Project: IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs)

Submission Title: 802.1 Cooperative Standards Efforts
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Re:

Abstract: A summary of 802.1 wireless activity, a history of OAM, and a suggestion for development methods.

Purpose: Assist the development of 802.15 mesh networks.

Reference

- This deck represents a personal opinion.
  - Although prepared by a very active 17-year member of IEEE 802.1, it not claim to represent the views of the 802.1 Working Group.
  - Although prepared by an 18-year employee of Cisco Systems, it does not claim to represent the views of that company.

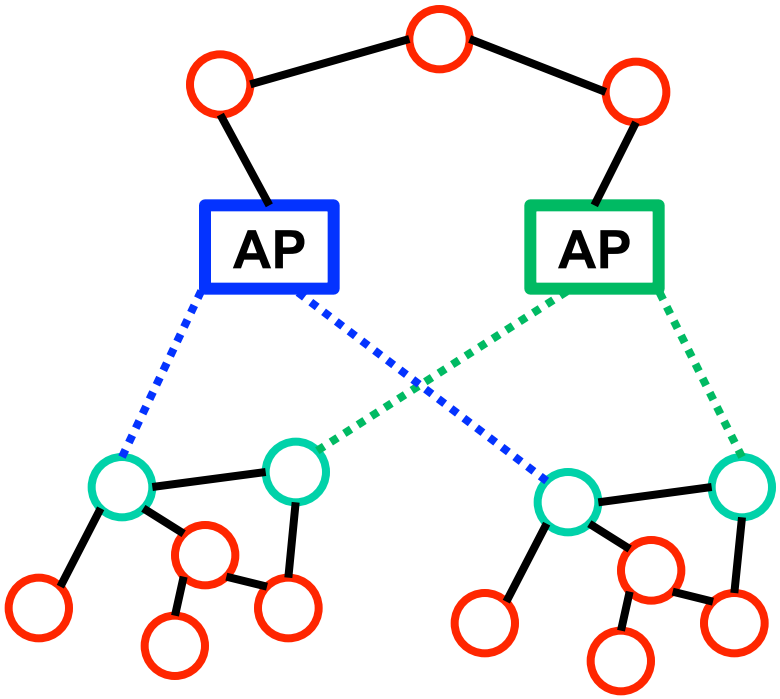
Current 802.1 / 802.11 activity

- At the July IEEE 802 plenary in San Diego, 802.1 and 802.11 both passed similarly worded motions to start parallel Study Groups. The 802.1 motion:

- **802.1 requests approval by IEEE 802 LMSC to form a Study Group on enabling the use of 802.11 (including consideration of infrastructure BSS, PBSS, and IBSS associations) as general transit links capable of supporting 802.1 bridging, with the intent of creating a PAR and five criteria.**

Example network

- This diagram helped to justify this work to 802.1 and 802.11. It shows an industrial application, and is from: http://www.ieee802.org/1/files/public/docs2012/new-nfinn-wired-wireless-bridges-0612-v02.pdf



Backbone

Access Point stations

Wireless "links"

Non-AP Station/switches

Semi-mobile wired networks (robots)

New PAR and Five Criteria

- IEEE 802.1 has approved a PAR and Five Criteria for submission to the 802 ExCom at the November plenary.

Amends: Standard 802.1Q-2011

Number: P802.1Qbz

Title:

IEEE Standard for Local and Metropolitan Area Networks---Virtual Bridged Local Area Networks - Amendment: Enhancements to Bridging of 802.11 Media

New PAR and Five Criteria

- **Scope:**

  This standard specifies protocols, procedures, and managed objects to allow 802.11 media to provide internal connections within bridged networks, as well as access to bridged networks.
- **Need:**

  There are a large number of new products, including home entertainment systems and industrial control equipment, that have both an IEEE 802.11 wireless station capability and a wired IEEE 802.3 Ethernet capability. IEEE 802.11 has initiated work on 802.11 media operating in the Gbit/sec range. These developments raise a demand for supporting IEEE 802.11 media to the same level as other media supported by bridges, as a medium internal to the network, as well as a medium offering access to the network.

Shortest Path Bridging

- 802.1 is no longer just spanning trees.
- IEEE Std 802.1aq-2012 “Shortest Path Bridging” has been published.
- 802.1aq uses the same Intermediate System – Intermediate System (IS-IS) that is used by routers in order to create Layer 2 paths.
- **802.1aq is a Layer 2 Routing standard.**

A story:

- In 2005, ITU-T embarked on an effort to develop Operations, Administration, and Maintenance (OAM) capability for switched Ethernet services.
  - ITU-T had a tremendous history of successful development of OAM capabilities over many media;
  - **All** of which media were **point-to-point**; and
  - **None** of which were **Ethernet**.
- At the same time, IEEE 802.1 had been developing, for some time, Service Provider Ethernet services for both point-to-point and shared-media (multipoint-to-multipoint) services.
  - 802.1 had **no OAM experience**, but needed OAM features.

IEEE 802.1ag and ITU-T Y.1731

- The result was a pair of closely related documents.
- ITU-T SG13 and 802.1 had at least four joint members who attended most of both groups' meetings.
- The editors of the two documents, in particular, attended all meetings of both groups, and worked in concert to share text and diagrams and ensure that the documents were compatible.
- Both groups strove to (and almost succeeded in) using the same terminology, and even where the terms differed, the concepts were identical.
- The result was a very successful pair of standards.

New 802.1 / 802.11 work

- Similarly, we fully expect that the joint 802.1 / 802.11 work will result in a pair of standards that, together, will define a successful means for integrating 802.11 inside a bridged network.

CHOICES FOR 802.15

Possible approaches

- Our group knows all about networking, and we can figure out low-power wireless, so we should write a standard.
- Our group knows all about low-power wireless, and we can figure out networking, so we should write a standard.
- Our group knows all about networking, and we have a guy who says he knows all about low-power wireless, so we should write a standard.
- Our group knows all about low-power wireless, and we have a guy who says he knows all about networking, so we should write a standard.

Two way-better approaches

- Our group knows all about low-power wireless, and that group knows all about networking, so we should work together to develop a standard for low-power wireless networking.
- Our group knows all about networking, and that group knows all about low-power wireless, so we should work together to develop a standard for low-power wireless networking.

Bridging or routing?

- IEEE 802.1 does not, at present, bridge devices with 64-bit addresses. But 15.4 short addresses are very adaptable bridging via 48-bit addresses.
- 802.11 does have some of the low-power characteristics of 802.15, though not as extensive.
- 802.1 is working with 802.11, now.
- 802.1 does “Layer 2 Routing”.

- IETF has activities in this area at present.
- IETF has a history of cooperation, as well as competition, with IEEE 802, and cooperation is improving.
- Routing is a proven method for connecting 48-bit and 64-bit technologies.