

IEEE-1588 Precision Time Protocol and C37.238 Power Profile: Update March 2016

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Outline

- History
- Current status
- Related activities - IEEE Conformity Assessment Program (ICAP)
- Closing thoughts

IEEE 1588-2008 network

grandmaster (role):
 top level clock of the time domain
 master of the top subdomain,
 defines **grandmaster identity**

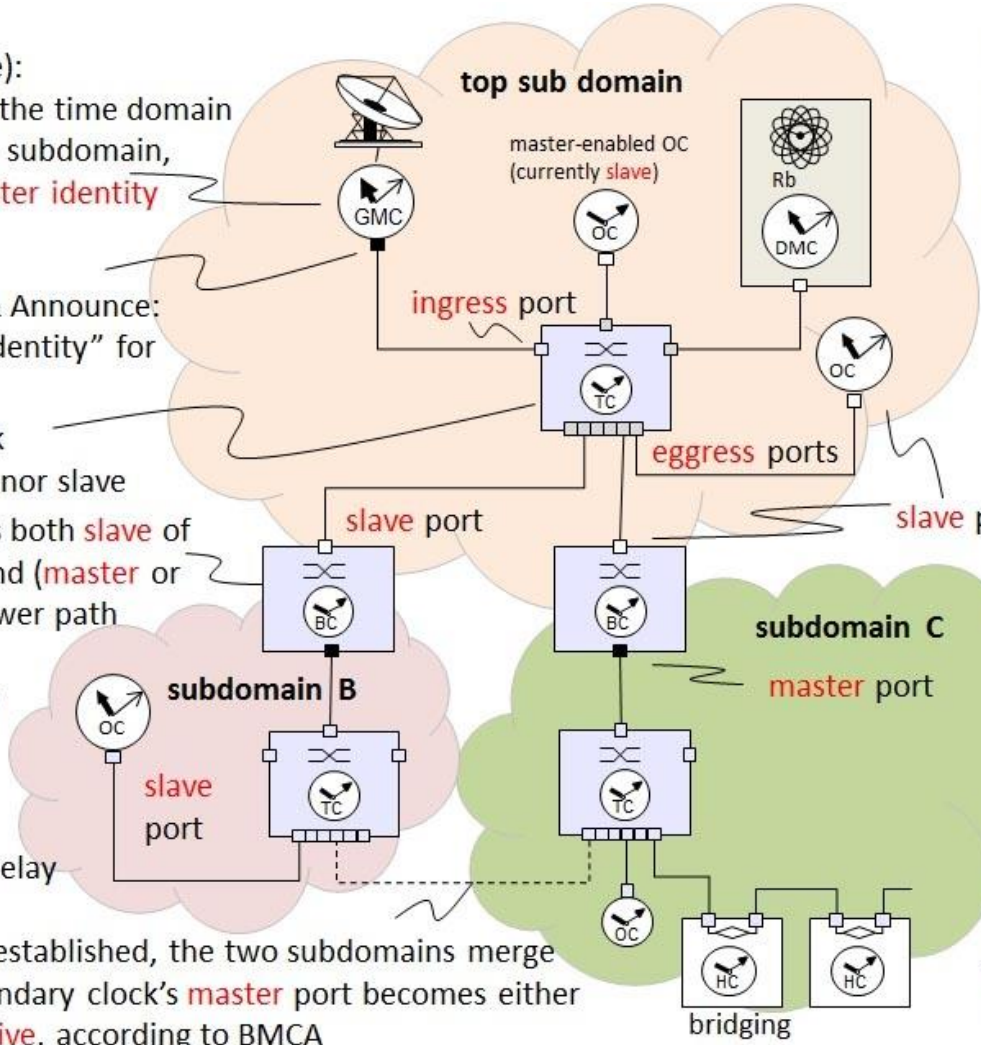
master port
 (sends the Sync & Announce:
 sets "sourcePortIdentity" for
 this subdomain)

Transparent Clock
 is neither master nor slave

Boundary Clock is both **slave** of
 the upper path and (**master** or
passive) of the lower path

sourcePortIdentity
 identifies the
master in Sync &
 Announce
 and the peer in Pdelay

if this link is established, the two subdomains merge
 and one boundary clock's **master** port becomes either
slave or **passive**, according to BMCA



designated master
 (back-up clock of domain)
 role: **slave**, but
 first to become **master**
 (after BMCA) if
 the current master stops

ordinary clock can take
 the role of **master** or
slave

Sync & Announce
 carry the MAC
 address of the
master, not of the
grandmaster)

Pdelay carry the
 MAC address of
 source port)

Hybrid clocks combine a
 TC and an OC,
 HC have two **slave** ports

History

- IEEE 1588-2002 (V1) - first edition
 - Not widely implemented
- IEEE 1588-2008 (V2) - second edition
 - Not backwards compatible to V1
 - New device type added: Transparent Clock
- IEEE C37.238-2011 - first Power Profile
- IEC/IEEE 61850-9-3:2016 - baseline (level 1) Power Profile
- IEEE PC37.238-2016 - extended (level 2) Power Profile

Status - IEEE Std 1588

■ P1588 revision

- Expected to be published 2017-2018
- All new features optional and backward compatible
- SNMP compatible MIB
- Extensive edits, clarifications, corrections
- Security, High Accuracy extensions
- Clock ID changes reflect changes imposed by RAC
- All changes to be included in P1588 to be approved by Paris meeting, April 18-21, 2016

Status - IEEE Std C37.238

■ C37.238 revision

- Co-sponsored by IEEE Power and Energy Society's Power System Relaying (H24) and Substations (C7) committees
- This is now a 'level 2' extension of IEC/IEEE 61850-9-3
- In final comment resolution, expected to be published later this year (2016)

Status - IEC/IEEE 61850-9-3

- Baseline (Level 1) power profile
 - Joint development of IEEE PES and IEC TC57, WG10
 - Common attributes of C37.238 and requests from WG10 (IEC 61850 group)
 - Baseline features only
 - No C37.238 TLV, simple slaves or GmShortId
 - Additional features to be added using 'Level 2' profiles
 - Presently at FDIS, NC voting results due by April 8

Schedule

- Note: these are tentative dates...
 - IEC 61850-9-3 PAS: May 2015
 - IEEE/IEC 61850-9-3: Mid 2016
 - IEEE C37.238-2016: Mid 2016

IEEE Conformity Assessment Program

- IEEE Conformity Assessment Program (ICAP) is a critical component of IEEE SA's Standards Implementation services
- ICAP started in 2008 and is wholly operated by IEEE-SA
- ICAP provides an industry support and operational structure that bridges standards development activities with the conformity assessment activities
- ICAP is an important initiative in achieving IEEE SA's strategic objectives and will have ongoing support from SA and IEEE
- Successful ICAP programs will ensure interoperability and accelerate market acceptance and enable new products and technologies in support of IEEE Standards

Understanding Conformity Assessment

- What is Conformity Assessment?
 - Conformity Assessment is defined as the process or processes that are used to demonstrate that a product or service meets specified requirements (set forth in Standards, Test Plans, etc.)
- Conformity assessment
 - Provides assurance and confidence a product or service meets requirements
 - Empowers the user to make better purchasing decisions
 - Benefits the supplier as products may gain market acceptance
- Conformity assessment activities include:
 - Conformance, Interoperability, Inspection, Accreditation
 - “Catch-all” term to address range of test-related activities

Benefits of Implementing a Conformity Assessment Program

- Benefits of conformance test before deployment implementation
 - Early identification of non-conformances
 - Exact functionality of the protocol is identified
 - Multi-vendor solutions will have interoperability issues – helps identify such issues
 - New offerings will have bugs – helps to catch them
- Reduces the vendor's cost/need for re-tests for different end-users
- Establishes a baseline for performance expectation
 - Eases interoperability
- Transparency based on common implementation/Test Authority

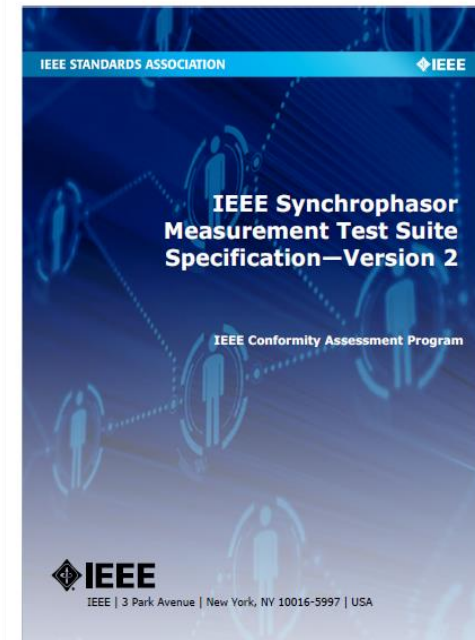
IEEE 1588P CASC Charter

- CASC: Conformity Assessment Steering Committee
- Products used by end users (utilities) should conform to current approved version of IEEE 1588 & C37.238 revision
- Product conformity should be certified
- Testing should be performed according to the IEEE 1588 Power Profile Test Suite Specification (TSS) – to be developed by this committee
- Testing should be assessed by third party independent experts

Goals of IEEE 1588P CASC

- Author, review and approve IEEE 1588 Power Profile TSS (Test Suite Specification)
 - Will continue as a standing committee to update and revise TSS as needed
- Advise ICAP about viability of a certification program based on the IEEE 1588 Power Profile TSS

- ▶ IEEE Synchrophasor Measurement Test Suite Specification (TSS) available now
 - Developed by IEEE Synchrophasor Conformity Assessment Steering Committee (SCASC)
 - Unambiguous, systematic way of testing PMUs according to IEEE C37.118.1a-2014
 - TSS format follows IPRM recommendations
- ▶ Certification Program – operational
 - Testing performed at IEEE authorized test Lab
 - Vendors can apply for certification
 - Certified PMUs are now available



Thanks!

Questions?