Packet Network Synchronization

Conformity Assessment and Certification

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Overview

- ICAP and IEEE 1588 Conformity Alliance

- IEEE 1588 Standard and Recommendations

- Conformity Alliance Certification Test Suite

- Certification Program Timeline and Deliverables

- Conclusions and Summary

IEEE Conformity Assessment Program (ICAP)

- Standard Development Organizations (SDOs) including the IEEE are focused on the development of standards for industry or technology
- Once established, SDOs periodically review and update the standard based on industry
  - Publication, and sale of standard is typically the end of SDO involvement
- Application and usage becomes a business decision of the end user community
- **Conformity assessment is the accepted way of demonstrating that a product adheres to a standard**
- These assessments may take various forms based on business needs, ranging from self- declaration of conformance to independent third party verification of conformance
- Demand drivers are needed for a successful program to be realized
  - Vendors wishing to demonstrate compliance, Service Providers (or large purchasers) demanding a certification in order to procure

ICAP and Conformity Assessment

Encompass all aspects of Conformity Assessment – Conformity Testing, Interoperability (via events or plugfests, etc.)

Understanding ICAP

- ICAP provides industry **with unbiased, independent and centralized resources** supporting conformity assessment activities
- ICAP provides **legal and operational umbrella** for testing & conformity assessment programs
- **Certification Authority focused** on full testing spectrum for **IEEE-related standards**
  - Focus on IEEE Standards today though may test to other standards
- **Not a Test Lab**… ICAP strategically aligns with expert test labs to provide the best level of conformance & certification support

Global Services

- ICAP programs will address marketing, promotion, etc.
- IEEE 1588 Conformity Alliance Support
- Test Lab Identification and Accreditation
- Certified Product Registry

IEEE 1588 Conformity Alliance

Mission

- The IEEE 1588 Conformity Alliance currently focuses on providing the **telecommunication & power industries** with a timing & sync product certification mark.
- The goal is to provide Industry a forum to develop IEEE 1588 certification tests and testing-related profiles
- Market demand will dictate the next vertical in the IEEE 1588 space that ICAP will support.

Model

- **Build Alliance around Standard's applications**
- Driven by Industry as well as several IEEE working group members
- **Industry recognized - Committee of Experts** provides additional level of integrity to test specs, documents and overall certification
- Develop test requirement documents, test case templates, test setup documents
- Formal review processes to ensure highest integrity of test suite
- End goal: Certification, Marking & Marketing of conforming products
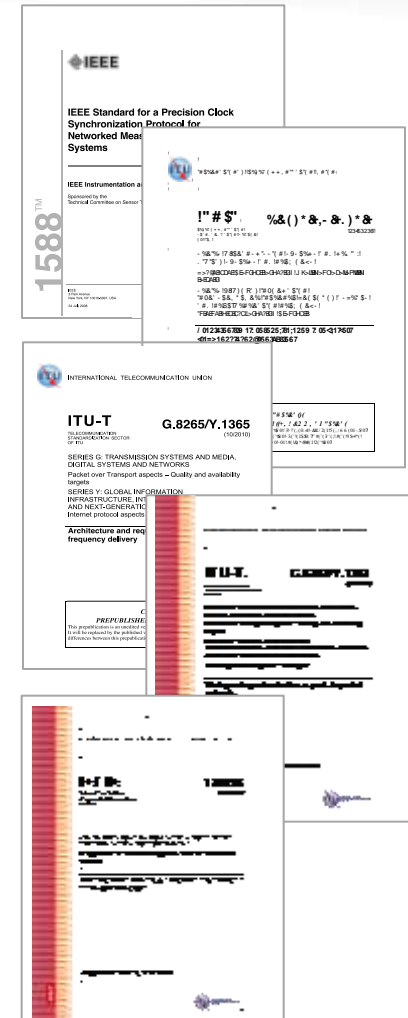
Members

Founding Members
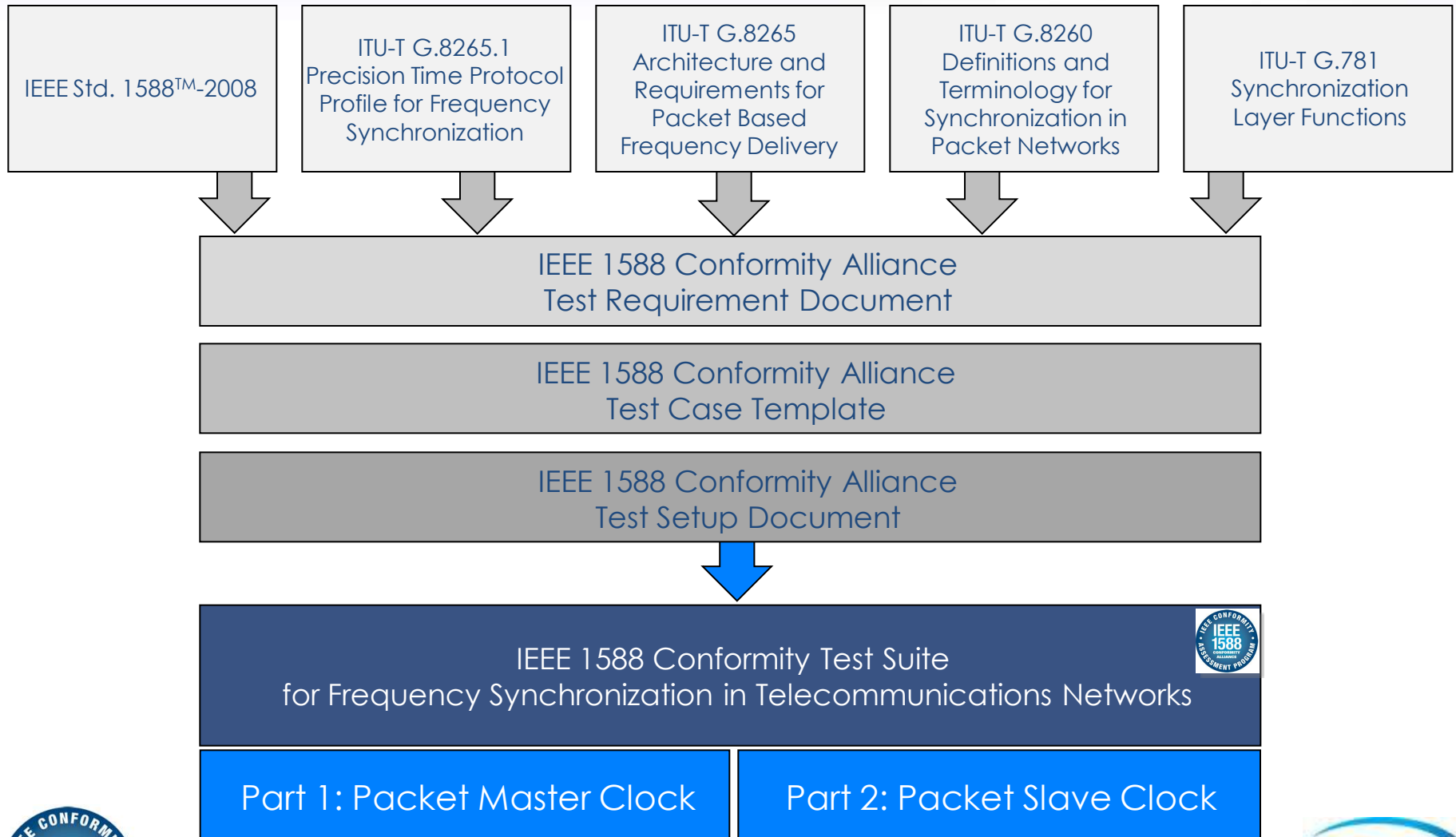

Committee of Experts

IEEE 1588 Standard & Recommendations

- IEEE Standard for Precision Clock Synchronization Protocol for Networked Measurement and Control Systems
  - IEEE Std. 1588™-2002 (v1)
  - IEEE Std. 1588™-2008 (v2)

- ITU-T Recommendation G.8265.1 (10/2010), Precision Time Protocol Profile for Frequency Synchronization

- ITU-T Recommendation G.8265 (10/2010), Architecture and Requirements for Packet Based Frequency Delivery

- ITU-T Recommendation G.8261 (04/2008), Timing and Synchronization Aspects in Packet Networks

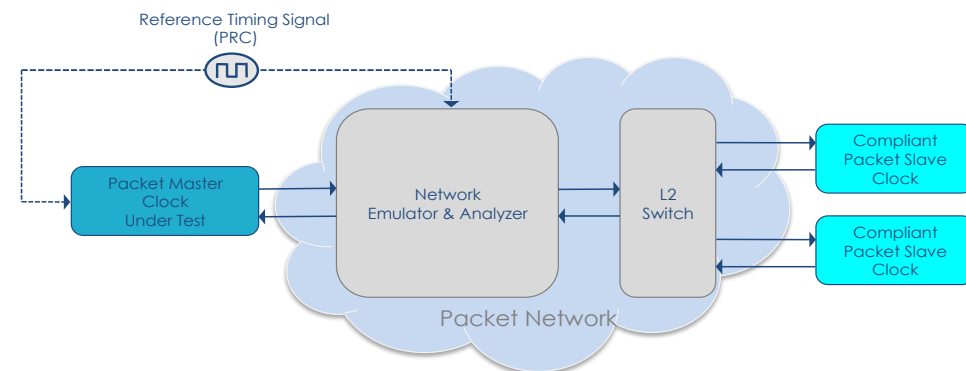- ITU-T Recommendation G.8260 (08/2010), Definitions and Terminology for Synchronization in Packet Networks

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IEEE 1588 Conformity Test Suite Framework

IEEE Std. 1588™-2008	ITU-T G.8265.1 Precision Time Protocol Profile for Frequency Synchronization	ITU-T G.8265 Architecture and Requirements for Packet Based Frequency Delivery	ITU-T G.8260 Definitions and Terminology for Synchronization in Packet Networks	ITU-T G.781 Synchronization Layer Functions

IEEE 1588 Conformity Alliance Test Requirement Document

IEEE 1588 Conformity Alliance Test Case Template

IEEE 1588 Conformity Alliance Test Setup Document

IEEE 1588 Conformity Test Suite for Frequency Synchronization in Telecommunications Networks

Part 1: Packet Master Clock	Part 2: Packet Slave Clock

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IEEE 1588 Packet Master Clock Conformance

Over 250 Test Cases to verify conformance of **one-step** and **two-step** Packet Master Clocks
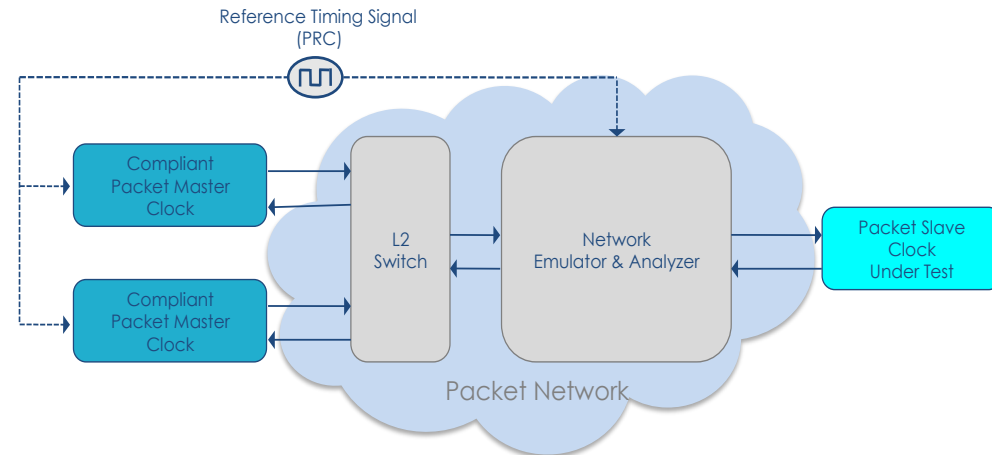
- Grant and Grant Cancellation of Announce Messages - Signaling Message Format
- Unicast Session - Announce Messages
- Announce Message Format

- Grant and Grant Cancellation of Sync Messages - Signaling Message Format
- Unicast Session - Sync Messages
- Sync and Follow_Up Message Format

- Grant and Grant Cancellation of Delay_Resp Messages - Signaling Message Format
- Unicast Session – Delay_Resp Messages
- Delay_Resp Message Format

- SSM Quality Levels & PTP clockClass Values

- Denied Requests of Unicast Messages
- Specific Cases Involving Multiple Messages

Reference Timing Signal (PRC)

Packet Master Clock Under Test

Network Emulator & Analyzer

L2 Switch

Compliant Packet Slave Clock

Compliant Packet Slave Clock

Packet Network

IEEE 1588 CONFORMITY ASSESSMENT PROGRAM CONFORMITY ALLIANCE

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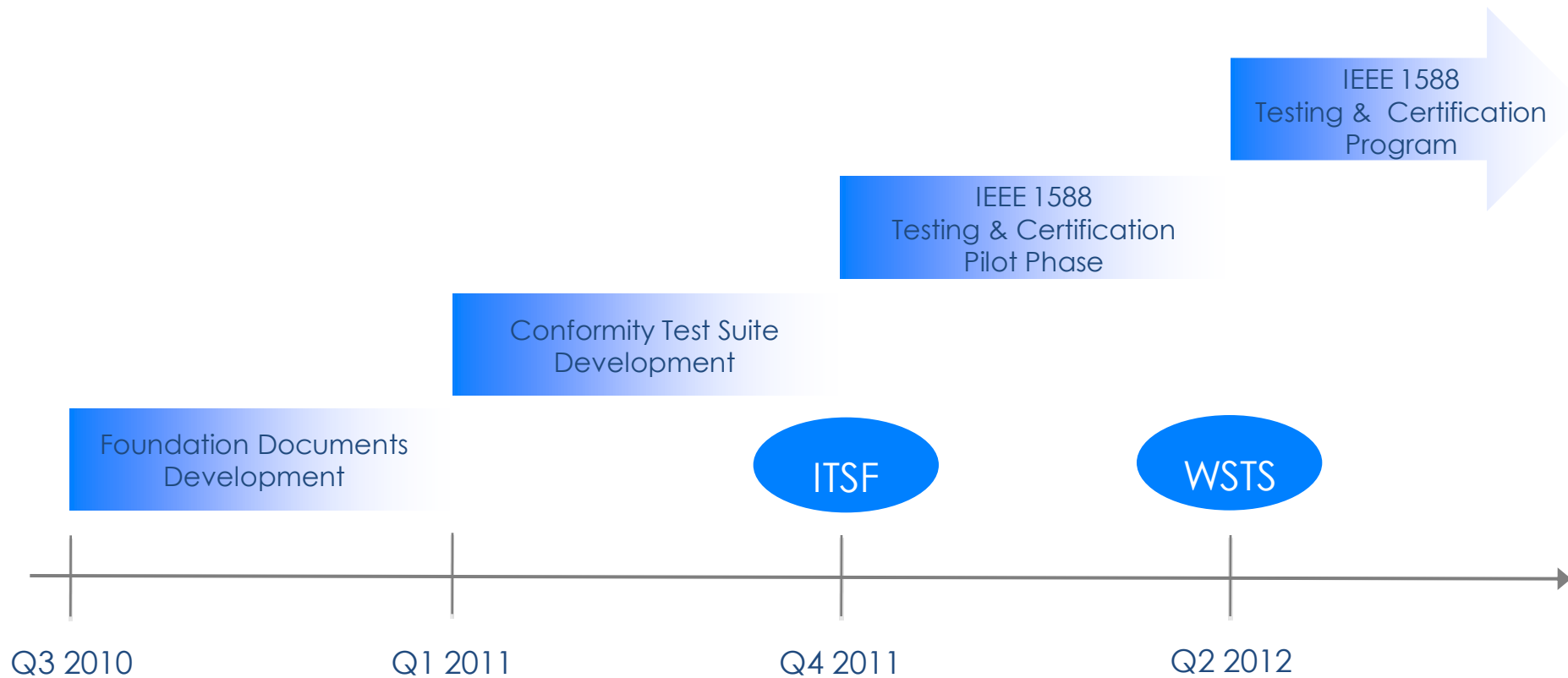
ICAP

IEEE 1588 Packet Slave Clock Conformance

Over 250 Test Cases to verify conformance of Packet Slave Clocks in **one-way** or **two-way** timing transfer modes

- Request, Cancellation & Cancellation Ack. of Announce Messages - Signaling Message Format
- Request of Announce Messages – Configurable Range

- Request, Cancellation & Cancellation Ack. of Sync Messages - Signaling Message Format
- Request of Sync Messages – Configurable Range

- Request, Cancellation & Cancellation Ack. of Delay_Resp Messages - Signaling Message Format
- Request of Delay_Resp Messages – Configurable Range

- Unicast Session of Delay_Req/Delay_Resp
- Delay_Req Message Format

- Alternate Best Master Clock Algorithm

- Protection Functions

- Denied Requests of Unicast Messages
- Specific Cases Involving Multiple Messages

Reference Timing Signal
(PRC)

Compliant
Packet Master
Clock

Compliant
Packet Master
Clock

L2
Switch

Network
Emulator & Analyzer

Packet Slave
Clock
Under Test

Packet Network

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IEEE 1588 Certification Program Timeline

IEEE 1588 Alliance's Committee of Experts calendar of activities and Certification Program timeline

IEEE 1588 Testing & Certification Program

IEEE 1588 Testing & Certification Pilot Phase

Conformity Test Suite Development

Foundation Documents Development

ITSF

WSTS

Q3 2010   Q1 2011   Q4 2011   Q2 2012

Conformity Certification Deliverables

- Four deliverables awarded to successful IEEE 1588 equipment vendors

- Designed to promote 1588 certification in product sheets, presentations, websites, press releases, product launches

- Allows vendors to respond to Service Providers RFPs with certified compliant products

- Provides network operators with a high level of confidence when selecting IEEE 1588 products

Certificate
Official statement of certification, serves as proof of compliance

Certified Logo
Instant recognition of certified companies and products

Test Report
Full description of test parameters, procedures and results

Certification Registry
On-line listing of certified companies and products

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Conclusions and Summary

- Conformity Certification program completes the IEEE 1588 standardization process

- Based on a single Test Suite developed under the authority and technical expertise of the IEEE 1588 Conformity Alliance

- Ensures that implementations reaching the market place are compliant to the 1588 Standard and Recommendations

- Meant to accelerate the adoption and strengthen market recognition of IEEE 1588 technology in Telecommunications networks

Thank You

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