Sync in IEEE Standards
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Sync in IEEE Standards

- The IEEE has created several standards that contain a synchronization requirement.
- In this presentation I will identify them and offer a brief discussion of the Sync component.
- The talks goal is to impart to you the reality that the world of sync is expanding beyond telecom!

Sync in IEEE Standards

- IEEE 1588-2002 & 2008 - Precision Time Protocol
- IEEE 1609.3 WAVE – Wireless Access in Vehicular Environments
- IEEE 802.1AS TSN Time Sensitive Networks
- IEEE 802.22 WRAN – Wireless Regional Area Networks
- IEEE 802.16e WMAN – Wireless Metropolitan Networks

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- IEEE 802.3BF TSSI – Time Synchronization Service Interface
- IEEE C37.238 IEEE1588-2008 Profile for power system protection applications.
- IEEE 1722 Standard for layer 2 Transport Protocol for Time Sensitive Applications in Bridged Local Area Networks
- IEEE 802.11u amends PHY/MAC to support interworking with external networks.

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- IEEE1588-2002 & 2008 - Precision Time Protocol
  - This standard has become the de-facto mechanism for distribution of frequency to Mobile Wireless Networks.
  - ITU Standards and technology development work is ongoing to add time or phase distribution.
  - IEEE1588-201x study group formed and PAR agreed

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- IEEE 1609.3 WAVE – Wireless Access in Vehicular Environments
  - One of the basic standards for the Intelligent Transportation System of the Dept of Transportation
  - The .3 standard describes the mechanism for synchronizing the control channel (802.11p) between the OBU (on board unit) to the (road side unit).

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- IEEE 802.1AS Time Sensitive Networks –
  - Sync over 10GEPON IEEE 802.1AS March 2011
  - Mechanisms to deliver frequency and phase to base stations via PON
    - EPON family time sync supports accuracy on the order of 100 nanoseconds
  - Work on Time Aware Shapers for Bridging Traffic is ongoing

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- IEEE 802.22 WRAN – Wireless Regional Area Networks
  - Known as WiFi on steroids
  - Range up to 30Km
  - Used for broadband delivery in rural areas
  - Radio is TDD only and sync method can be GPS or IEEE 1588-2008

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- IEEE 802.16e WMAN – Wireless Metropolitan Networks
  - Referred to as WiMAX
  - TDD radio requires 1µ alignment across adjacent cell sites.
  - Absolute Frequency across network is 2ppm
  - Adjacent cell site frequency is 50ppb

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- IEEE 802.3BF – Time Synchronization Service Interface
  - Created for 802.1AS to provide trigger of good Start of Frame detect from PHY to MAC in 802.3 systems
  - Works on ingress and egress of PHY.
  - Input to Time Client block of MAC
  - Max latency allowed thru PHY of 5ns

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- IEEE PC37.238 IEEE-1588 Profile for power system protection applications
  - This standard establishes IEEE 1588-2008 as the only acceptable time distribution method for power grid protection applications.
  - Syncro-phaser and actuator systems primary target
  - Standard completion 11/2012

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- IEEE1722-2011 – IEEE Standard for Layer 2 Transport Protocol for Time Sensitive Applications in a Bridged Local Area Network
  - The protocol, data encapsulations, and presentation time procedures used to insure interoperability between audio & video based end stations that use standard networking services provided by all IEEE 802 networks meeting quality-of-service requirements for time-sensitive applications by leveraging concepts of IEC 61883 are specified in this standard.

Sync in IEEE Standards

- IEEE 802.11u amends PHY/MAC to support interworking with external networks.
  - The benefit of this particular project is to address issues noted in the IETF, 3GPP, 3GPP2 by producing an amendment to allow external networks to interwork with IEEE 801.11 equipment in a common, harmonized and standardized manner and remove requirements for bespoke solutions. Timing and time sensitivity are key elements of this amendment.

Thank you for your attention and interest

Are there any Questions?