IEEE P1904.1:
Standard for Service Interoperability in Ethernet Passive Optical Networks (SIEPON)

Project Overview

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EPON Ecosystem

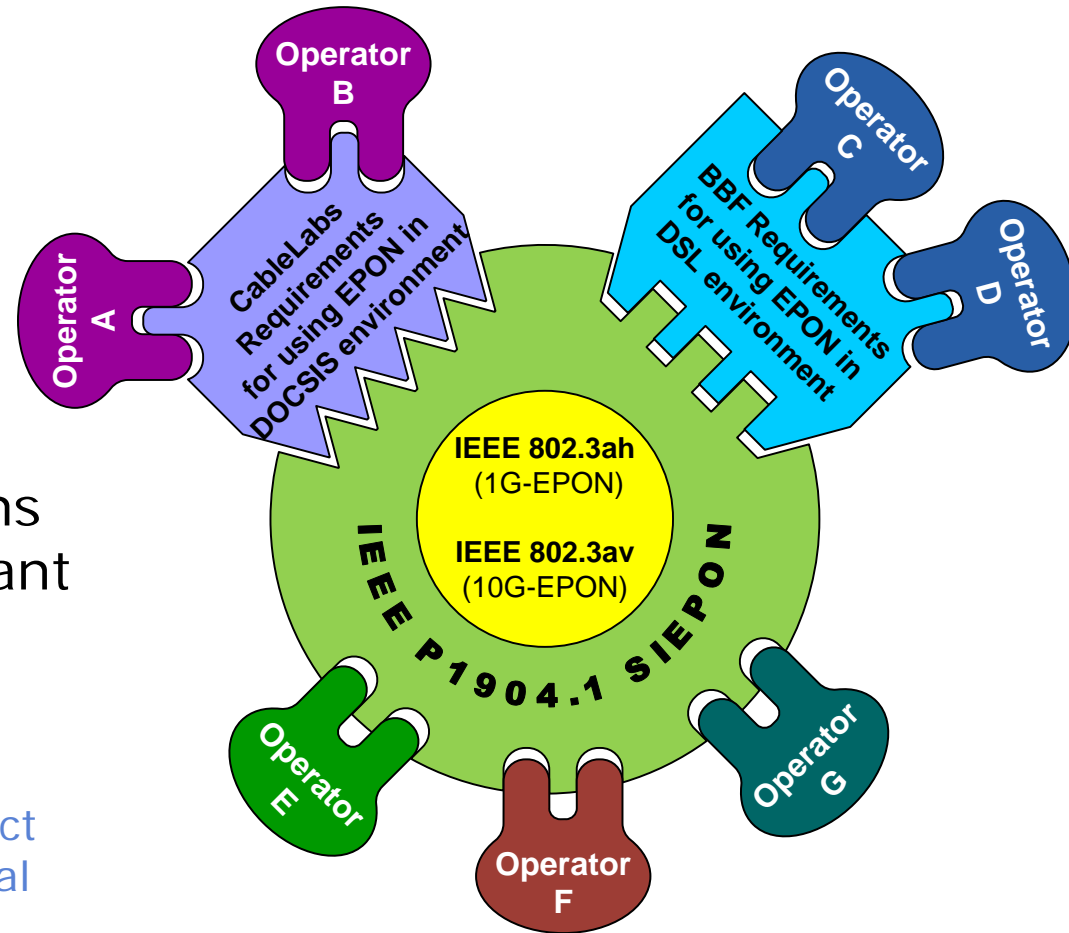- ❑ EPON is being used in various environments
  - – Some would like to manage EPON as part of DOCSIS network
  - – Some would like to manage EPON like DSL network

- ❑ Many external specifications supply requirements relevant to EPON technology
  - – BBF (WT-200)
  - – CableLabs (DPoE)
  - – Also, deployed solutions reflect different regulatory or national environments

- ❑ **The goal of IEEE 1904.1 SIEPON project is to address these diverse requirements in a consistent and unified way**
  - – Improve system-level interoperability by specifying common management and provisioning framework.

Operator B

Operator C

Operator A

Operator D

CableLabs Requirements for using EPON in DOCSIS environment

BBF Requirements for using EPON in DSL environment

IEEE 802.3ah (1G-EPON)

IEEE 802.3av (10G-EPON)

IEEE P1904.1 SIEPON

Operator E

Operator G

Operator F

IEEE P1904.1 PAR Scope

This standard describes the system-level requirements needed to ensure service-level, multi-vendor interoperability of Ethernet Passive Optical Network (EPON) equipment. The specifications complement the existing IEEE Std. 802.3 and IEEE Std. 802.1 standards which ensure the interoperability at the Physical layer and Data Link layer. Specifically included in the proposed work are:

– EPON system-level interoperability specifications covering equipment functionality, traffic engineering, and service-level QoS/CoS mechanisms;

– Management specifications covering: equipment management, service management, and power utilization.

IEEE P1904.1 PAR Purpose

To build upon the IEEE 802.3ah (1G-EPON) and IEEE 802.3av (10G-EPON) Physical layer and Data Link layer standards and create a system-level and network-level standard, thus allowing full plug-and-play interoperability of the transport, service, and control planes in a multi-vendor environment.
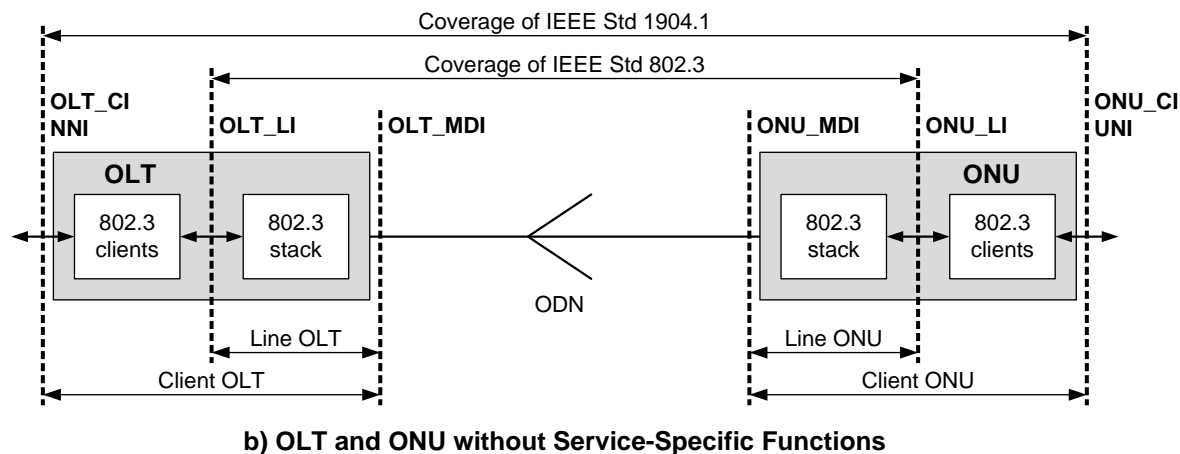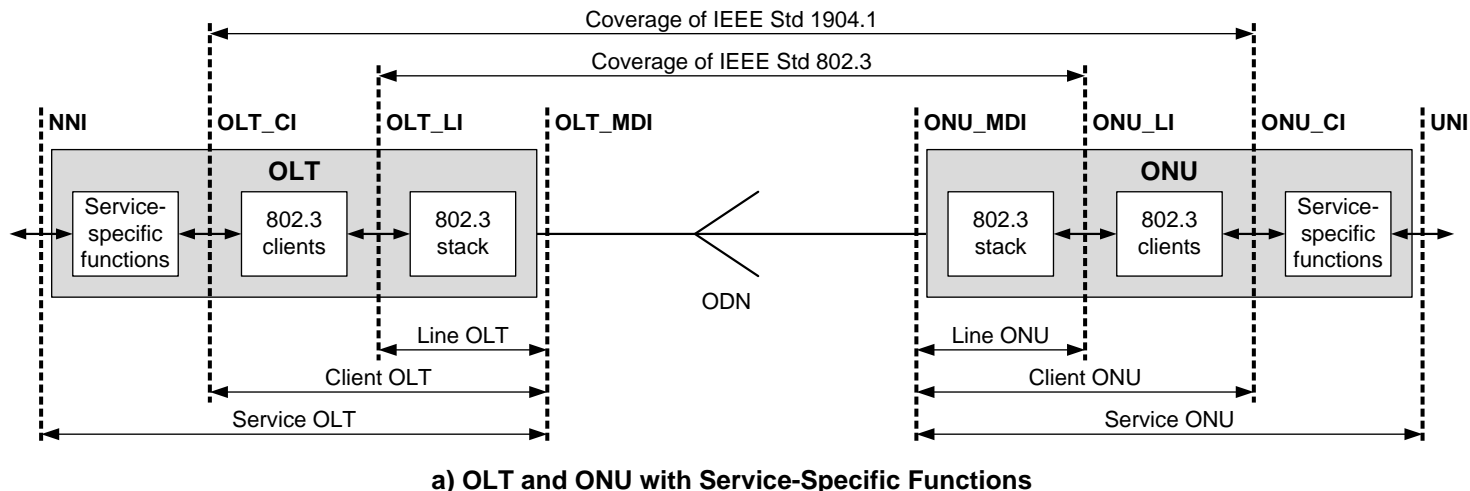
See 1904.1 PAR at
http://www.ieee1904.org/1/documents/P1904_1_PAR.pdf
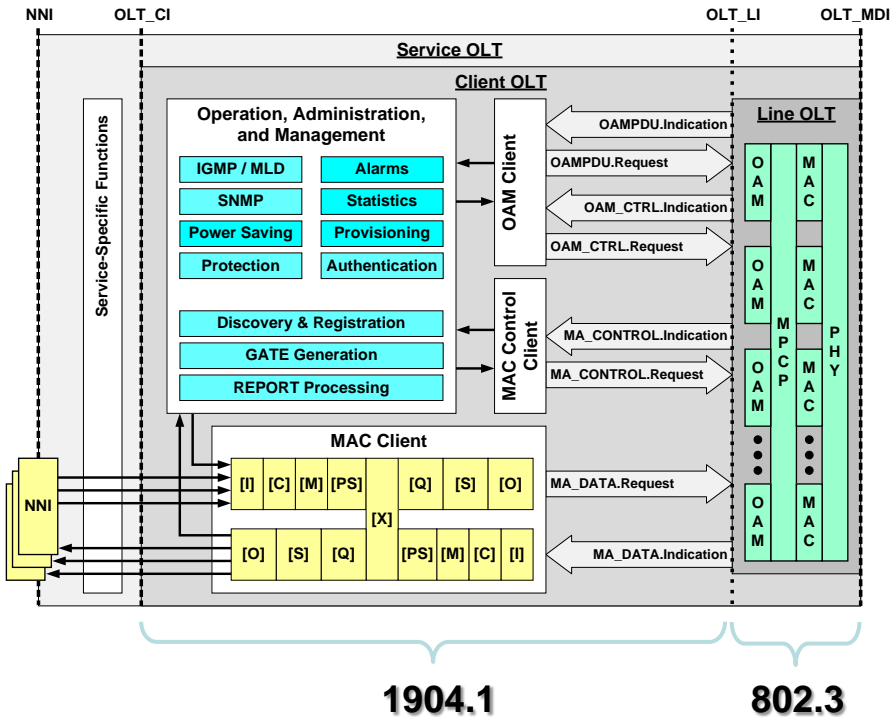
Standard Coverage

- ❑ IEEE 1904.1 sits on top of 802.3

- ❑ Does not include services or functions that are not specific to EPON
  - VoIP (SIP)
  - MDU switch
  - HGW router
  - POTS
  - CES

a) OLT and ONU with Service-Specific Functions

b) OLT and ONU without Service-Specific Functions
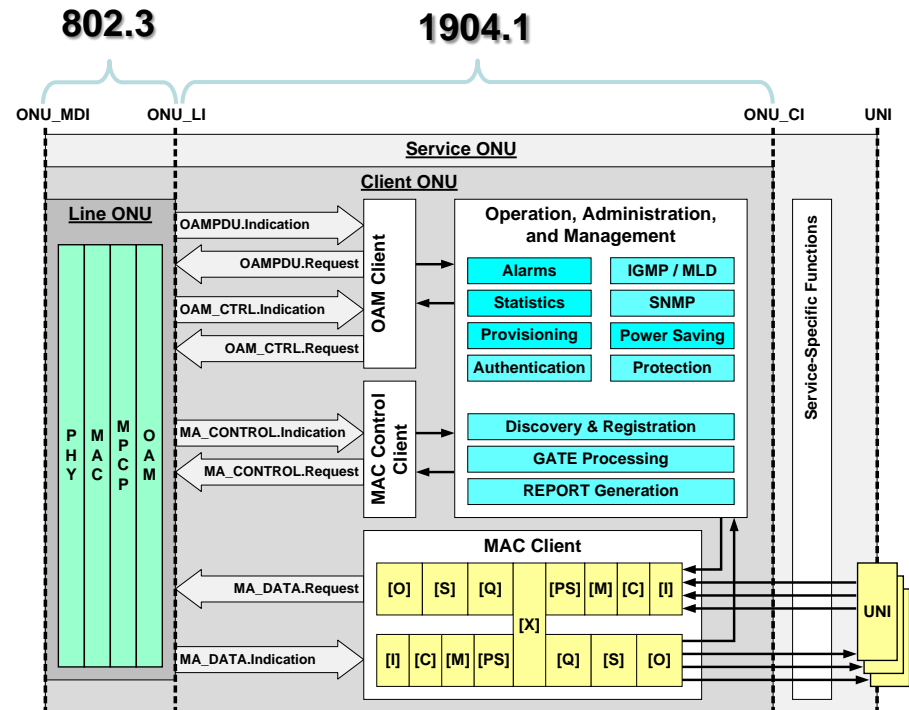
OLT and ONU Architecture

SIEPON covers various functions and features:
- Power Saving
- Trunk and Tree Protection
- Power Saving
- Software Download
- Authentication
- IGMP/MLD

SIEPON provides unified provisioning model for the MAC Client data path :
- [C] = Classifier
- [M] = Modifier
- [PS] = Policer/Shaper
- [X] = CrossConnect
- [Q] = Queues
- [S] = Scheduler

SIEPON Conformance Tests

❑ **P1904.1 WG is interested in specifying Conformance Tests as companion standard(s)**
  – P1904.1/Conformance01
  – P1904.1/Conformance02
  – P1904.1/Conformance03

❑ **Benefits of the process**
  – Developing test specifications and procedures often identifies omissions or ambiguities of the main specification. Development of test cases will help us improve the main specification.

❑ **Benefits of the result**
  – The available test cases will allow vendors, network operators, and independent testing facilities to produce consistent results when testing EPON equipment for conformance with 1904.1.
  – Can become foundation for a future certification program

IEEE P1904.1 WG Membership

❑ Chair: Glen Kramer, Broadcom Corporation
❑ Vice Chair: Duane Remein, FiberHome Technologies
❑ Executive Secretary: Ken-Ichi Suzuki, NTT Corporation
❑ Chief Editor: Marek Hajduczenia, ZTE Corporation

❑ Current Full Members:

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▪ Ericsson	▪ Qualcomm Inc.
▪ FiberHome Technologies	▪ Sumitomo Electric
▪ Fujitsu Telecom Networks	▪ Victor Blake
▪ Hitachi Communications	▪ ZTE Corporation
▪ Huawei Technologies	

Work Divided in 5 Task Forces

Task Force	TF1: Service Configuration and Provisioning	TF2: Performance Requirements and Service Quality	TF3: Service Survivability	TF4: System/Device Management	TF5: Conformance Test Procedures
Focus	*Non-real-time* features that affect connectivity (VLAN, Encapsulation, Multicast) : frame classification and modification , forwarding rules, etc.	Requirements and features that affect service performance, i.e., *real-time* control mechanisms for delay, packet loss, BW guarantees.	Features that affect availability of services: device monitoring and diagnostics, protection, power saving.	Features that are required to operate EPON as a managed public network: authentication, SW update, device capability discovery.	Suite of conformance tests for EPON system-level requirements for Packages A, B, and C.
Chair	**Lior Khermosh,** PMC-Sierra	**Curtis Knittle,** Cablelabs	**Seiji Kozaki,** Mitsubishi Electric	**Mike Emmendorfer,** ARRIS	**Jeff Lapak,** UNH-IOL
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SIEPON Draft D1.4 (8 July 2011)

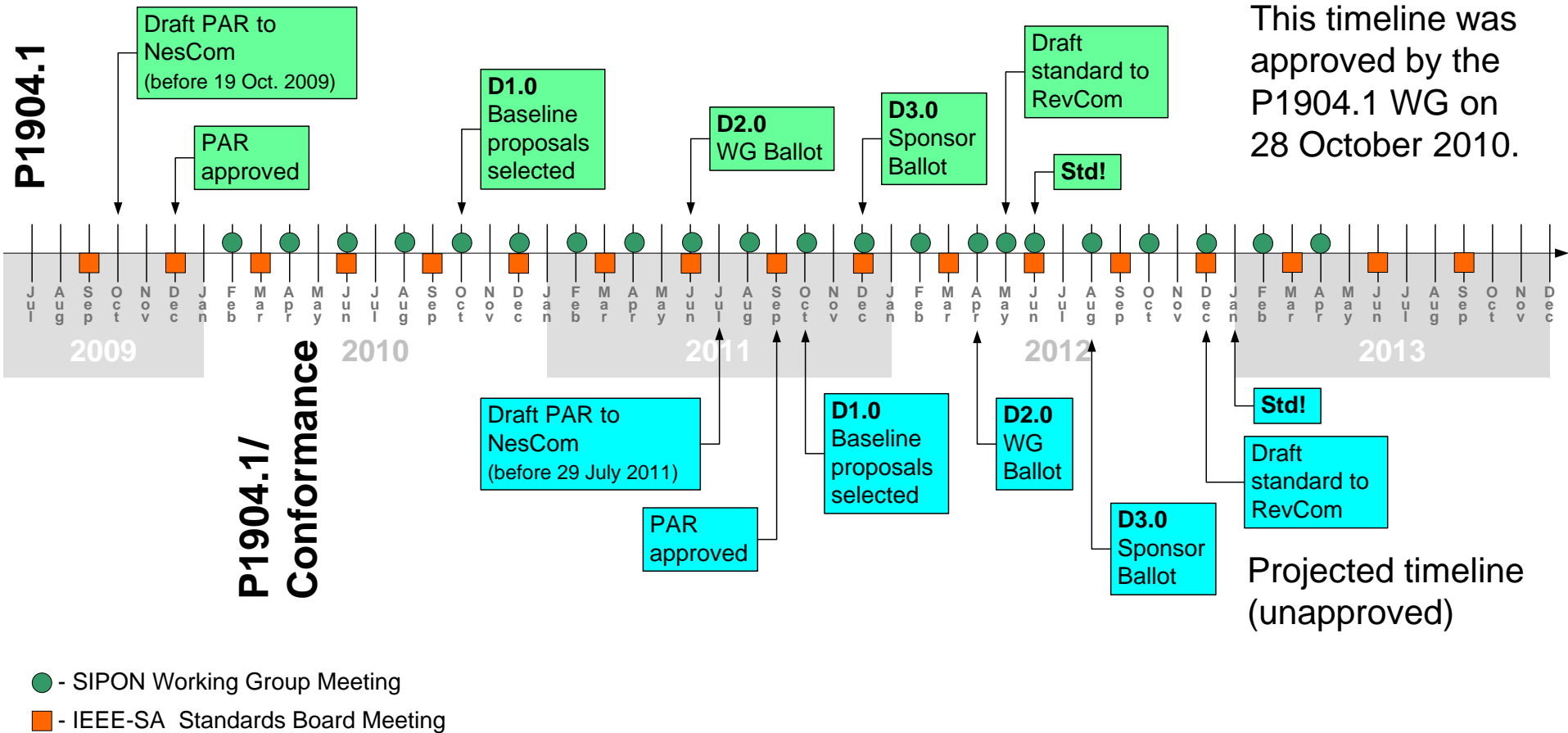|	
Clause 1	Overview
Clause 2	Normative references
Clause 3	Definitions, acronyms, and abbreviations
Clause 4	Specification packages
Annex 4A	Protocol implementation conformance statement (PICS) for Package A (normative annex)
Annex 4B	Protocol implementation conformance statement (PICS) for Package B (normative annex)
Annex 4C	Protocol implementation conformance statement (PICS) for Package C (normative annex)
Clause 5	Scope and Architecture
Annex 5A	Relation to other architecture models (informative annex)
Clause 6	MAC Client Reference model
Clause 7	Connectivity configuration
Annex 7A	EPON Data Path (EDP) (normative annex)
Clause 8	Service performance and QoS guarantees
Clause 9	Service availability
Annex 9A	Dual-Homing Protection in EPON (informative annex)
Annex 9B	Measurement of the bRTT in Trunk-protected EPON (informative annex)
Clause 10	Power saving
Clause 11	Security-oriented mechanisms
Clause 12	EPON Management
Annex 12A	Examples of eOAM message flows (informative annex)
Clause 13	Management entities

6 Meetings/Year

Date	Location	Host
Feb 2010	**Piscataway, NJ**	**IEEE SA**
Apr 2010	**Shanghai, China**	**ZTE**
Jun 2010	**Busan, S. Korea**	**Korea Telecom**
Aug 2010	**Beijing, China**	**Fiberhome**
Oct 2010	**Tokyo, Japan**	**NTT**
Dec 2010	**Santa Monica, CA**	**Broadcom + RITT**
Feb 2011	**Vancouver, Canada**	**PMC Sierra**
Apr 2011	**Louisville, CO**	**CableLabs**
Jun 2011	**Shenzhen, China**	**Huawei**
Aug 2011	**Kobe, Japan**	**Sumitomo**
Oct 2011	**Kamakura, Japan**	**Mitsubishi**
Dec 2011	**Shanghai, China**	**China Telecom**

Past Meetings (Feb 2010 – Jun 2011)

Future Meetings (Aug 2011 – Dec 2011)

SIEPON

P1904.1

Draft PAR to NesCom (before 19 Oct. 2009)

PAR approved

D1.0 Baseline proposals selected

D2.0 WG Ballot

D3.0 Sponsor Ballot

Draft standard to RevCom

Std!

This timeline was approved by the P1904.1 WG on 28 October 2010.

P1904.1/ Conformance

Draft PAR to NesCom (before 29 July 2011)

PAR approved

D1.0 Baseline proposals selected

D2.0 WG Ballot

D3.0 Sponsor Ballot

Draft standard to RevCom

Std!

Projected timeline (unapproved)

Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

2009 2010 2011 2012 2013

● - SIPON Working Group Meeting

■ - IEEE-SA Standards Board Meeting

Where to Get More Information

❑ **P1904.1 website is located at http://www.ieee1904.org/1/**

– Information about IEEE SA Corporate membership program
– Contact Information for WG Officers and IEEE SA Project manager

❑ **Public e-mail reflector is used for various announcements and reminders**

– Instructions on how to subscribe: **http://www.ieee1904.org/1/subscribe_pub.html**

– Archive: **http://www.ieee1904.org/1/email/index.html**