

# Time In Distributed Systems Pt.1



# Hello



Denis Golovachev

Hello



Hello



Saint-Petersburg

# Hello



Hello



# Hello



Hello





# Time



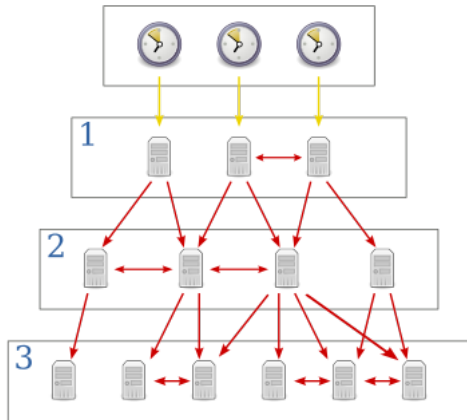
# Time



# Time



# Time



## Question

What is time?

Time is ...



**MYSTERY SOLVED**

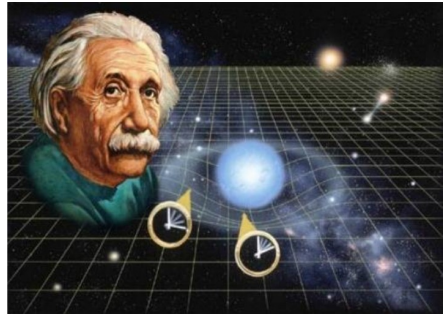
Way of arrange the order of events

Time is ...



**MYSTERY SOLVED**

Way of arrange the order of events



Another dimension

## Definition of time

Compact and robust definition of time has proved to be remarkably tricky and elusive.

- ▶ What clocks measure (attr. to physicists Albert Einstein, Donald Ivey, and others)



## Definition of time

Compact and robust definition of time has proved to be remarkably tricky and elusive.

- ▶ What clocks measure (attr. to physicists Albert Einstein, Donald Ivey, and others)
- ▶ What prevents everything from happening at once (physicist John Wheeler and others)
- ▶ A linear continuum of instants (philosopher Adolf Grünbaum)

# Religion



## Wikipedia

In Zurvanism, Zurvan was perceived as the god of infinite time and space and was aka ("one", "alone").

Time is ...

Time is something we deal with every day, and something that everyone thinks they **understand**

## Game Time

Let's play a game

## Round 1

There are always 24 hours in a day

## Round 1

There are always 24 hours in a day

Daylight saving time



*Daylight Saving  
Time Begins*

## Round 2

A month always ends in the same year it started

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A month always ends in the same year it started

- ▶ Fiscal year/calendar
- ▶ Chinese Year





## Round 3

Months have either 28, 29, 30 or 31 days

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September 1752 had 19 days in British Empire



Everyone do it wrong!?

# Everyone do it wrong!?

bugzilla.redhat.com/show\_bug.cgi

## Red Hat Bugzilla – Bug 479765

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### Bug 479765 - Leap second message can hang the kernel

**Status:** CLOSED ERRATA

**Alias:** None

**Product:** Red Hat Enterprise Linux 5

**Component:** kernel 

**Sub Component:**  (Show other bugs)

**Version:** 5.2

**Hardware:** All Linux

**Priority:** high

**Severity:** medium

**Target Milestone:** rc

**Target Release:** ---

**Assignee:** Prarit Bhargava

**QA Contact:** Red Hat Kernel QE team

**Docs Contact:**

**URL:**

**Whiteboard:**

**Keywords:** Reopened, ZStream

**Duplicates (1):** [800289](#) (view as bug list)

**Depends On:**

**Reported:** 2009-01-12 22:31 UTC by Chris Adams

**Modified:** 2018-11-28 20:21 UTC ([History](#))

**CC List:** 15 users ([show](#))

**Fixed In Version:**

**Doc Type:** Bug Fix

**Doc Text:**

**Clone Of:**

**Environment:**

**Last Closed:** 2009-09-02 08:33:56 UTC

**Dependent Products:**

# Everyone do it wrong!?

## JDK-6900441 : PlatformEvent.park(millis) on Linux could still be affected by changes to the time-of-day clock

Type: Bug

Component: hotspot

Sub-Component: runtime

Affected Version: e5.0u21,hs24,hs25,6,6u29,7

Priority: P3

Status: Closed

Resolution: Fixed

OS: linux,linux\_ubuntu

CPU: generic,x86,ppc

Submitted: 2009-11-11

Updated: 2015-11-27

Resolved: 2013-09-24

### Versions (Unresolved/Resolved/Fixed) ⓘ

JDK 6	JDK 7	JDK 8	Other
6u71 <span>Fixed</span>	7u60 <span>Fixed</span> <span>🔴</span>	8 b109 <span>Fixed</span> <span>🔴</span>	hs25 <span>Fixed</span>

### Related Reports

Duplicate : [JDK-8024036](#) - Thread.sleep(long) is not immune to system time shifts with Linux kernel 3.7.10

Duplicate : [JDK-7139684](#) - ScheduledExecutorService doesn't schedules correctly if sys time drifts back

Relates : [JDK-8029453](#) - java/util/concurrent/locks/ReentrantLock/TimeoutLockLoops.java failed by timeout

Relates : [JDK-8024036](#) - Thread.sleep(long) is not immune to system time shifts with Linux kernel 3.7.10

Relates : [JDK-8144167](#) - [OS\_X] ConditionObject#awaitNanos waits too long if system clock is turned back

Relates : [JDK-6546236](#) - Thread.interrupt() of Thread.sleep() can be lost on Solaris due to race with signal handler

# Distributed environment

