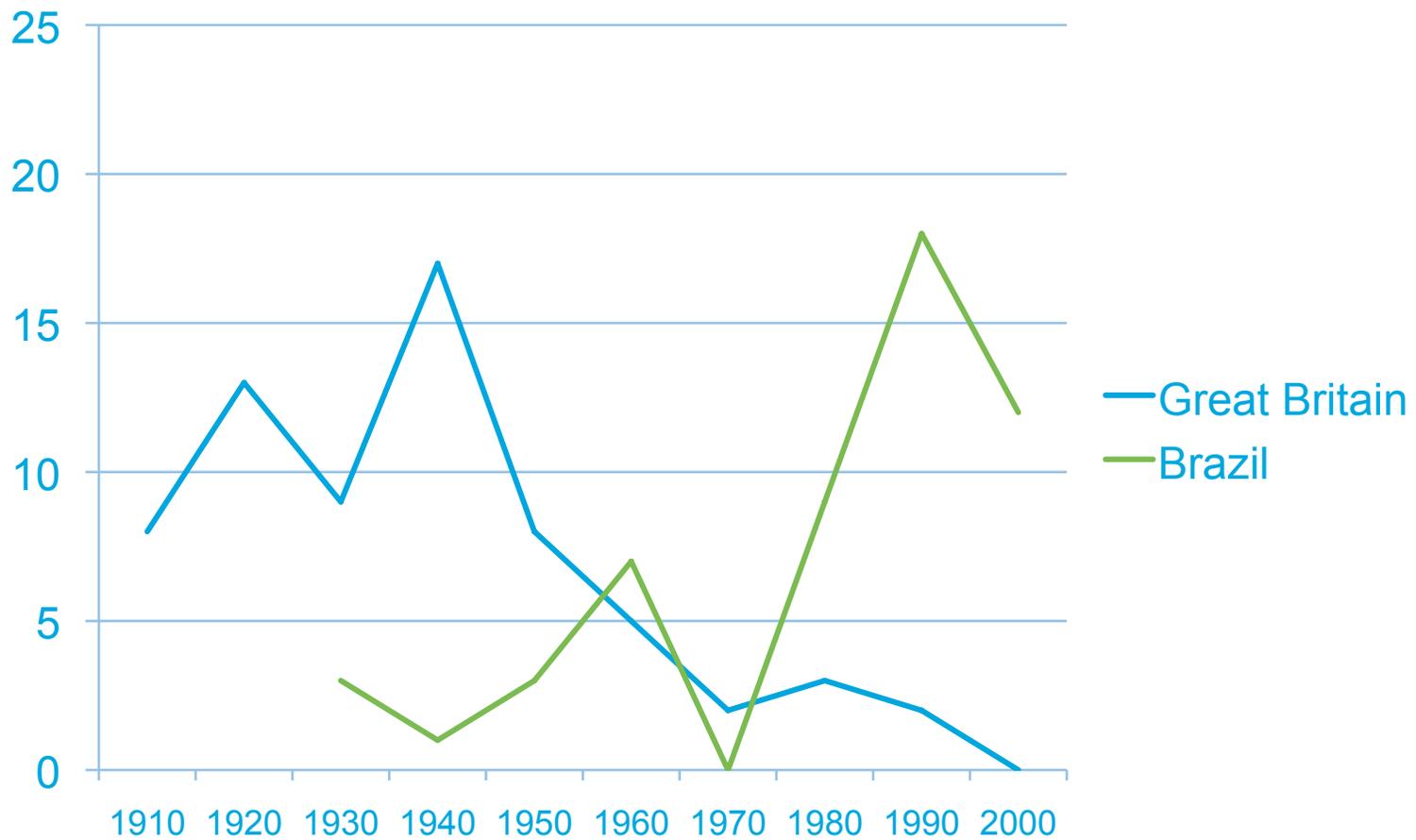
UTC != Local Time != DST…

- UTC is the same across the planet

- Local time within a timezone is the same, absent DST considerations

- Each of these units are political determinations

- DST in particular tends to be volatile

How volatile is Local Time?
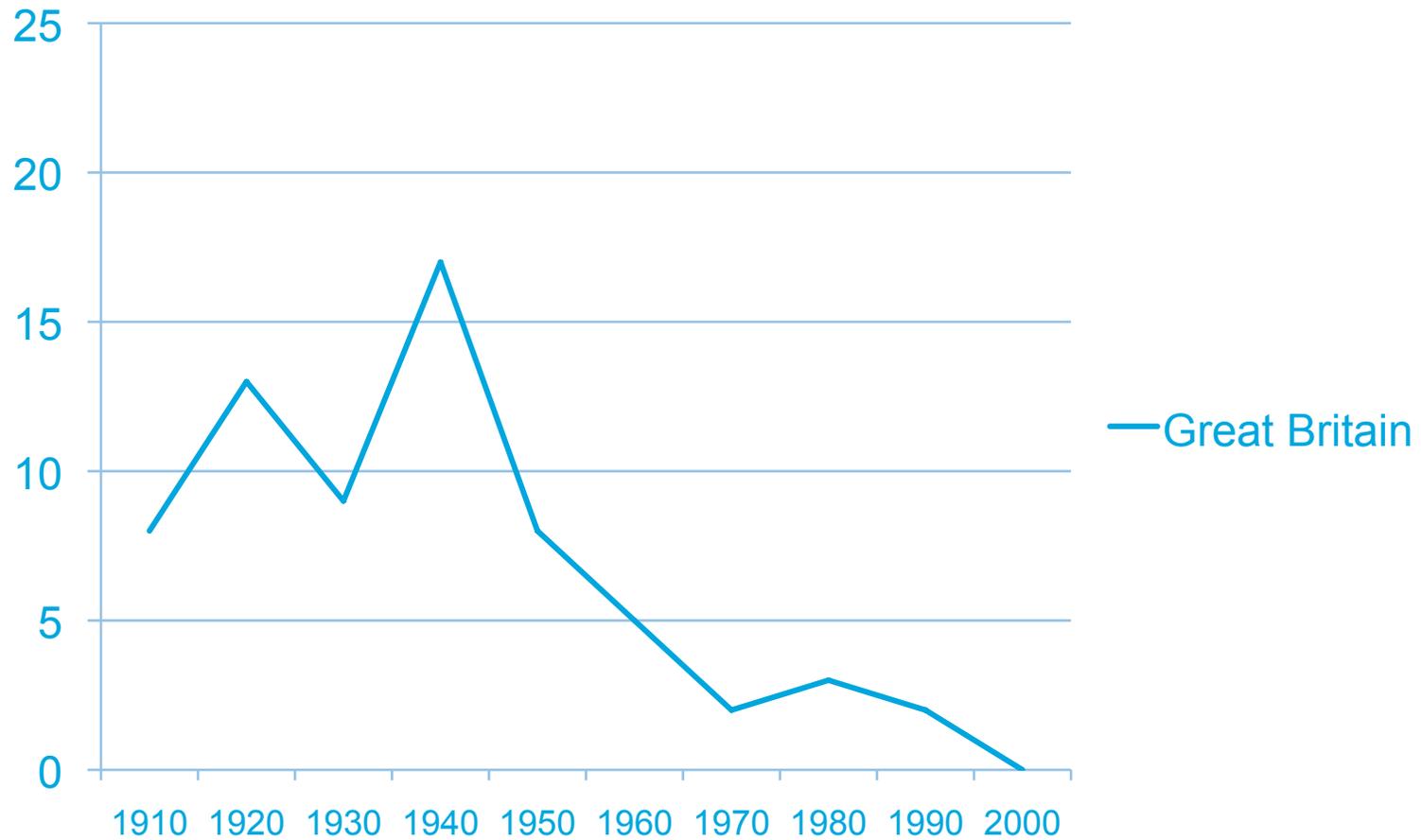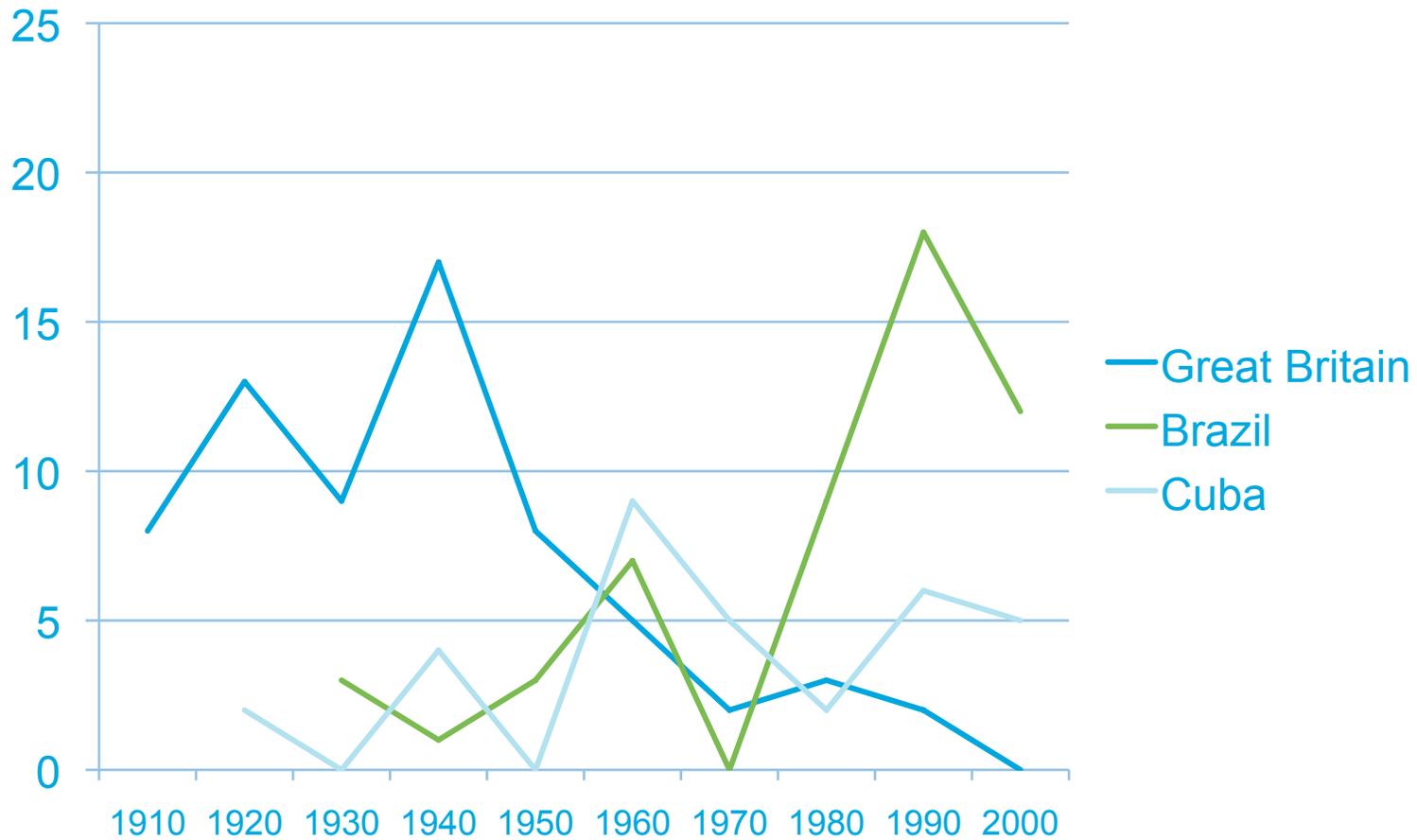

Source: TZ Database

How volatile is Local Time?

Source: TZ Database
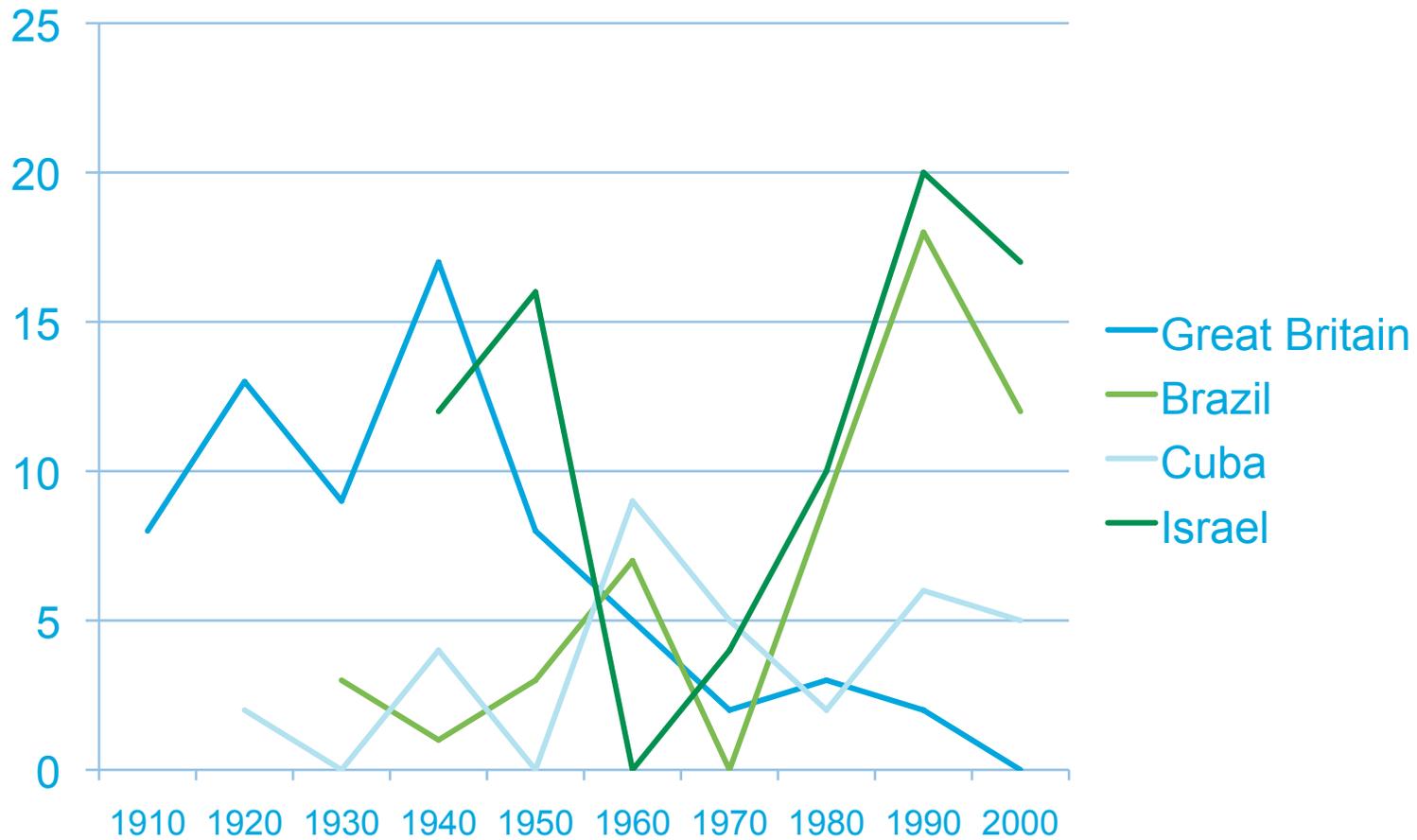
How volatile is Local Time?

Source: TZ Database

How volatile is Local Time?

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How volatile is Local Time?
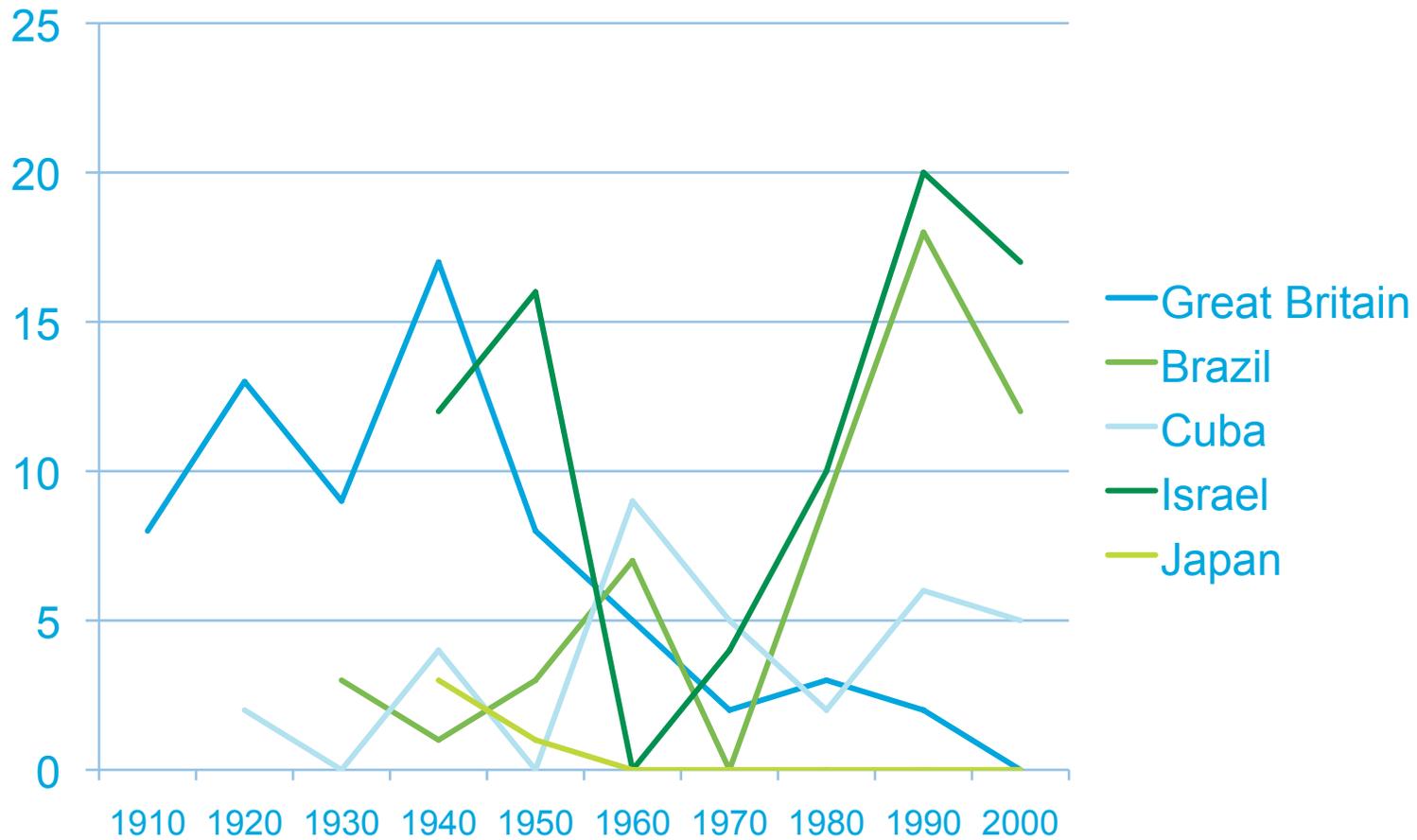
Source: TZ Database

Continuity & Ambiguity through DST Transition

- Local time with time zones is not a continuous function.

2:59:59 2:00

1:59:59 3:00:00
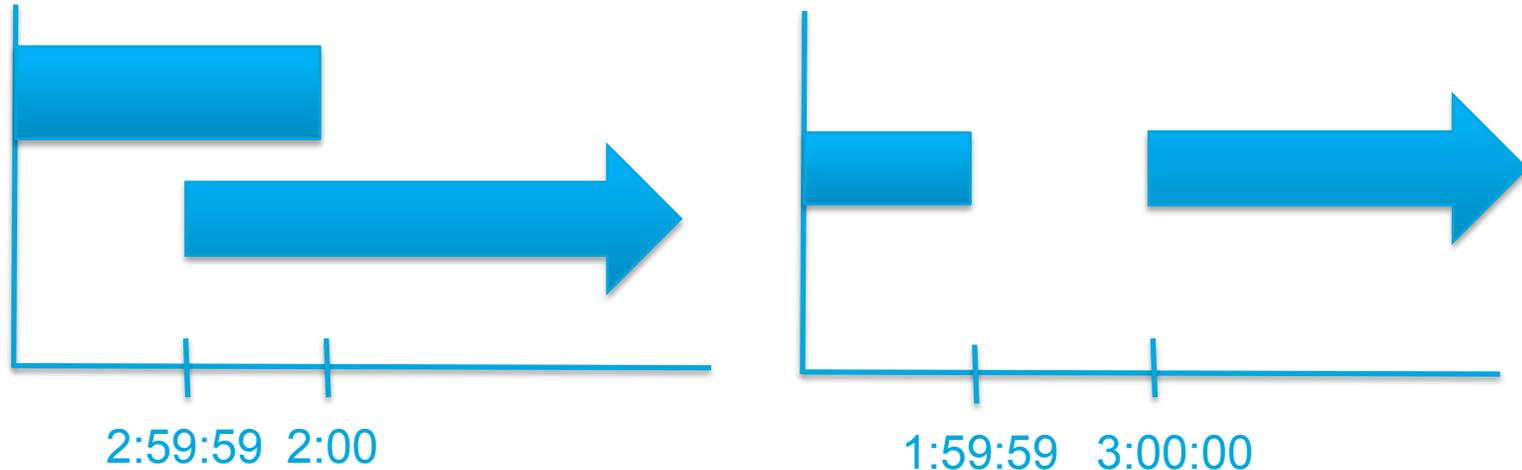
Discontinuities or ambiguities occur when an event is scheduled in the period in question.

Why Have ANY Time Zones?

Three reasons

- People like light

- People like regularity

- And there are ca. 500 separate time zones, and we'll never get rid of them.

Within Computing

Five Common Representations

- Naked offsets

  Commonly implemented on old cell phones and old software

- TZ Database

  Commonly implemented in Linux and Java

- Windows TZ Database(s)

  Commonly implemented on Windows

- IEEE 1003.1 TZ string

  Implemented on POSIX-compliant Oses

- RFC-2445 VTIMEZONEs

  Part of calendaring and scheduling standard

Why not just use naked offsets or nothing?

- Simplest to represent. Simply specify local time and an optional offset.

- But…

- Requires a flag day to update the offset

- No notion of what time it is anywhere else

TZ Database

- Dates back to 1980s

- Based on contributions of hundreds of people

- Contains perhaps the most comprehensive and complete TZ history.

- Managed By Arthur David Olson and Paul Eggert

- Database and most of the associated code are in the public domain

Olson TZ Database Example

```
# Rule   NAME     FROM    TO       TYPE     IN       ON       AT      SAVE     LETTER/
S
Rule    Swiss    1941    1942     -        May      Mon>=1   1:00    1:00        S
Rule    Swiss    1941    1942     -        Oct      Mon>=1   2:00    0           -
# Zone  NAME             GMTOFF   RULES    FORMAT   [UNTIL]
Zone    Europe/Zurich    0:34:08  -        LMT      1848 Sep 12
                         0:29:44  -        BMT      1894 Jun # Bern Mean Time
                         1:00     Swiss    CE%sT    1981
                         1:00     EU       CE%sT
```

The natural place to provide for time zone information is… The Network!

- RFC-4833 provides two new options for both IPv4 and IPv6

  One for Olson

  One for POSIX

- Example:

```
ip dhcp pool mynet
   network 10.12.173.112 255.255.255.240
   default-router 10.12.173.113
   option 101 ascii "Europe/Zurich"
   domain-name example.com
```

So Everything's Cool. Right?

- Unfortunately not.

- Arthur David Olson is due to retire in 2012.

- There is no succession plan (yet).

- There is no license structure, because the DB is public domain.

- There is no place to store the data yet.

- There is no home for the mailing list yet

Salvadore Dali. Source: Wikimedia Commons Author Ines Zgonc

Requirements

- A home for the database

- A process for managing it

- A maintainer

- **We need to preserve the current collaboration!**

draft-lear-iana-timezone-database

- Transfers responsibility of hosting the database and supporting code to the IANA

- Transfers selection of the maintainer to the IESG

- Transfers management of the mailing list to IANA

- Sets forth guidance on how decisions are made, by documenting existing practice.

- Deals with IPR associated with support code that is also distributed

What is needed now

- Review of the document by the community

- Endorsement of the approach by the community
  OR feedback on how to improve the approach

- One or more volunteers who know something about time

Thank you.

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CISCO

Time is short…