MiFID 2 Clock Sync

A report from the trenches

@_zyxt_

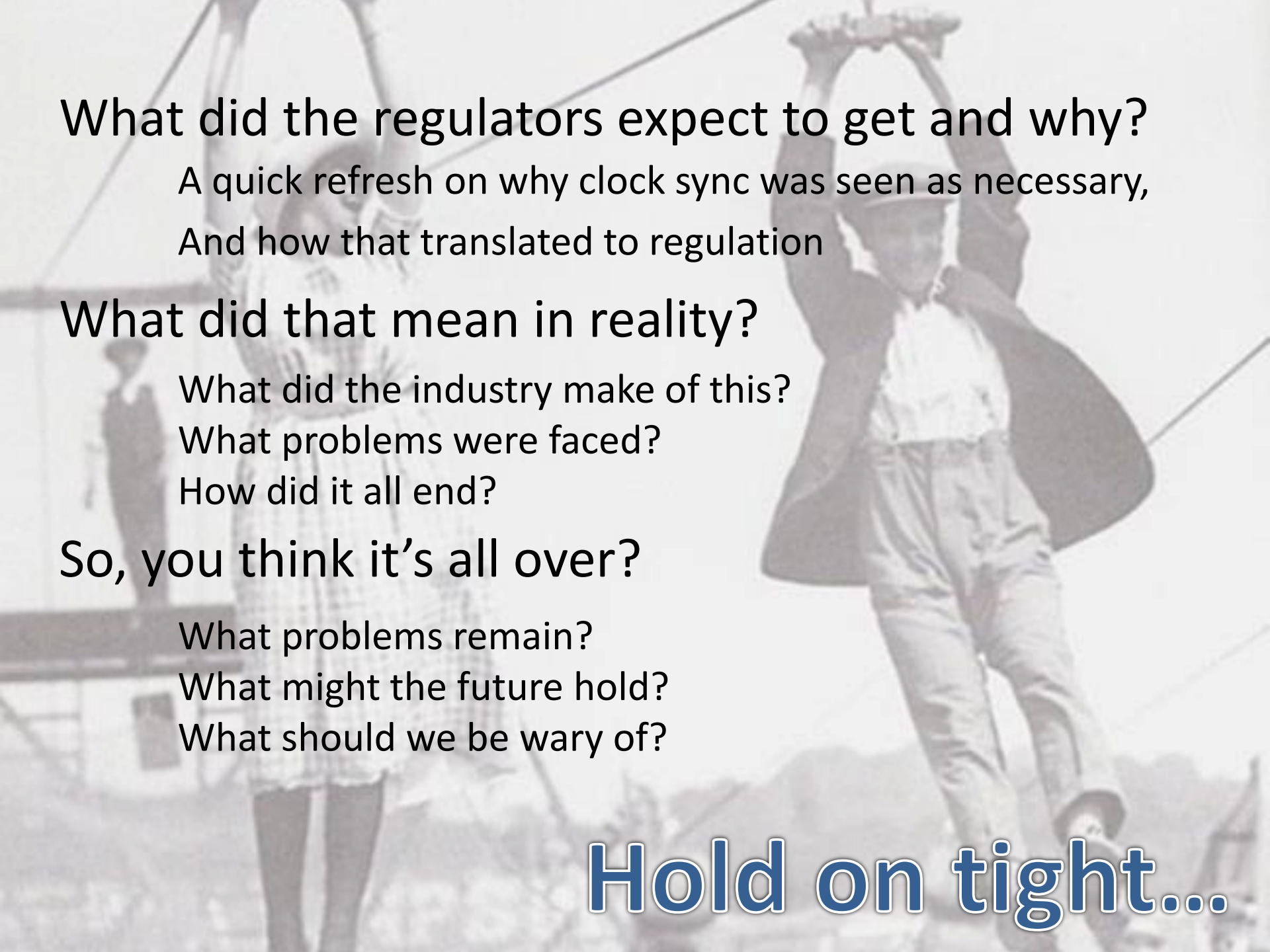
Neil Horlock

Who are you, and why are you here?

- Neil Horlock

  Former director at Credit Suisse in London and chair of the clock sync working group for FIX protocol, STAC fellow for work on time sync.
- 20 years at Credit Suisse, spent predominantly in low latency trading and market data. Technical advisor to two successful consortium led businesses from MiFID1 (BOAT and Turquoise), Contributing author on UK govt report on GNSS dependency for critical infrastructure.
- Now independent consultant, writer and trainer, Member of BSI and ISO committees for C++, active STEM ambassador.

- Thank you to FSM Labs for bringing me here.



What did the regulators expect to get and why?

- A quick refresh on why clock sync was seen as necessary,
- And how that translated to regulation

What did that mean in reality?

- What did the industry make of this?
- What problems were faced?
- How did it all end?

So, you think it's all over?

- What problems remain?
- What might the future hold?
- What should we be wary of?

Hold on tight…

Regulators' Wishlist

1) A pan-European consolidated tape

2) Cross venue monitoring for market abuse

3) Addresses modern trading message rates

Regulatory solution

- Minimum timestamp granularity
- Common Reference Time
- Maximum divergence rules
- Evidence of compliance (traceability)

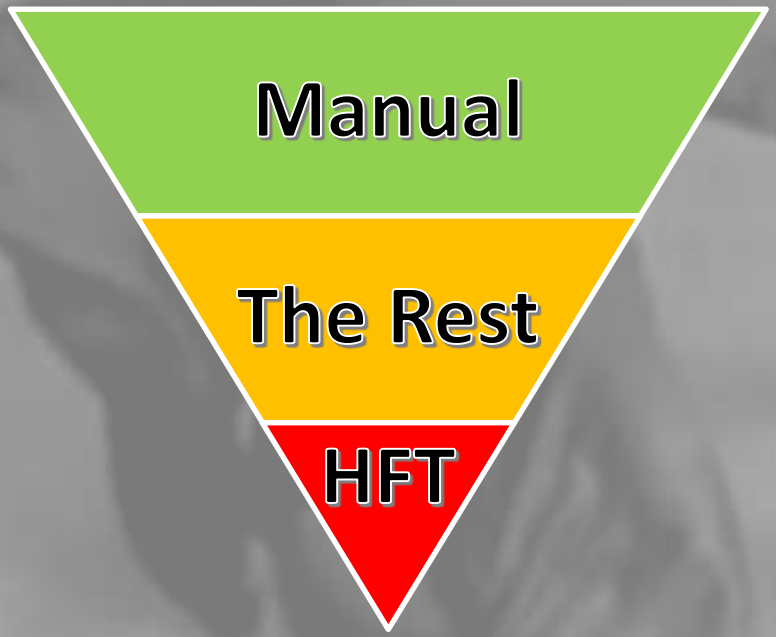
MiFID2 – What did they need & why?

What did that actually mean?

Common clock source
- Approved UTC/GNSS

Divergence/Granularity
- By type of trading, latency for venues

System of traceability
- To the exact point at which the event occurs



Granularity	Divergence
1 sec	±1 sec
1 ms	± 1 ms
1 μs	± 100 μs

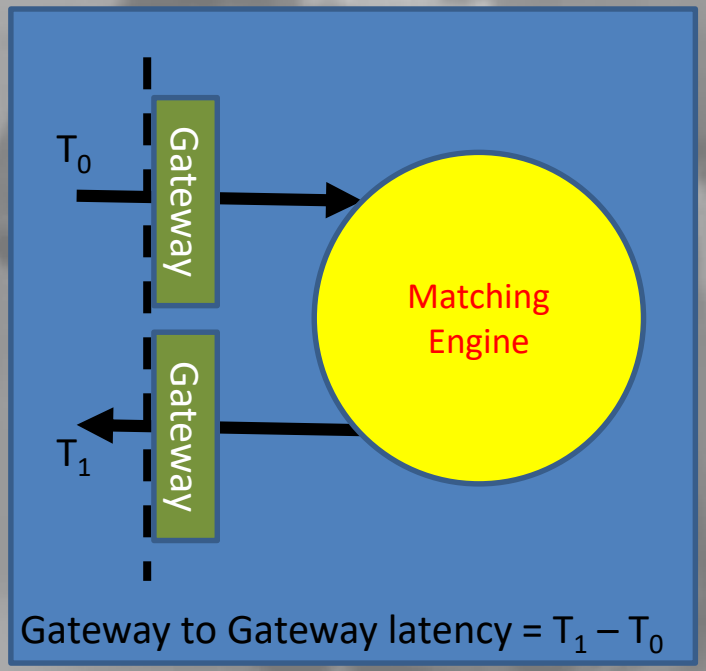
@_zyxt_

What did that actually mean?

Common clock source
- Approved UTC/GNSS

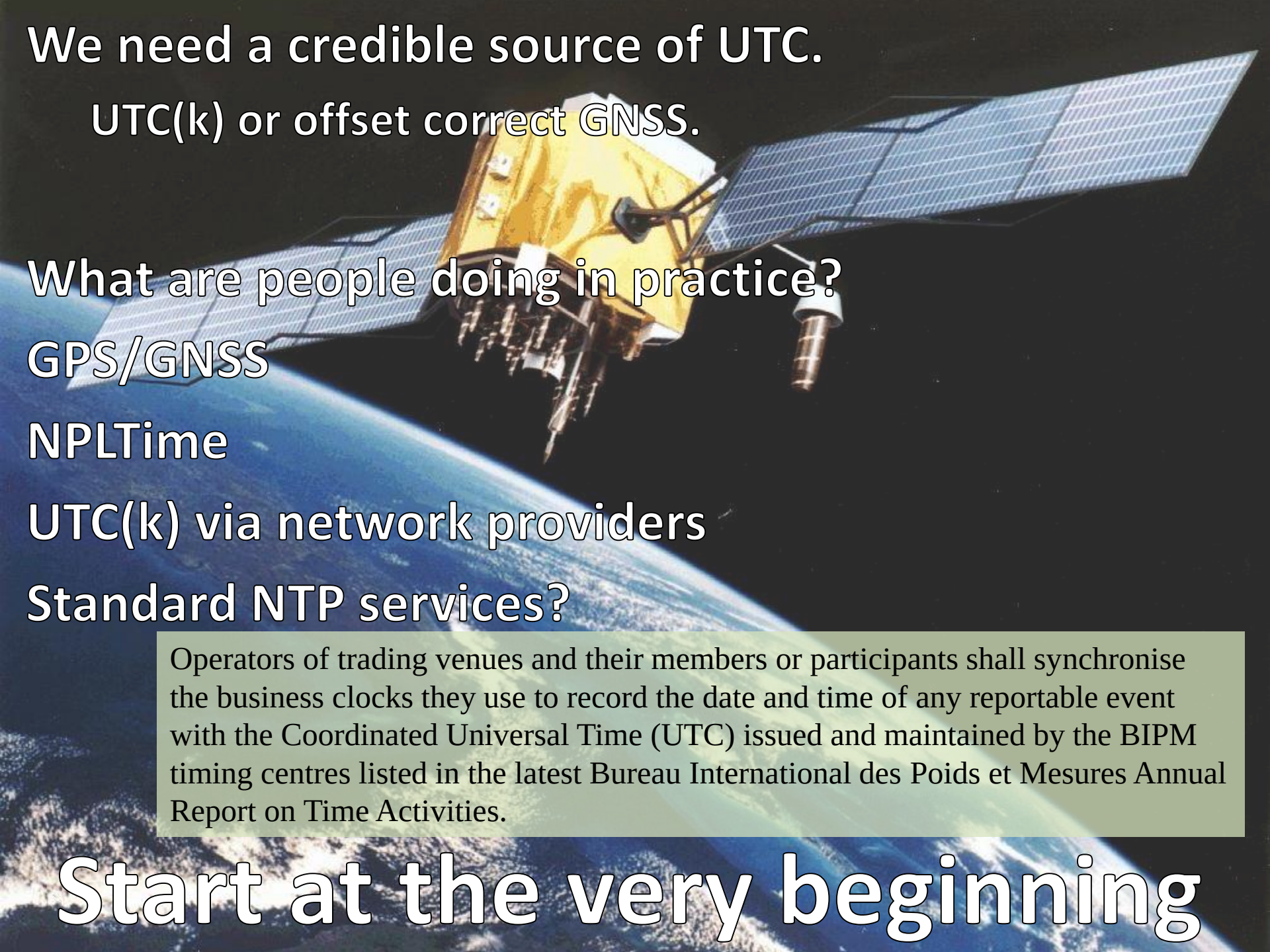
Divergence/Granularity
- By type of trading, latency for venues

System of traceability
- To the exact point at which the event occurs



	Granularity	Divergence
>1 sec	1 sec	±1 sec
>1 ms	1 ms	± 1 ms
<1 ms	1 µs	± 100 µs

@_zyxt_



We need a credible source of UTC.

UTC(k) or offset correct GNSS.

What are people doing in practice?

GPS/GNSS

NPLTime

UTC(k) via network providers

Standard NTP services?

Operators of trading venues and their members or participants shall synchronise the business clocks they use to record the date and time of any reportable event with the Coordinated Universal Time (UTC) issued and maintained by the BIPM timing centres listed in the latest Bureau International des Poids et Mesures Annual Report on Time Activities.

Start at the very beginning

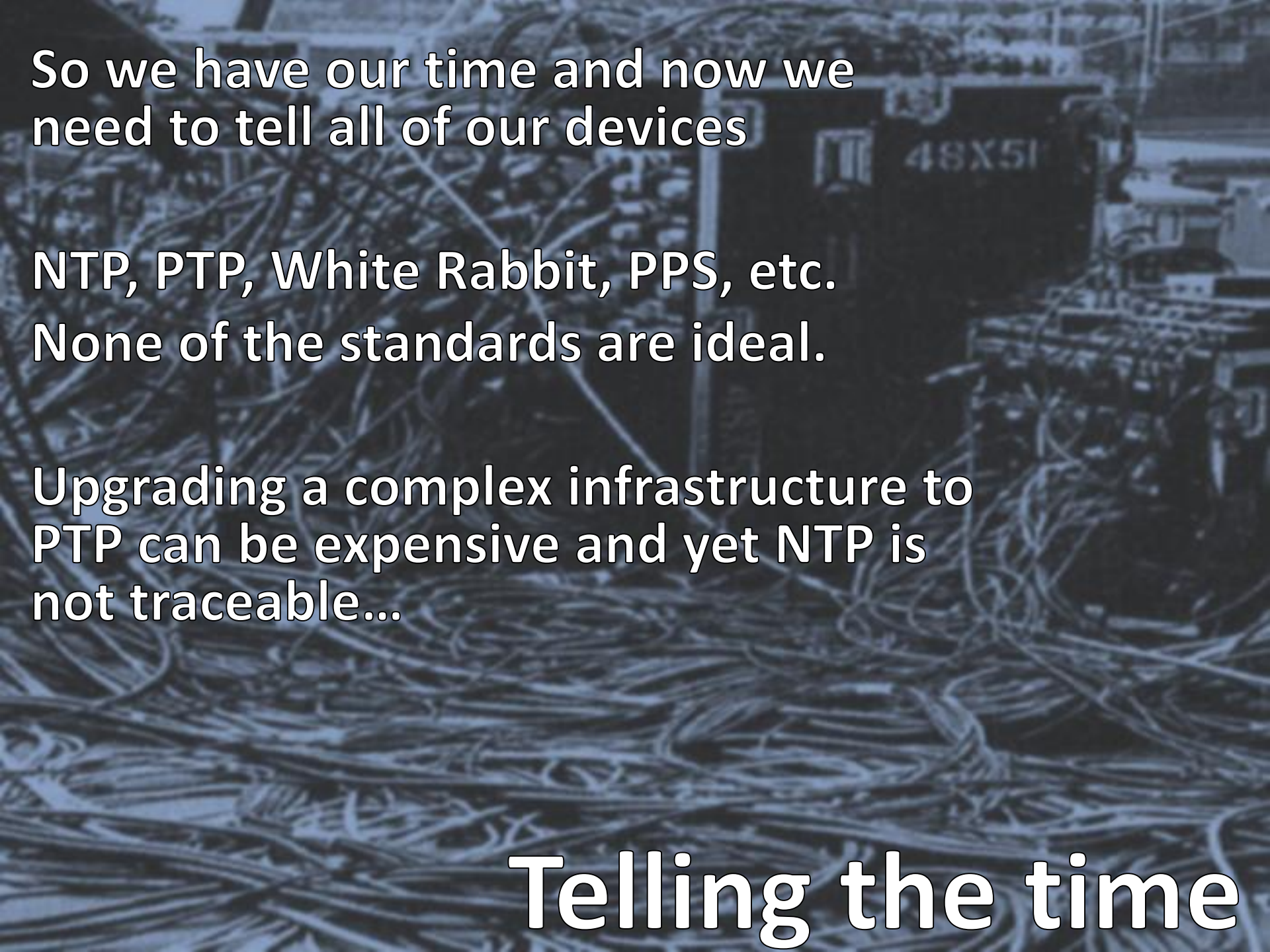
"users of such sytems should be aware of the risks such as solar flares, interference, jamming or multipath reflections. Steps should be taken to ensure that these risks are minimised."

Are people going to be taking a backup solution?

Relying on holdover, is that enough?

How long is long enough?

But what about those risks?



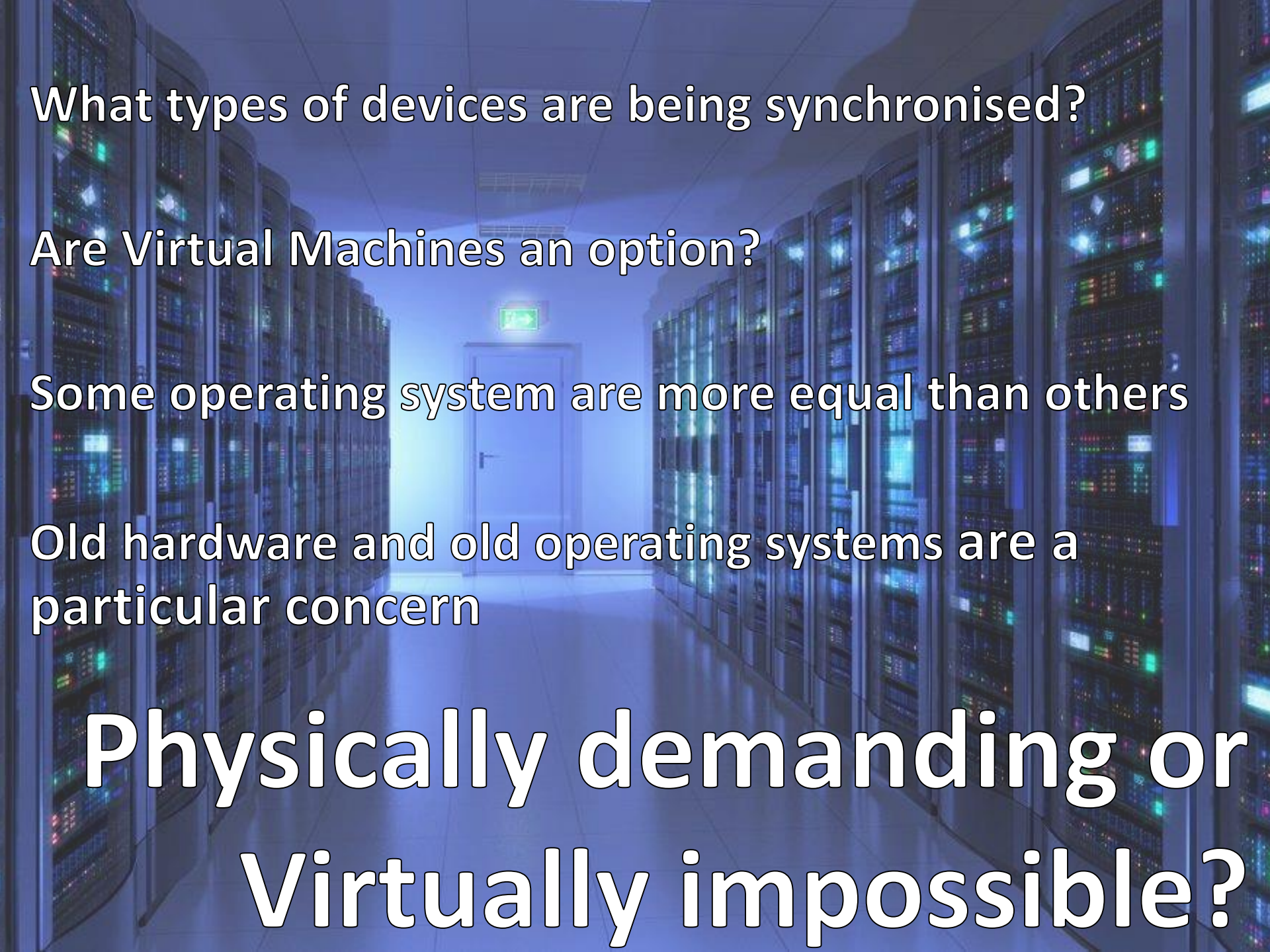
So we have our time and now we need to tell all of our devices

NTP, PTP, White Rabbit, PPS, etc.

None of the standards are ideal.

Upgrading a complex infrastructure to PTP can be expensive and yet NTP is not traceable…

Telling the time



What types of devices are being synchronised?

Are Virtual Machines an option?

Some operating system are more equal than others

Old hardware and old operating systems are a particular concern

Physically demanding or Virtually impossible?

What is Traceability?

What are we testing?

What do we monitor?

When do you alert?

What does the annual review look like?

Article 4

Compliance with the maximum divergence requirements

Operators of trading venues and their members or participants shall establish a system of traceability to UTC. They shall be able to demonstrate traceability to UTC by documenting the system design, functioning and specifications. They shall be able to identify the exact point at which a timestamp is applied and demonstrate that the point within the system where the timestamp is applied remains consistent. Reviews of the compliance with this Regulation of the traceability system shall be conducted at least once a year.

Relevant and proportionate testing of the system should be required along with relevant and proportional monitoring thereof to ensure that the divergence from UTC remains within tolerance.

More than any other question…

Where on earth am I meant to be storing all of this?

Traceability

Didn't they?

A broad range of implementation choices were made.
In practice, a pragmatic mix of choices may be found in any given solution.

The venues had a smaller exposure and more business motivation, and can be seen to have used more "brick" in their houses.

For the most part the major banks did what the major banks always do, they found the middle ground, settling on the wooden houses and the herd mentality.
They only need to be as good as their neighbour.

But some chose to take a position that the regulator had not really wanted all this "science" and "best endeavours" would see them through.

At least one, is still stood at the side of the road trying to decide what to do. Perhaps hoping the wolf doesn't come by too soon.

And they all lived happily ever.....

What remains?

- What evidence will the regulators really want?
- How much of a science project is traceable time, or how little perhaps?
- Is a straw house good enough?
- Does any of this get to where they wanted to be?

What might the future hold?

- Less “wiggle room” and “better definition”
- More regulators in more jurisdictions.
- More cloud and virtualisation.

What should we be wary of?

- Contradictory or incompatible regulations - UTC versus national.
- Achievable accuracy.

Thoughts for the future..

- Simplified network auditing for asymmetry.
- A manageable, standardised definition of traceable time.

What does the future hold?


The end of time as we know it?