SEVEN
Solutions
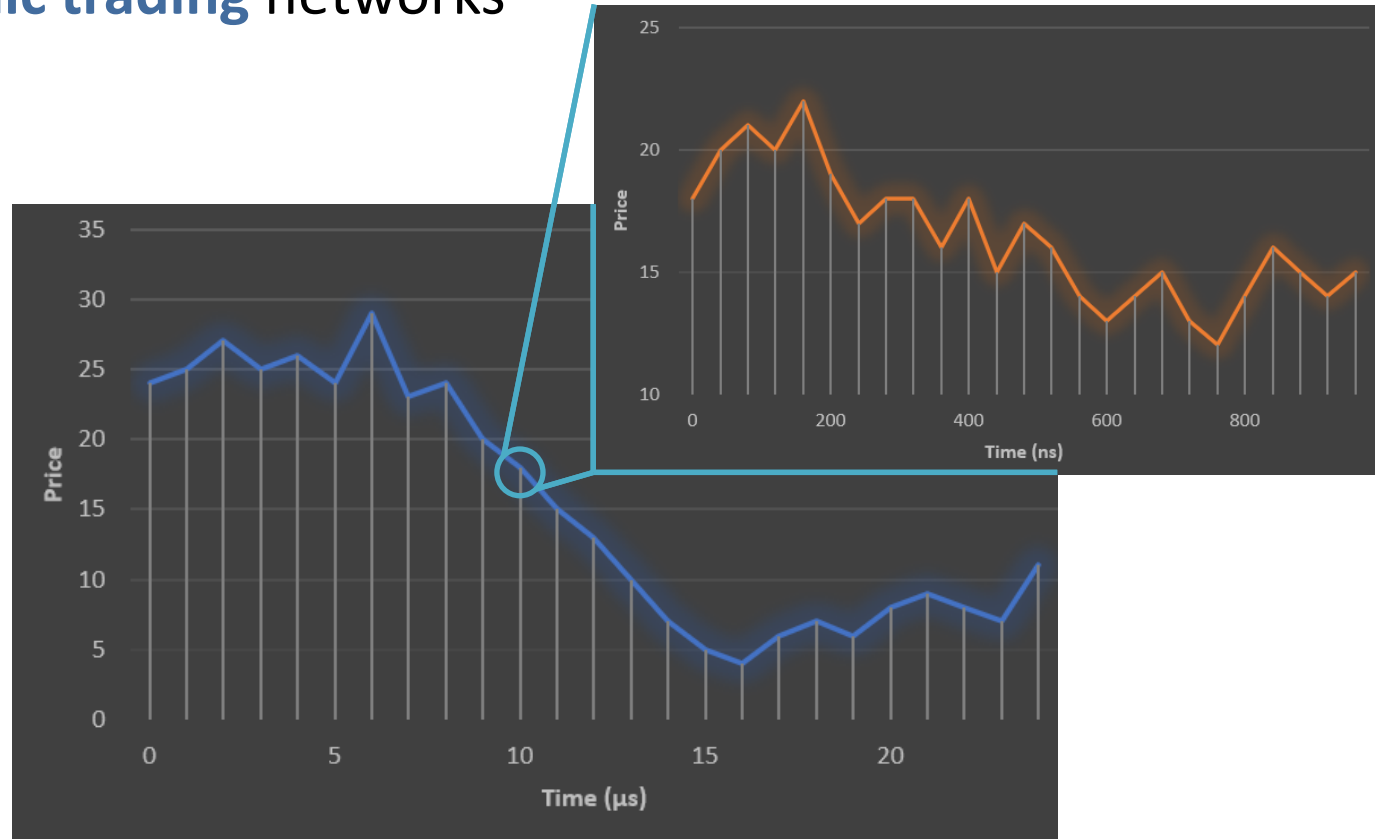When every nanosecond counts

Clocking your trading

Francisco Girela @ Global STAC Live

www.sevensols.com

At the **core of electronic trading** networks

- Latency
  - Optimization
  - Network visibility

- Data quality
  - Timestamping precision
  - Distributed strategies

- Regulations

- Resiliency

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White Rabbit technology

White Rabbit (WR) is an ultra-accurate IEEE 1588 (PTP) implementation that achieves **sub-nanosecond** accuracy.

Easy to integrate in **Ethernet** networks

Avoid calibration and complex deployments

NTP, PTPv2, PPS and sub-nanosecond **WR**

Scalable to thousands of nodes in **metro areas**

Resilient to GNSS disruption

Unprecedented trading capabilities

WR-Z16: The ultimate White Rabbit fanout

- **Multi-port synchronization** fan-out.
- WR, HATI, IEEE 1588 PTPv2 and NTP **interoperability** in all optical interfaces.
- **Multi-source** time references.
- **Failover** mechanisms.
  - Automatic switchover.
  - Holdover.
- Time **traceability** for regulatory purposes.
- **Extended monitoring** and management tools (Authentication, SNMP, security…).
- **Redundant power** supply and fans.
- Serial and Ethernet RJ45 ports.
- Additional features to come!

NEW!

Spanish stock market use case

- **Redundant** time references.

- **Sub-nanosecond synchronization** over a 44 km fiber link (27 miles).

- **± 15 nanoseconds traceability** to UTC using the DOWR.

- **Holdover capabilities** if the link is lost.

|	2 h	6 h	12 h	24 h	36 h
2019-09-06	8 ns	58 ns	53 ns	729 ns	1252 ns
2019-10-26	17 ns	95 ns	270 ns	474 ns	609 ns
2019-11-02	80 ns	336 ns	529 ns	881 ns	1649 ns
2019-11-09	34 ns	46 ns	40 ns	38 ns	272 ns
2019-11-16	28 ns	5 ns	52 ns	73 ns	53 ns
Worst observed case	80 ns	336 ns	529 ns	881 ns	1649 ns

Not STAC benchmark
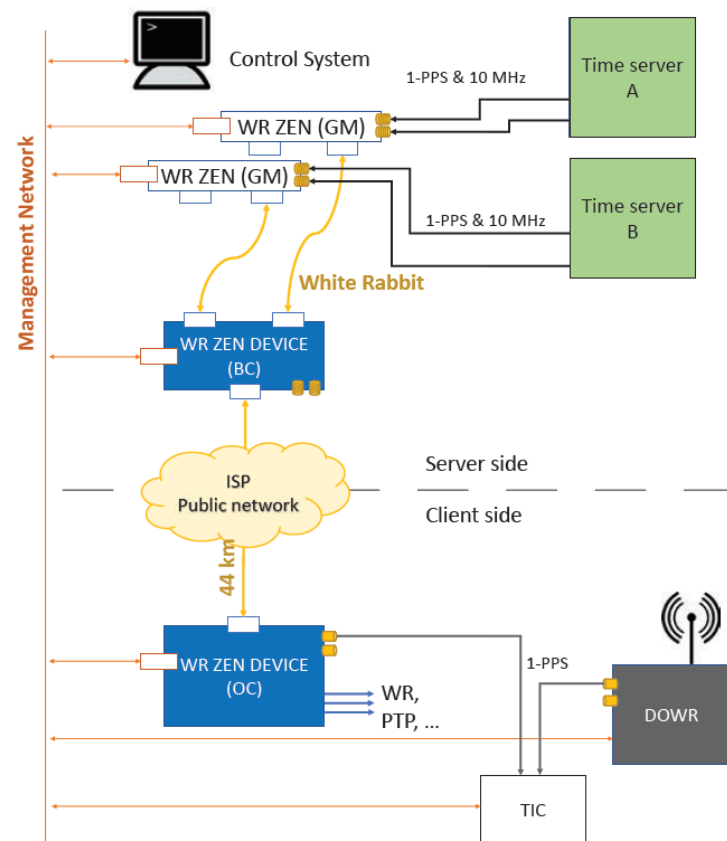
- **Sub-nanosecond** synchronization between different datacenters.

- Thousands of **synchronization** nodes.

- NTP, PTPv2 and PPS **local distribution**.

- Backup to GNSS **time over fiber**.

https://www.whitehouse.gov/presidential-actions/executive-order-strengthening-national-resilience-responsible-use-positioning-navigation-timing-services/
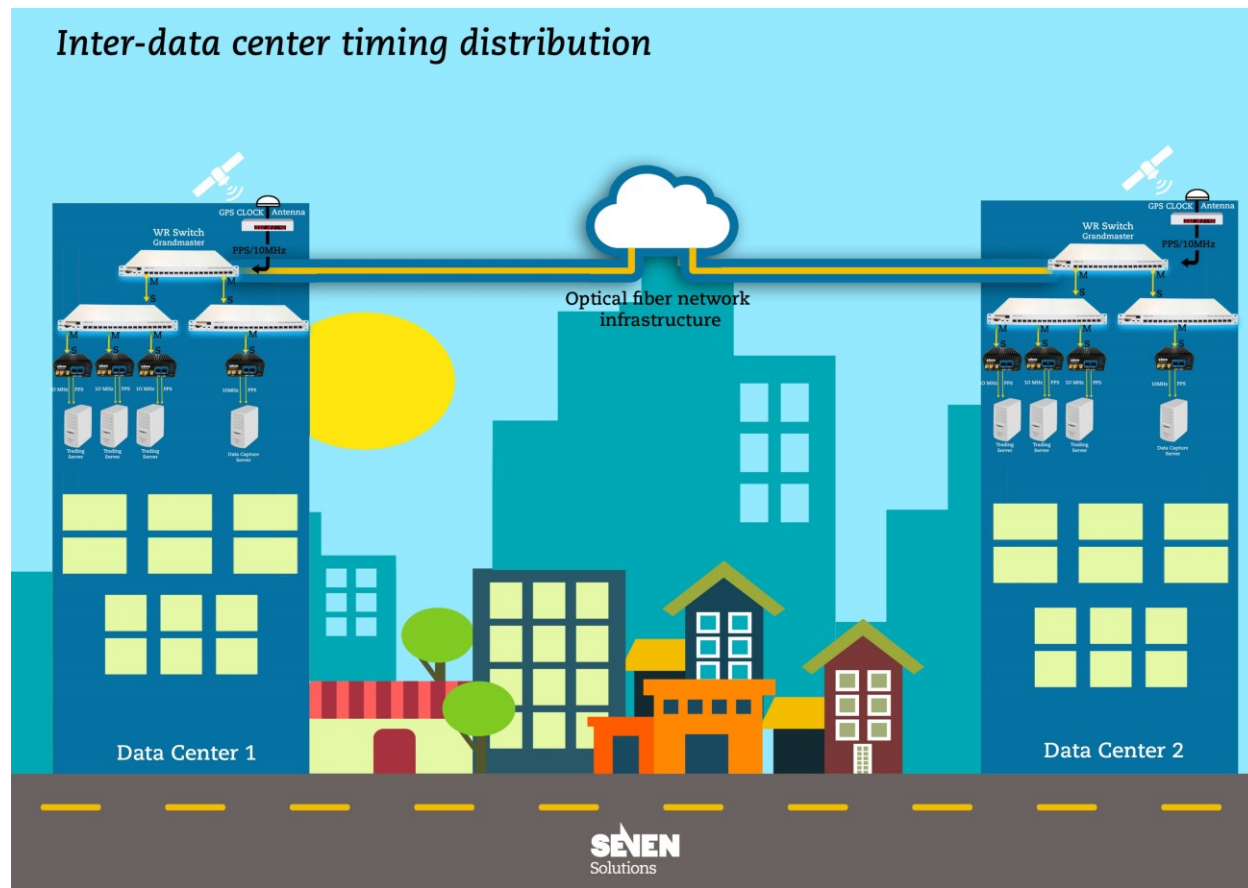
Inter-data center timing distribution

- **Plug-and-play** sub-nanosecond **synchronization** for thousands of nodes.
- Different **interoperability** options depending on the accuracy level.

Not STAC benchmark

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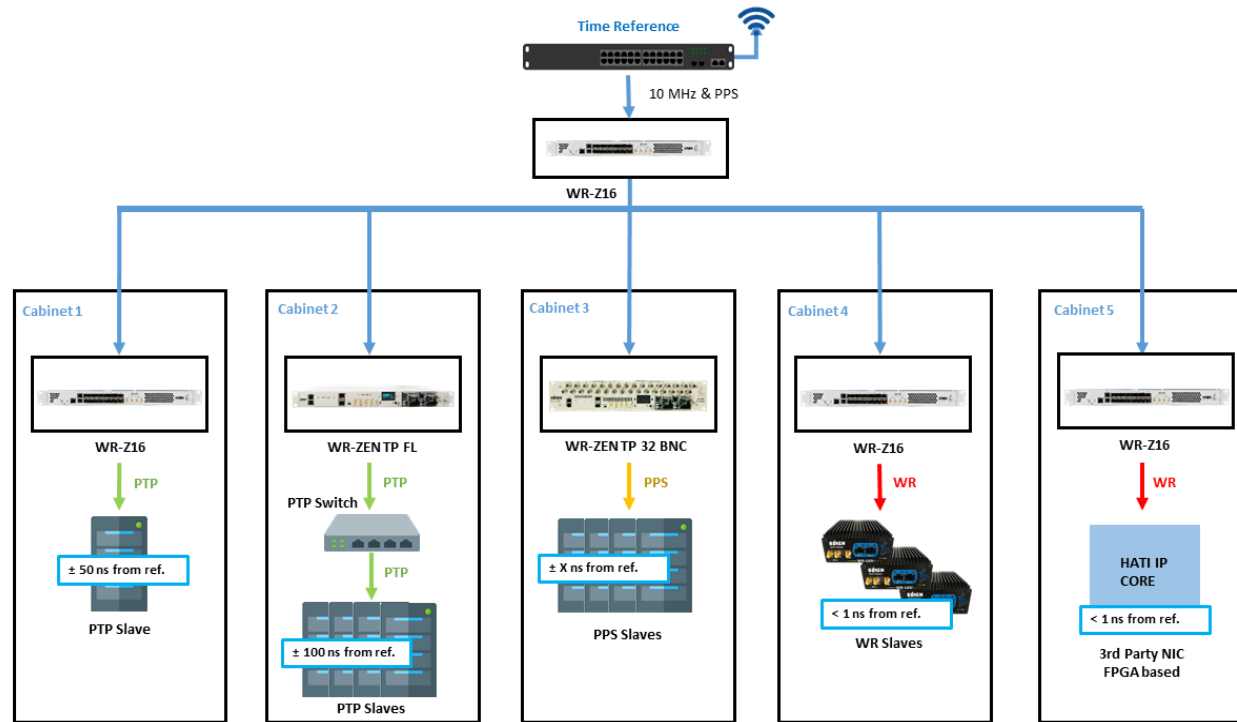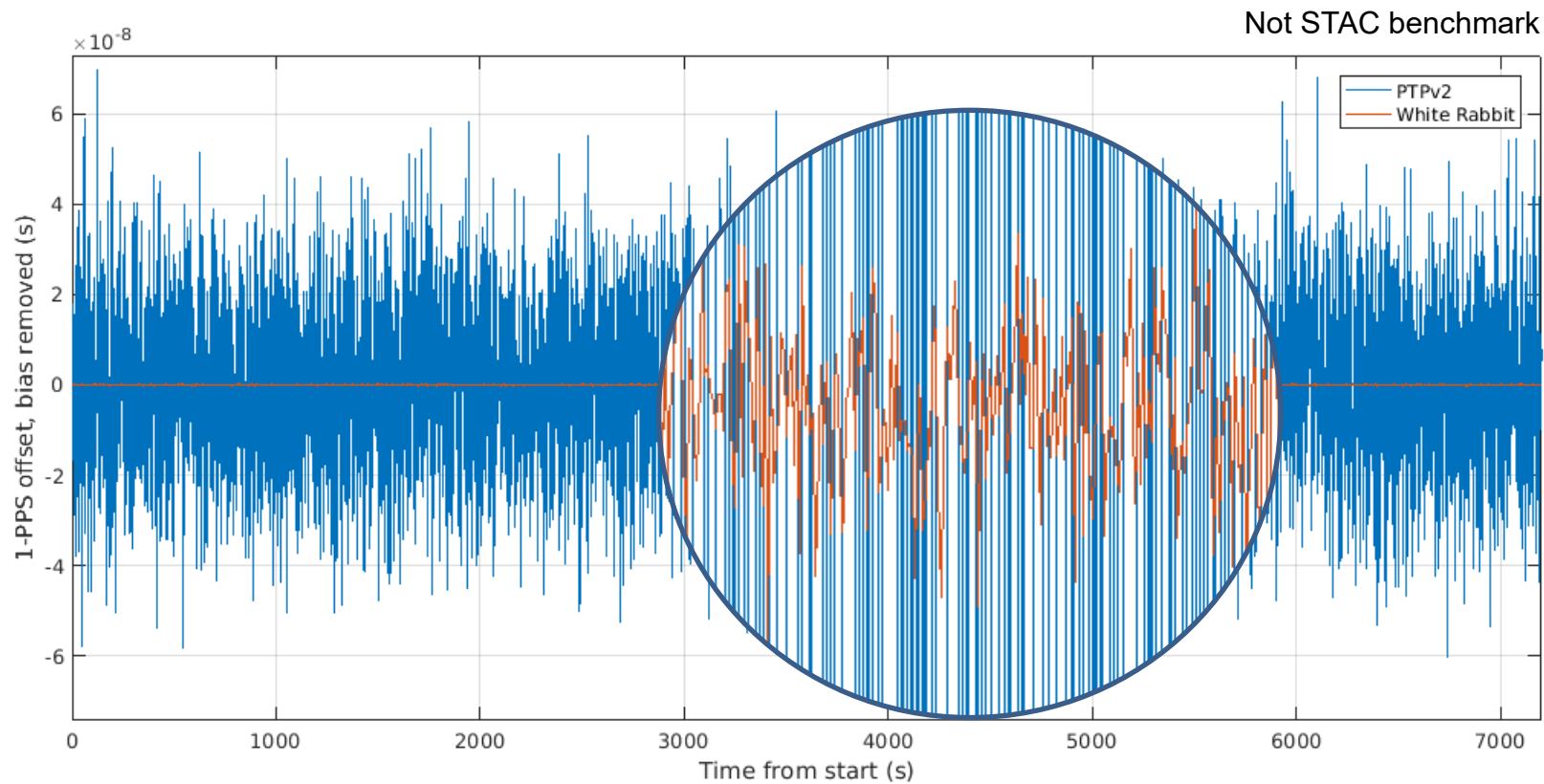
A present technology **designed for the future**

Best-in-class synchronization **accuracy** for the next electronic trading generation.
- Deutsche Börse: https://stacresearch.com/STAC-Summit-6-Jun-2019-deutsche-boerse
- Optiver: https://www.youtube.com/watch?v=pe6Gh_fi3Wc&t=2s
- Spanish stock market: https://ieeexplore.ieee.org/document/9071992

Basis for the Standard IEEE 1588-2019 **High Accuracy** profile.

Alternative to GNSS synchronization in several segments.
- USA Department of Transportation demonstration as Global Positioning GPS backup:
https://insidegnss.com/seven-solutions-to-demo-alternate-precision-time-keeping-for-dot/
- European GNSS Agency: https://www.gsc-europa.eu/sites/default/files/sites/all/files/
Report_on_User_Needs_and_Requirements_Timing_Synchronisation.pdf
- Leader technology in science.
- 5G telecom evaluations: Deutsche Telekom, Orange…

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  - Available during the whole show!

Thank you for your attention!