

www.sevensols.com

SEVEN

Solutions

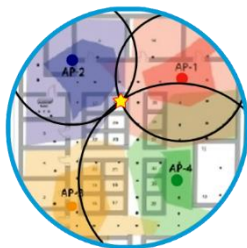
When every nanosecond counts

Scalable and long distance deterministic time transfer

ITSF 2016, Prague 31 Oct - 3 Nov



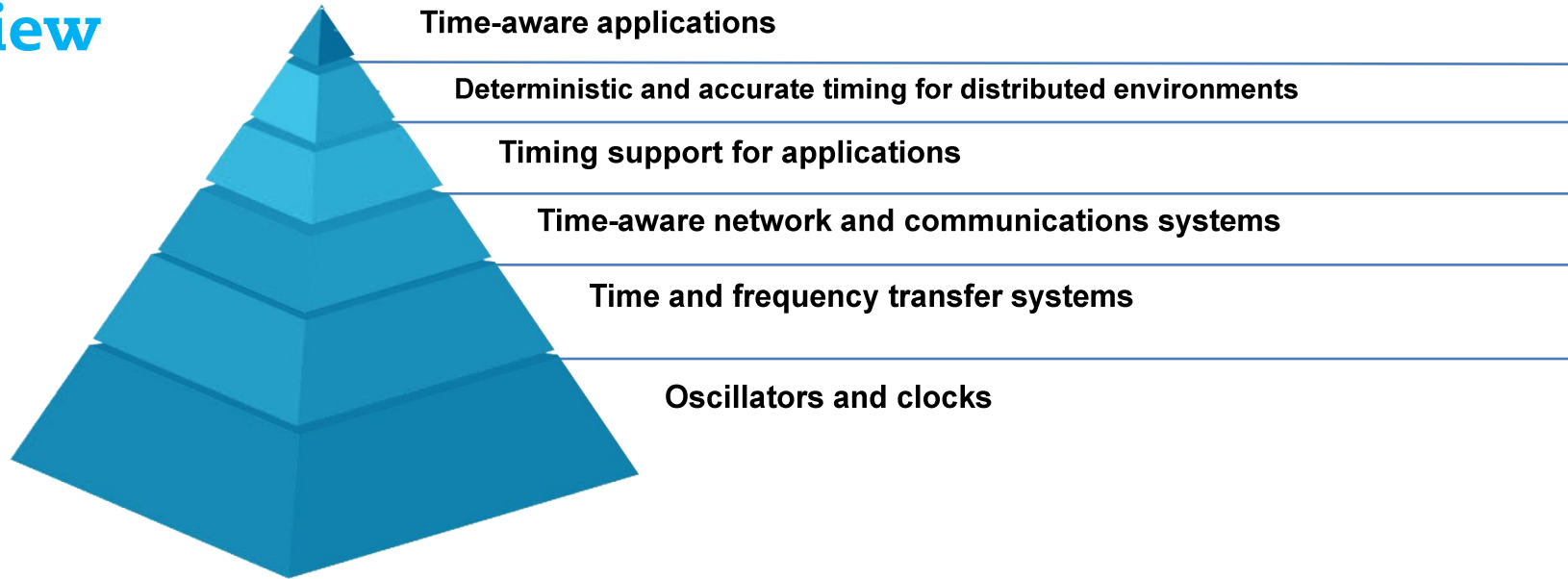
The world needs timing



Timing is coming
New challenges

SEVEN
Solutions

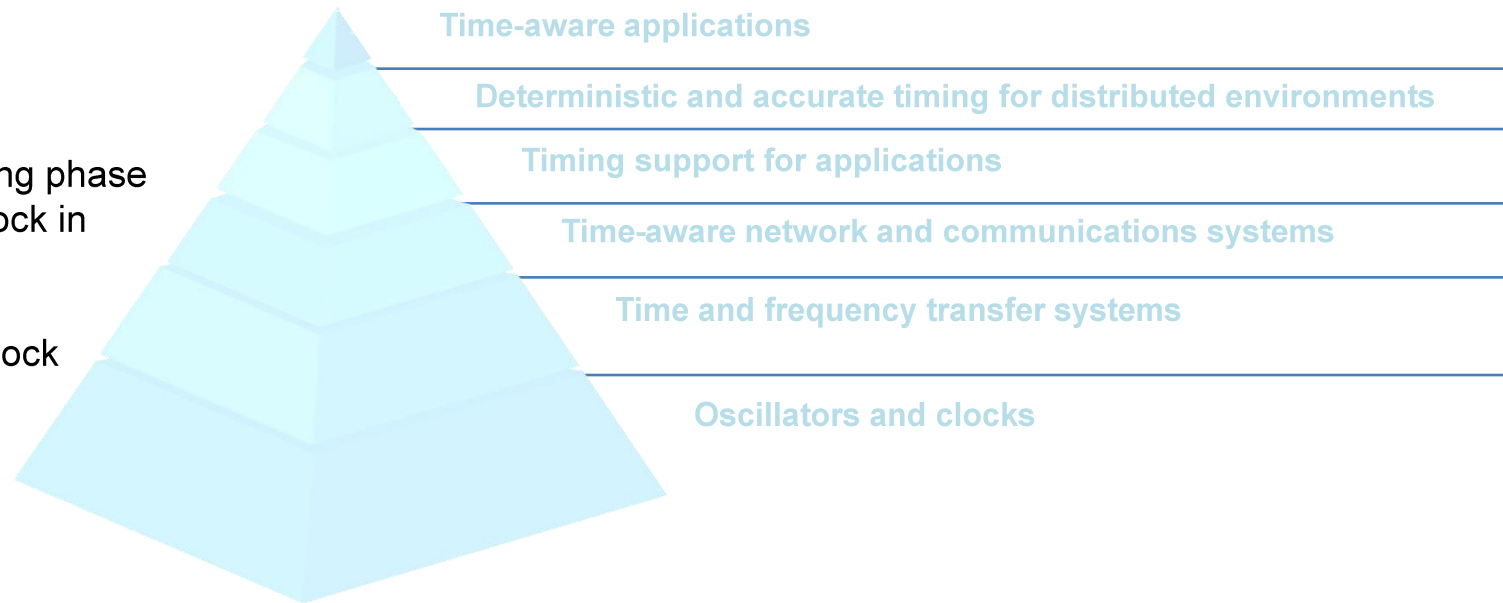
Time Aware Systems: A layered view



Timing is coming New challenges

Time Aware Systems: A layered view

- Global clock domain including phase alignment of the physical clock in each component.
- The need to distribute the clock with compensated delays.



IIoT: many devices and applications that require frequency, time or phase synchronization.

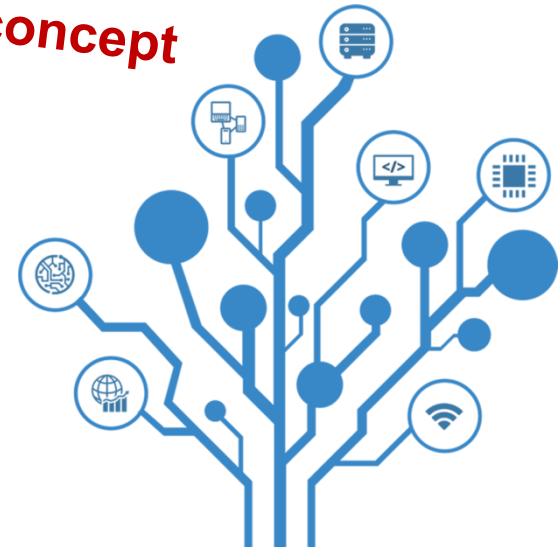
Requirements:

- Parameters that can respond to different demands on systems.
- Accuracy, stability, integrity and security.
- Timing as correctness criterion (latency control, QoS, safety critical systems constraints).

Timing accuracy emerges from the details of the implementation, the systems topology and the specific equipment.

Data processing and networking will need to converge with timing.

**Time is a first
order concept**





Deterministic Industrial Timing

worldwide, scalable & dependable Time Transfer



New Scientist

HOME NEWS TECHNOLOGY SPACE PHYSICS HEALTH EARTH HUMANS LIFE DATING JOBS MAGAZINE

What do you think of our new site? Give us your feedback

Home | Features | Space | Technology

Facebook Twitter LinkedIn RSS

FEATURES 4 March 2015

GPS chaos: How a \$30 box can jam your life



20th IMEKO TC4 International Symposium and
18th International Workshop on ADC Modelling and Testing
Research on Electric and Electronic Measurement for the Economic Upturn
Benevento, Italy, September 15-17, 2014

The Impact of GPS Vulnerabilities on the Electric Power Grid

Bernhard Baumgartner¹, Christian Riesch², Wolfgang Schenk³

^{1,2,3}OMICRON electronics GmbH, Oberes Ried 1, 6833 Klaus, Austria

¹bernhard.baumgartner@omicron.at, ²christian.riesch@omicron.at, ³wolfgang.schenk@omicron.at

Abstract – The failure of time references can result in absolute accuracy of 1 us or better [3]. In like sampled values or synchrophasors require operational distortions of power plants or substations.

SLASHGEAR REVIEWS COLUMNS FEATURES HUBS

Challenged by 802.11ac design and test?

Get app note > Getting New Contracts MEANING?

Globalstar GPS network (allegedly) vulnerable to hackers

Brittany Hillen - Jul 31, 2015

Twitter Facebook Google+ Reddit

Forbes / Tech

6/23/2015 @ 10:07 AM 6,398 views

Watch GPS Attacks That Can Kill DJI Drones Or Bypass White House Ban



Thomas Fox-Brewster

Senior digital crime, privacy and hacker culture

Follow on @forbes.com

Twitter Facebook LinkedIn

When a government intelligence staffer managed to crash his DJI Phantom drone on [White House property](#), the Chinese manufacturer took the decision to [issue a no-fly zone over the DC area](#). DJI already used GPS to implement invisible demarcations stopping users flying their machines into no-fly zones like airports, forcing them to land when they hit certain coordinates.

Unfortunately, as noted in a [FORBES report on smartphone issues yesterday](#), there's a vulnerability in GPS affecting most commercial drones that would allow a nearby hacker to spoof signals, change coordinates and commandeer an Unmanned Aerial Vehicle (UAV) and take it wherever they wanted, whether that's the White House or Dulles airport. That's according to researchers from China's Qihoo, who demonstrated



sentinel

chromium technology

GPS Jamming – Threat Scenarios CGSIC 2013 Nashville



Global time reference is the key

The Need for Global time provides the backbone of the temporal infrastructure of any dependable-distributed system in the Internet of Things world.

A global time is key to:

- Interpret the time-stamps across the diverse embedded systems.
- Control and synchronize the durations of the physical time frames.
- Specify the temporal properties of interfaces.
- Synchronize inputs and output actions.
- Allocate resources conflict-free (e.g. scheduling).
- Detect errors promptly.
- Strengthen security protocols.
- Monitoring QoS.
- Validate/evaluate latency and performance.
- Optimize power.

We ride on Telecom networks



Solutions for time and frequency distribution

Stop using PTPv2 patches

From Science to Industry. Solution features

- **Resilient/secured GNSS time receiver** (getting the best of networks and GNSS technologies)
- **Distributed sensor and actuators** (the best of sync over thousands of km).
- **Legal-time is here** (powered by a deterministic timestamping)
- Determinism, number of hops, selfcalibration

**Telecommunications (LTE-A & 5G) and
finances ((MiFID II) as relevant markets**



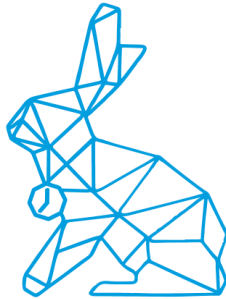
WR-Switch

*The key element of a
synchronized network*



HIGHLIGHTS

- Sub-nanosecond deterministic time
- Thousands of nodes
- Distance range: over 80 km using fiber
- PTPv2, Sync-E supported
- Robustness & Redundancy
- Dynamic calibration
- Web and SNMP software interfaces



WR-LEN

*The wired GPS-like
cost effective node*



HIGHLIGHTS

- Sub-nanosecond deterministic time
- Compact size
- Daisy-chain
- OEM modules available



Turn-key time integration



WR-Zen Time Provider

Redundancy, security, multiple interfaces and protocols



HIGHLIGHTS

- Sub-nanosecond deterministic time
- Redundancy & security features
- Remote configuration and monitoring
- Distance range: over 120 km using optical fiber interface.
- PTPv2, NTP, IRIG-B, NMEA
- Management API
- Arbitrary & phase-locked frequency generation



- **Seven Solutions is the leading company offering ultra-accurate deterministic time transfer solutions**
 - From Scientific infrastructures to the most accurate PTP implementation in the world
 - Time can be distributed worldwide using existing Telecom networks
 - Deterministic time transfer over large number of hops and long distances
 - Time integrity features. Redundancy mechanisms
- Flexible services and equipment to fulfill the existing needs on a complex & interconnected world. Deterministic industrial timing is now available
- **It is not about accuracy but providing tightly integrated time as a first order concept**

Stop patching time. Integrate it!



SEVEN

Solutions

When every nanosecond counts

Thank you for your attention!

www.sevensols.com