Wired-Wireless Bridging

Proposal for PAR and 5 Criteria

Version 1

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Project Authorization Request

Title

- PAR for an amendment to an existing Standard 802.1Q-2011
- P802.1Qbw (or Qbx, etc., as appropriate)
- IEEE Standard for Local and Metropolitan Area Networks---Virtual Bridged Local Area Networks - Amendment: Wired-Wireless Bridging

Scope

- This standard specifies protocols, procedures, and managed objects to support the use of IEEE 802.11 media in VLAN bridged networks.

Purpose

- This standard supports the implementation of VLAN Bridges that have, among their ports to bridged LANs, IEEE 802.11 stations. These stations can be Access Point or non-Access Point stations.

Need

- There are a large number of new products, including televisions, digital video recorders, and game stations, 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 VLAN Bridges, as a medium internal to the network, rather than as a medium offering access to the network.

Stakeholders

- Vendors, users, administrators, designers, customers, and owners of mixed wireless and wired IEEE 802 networks.

Other standards with a similar scope

- The IEEE 802.11s Mesh Network standards attempts to address this need. However, it defines only the wireless portion of a network. A mixed network of wired and wireless connections suffers in this model because a) the wired and wireless portions of the network are opaque to each other; b) the Mesh Network makes demands upon the VLAN Bridged network that it cannot meet; c) the frequent improvements made in 802.1 VLAN Bridged networks are unavailable to the wireless portions of the whole.

Five Criteria

Broad Market Potential

A standards project authorized by IEEE 802 shall have a broad market potential. Specifically, it shall have the potential for:

- Broad sets of applicability.

  Home entertainment devices are acquiring wired and wireless interfaces. The ability to obtain a reliable plug-and-play bridged network by making arbitrary connections would greatly help to accelerate the acceptance of Ethernet as the primary means of transmitting video and audio signals.

- Multiple vendors and numerous users.

  A great many vendors offer devices with both wired and wireless capability.

- Balanced costs (LAN versus attached stations).

  This project reduces the cost of ownership of devices with wired and wireless connectivity by reducing the overall network complexity in the absence of a bridging solution.

Compatibility

- IEEE 802 defines a family of standards. All standards shall be in conformance with the IEEE 802.1 Architecture, Management, and Interworking documents as follows: 802. Overview and Architecture, 802.1D, 802.1Q, and parts of 802.1f. If any variances in conformance emerge, they shall be thoroughly disclosed and reviewed with 802.

  This PAR is for an amendment to 802.1Q, which defines VLAN bridging, and will be internally consistent.

- Each standard in the IEEE 802 family of standards shall include a definition of managed objects that are compatible with systems management standards.

  Such a definition will be included.

Distinct Identity

Each IEEE 802 standard shall have a distinct identity. To achieve this, each authorized project shall be:

- Substantially different from other IEEE 802 standards.

  There are no IEEE 802 standards that integrate wired and wireless media on an equal basis. The only similar standard has found little market acceptance.

- One unique solution per problem (not two solutions to a problem).

  There are no IEEE 802 standards that integrate wired and wireless media on an equal basis.

- Easy for the document reader to select the relevant specification.

  This project will amend the only IEEE 802 standard defining VLAN Bridges.

Technical Feasibility

For a project to be authorized, it shall be able to show its technical feasibility. At a minimum, the proposed project shall show:

- Demonstrated system feasibility.

  Multiple vendors have implemented similar proprietary solutions.

- Proven technology, reasonable testing.

  IEEE 802.1Q is one of the most widely implemented standards. Applying it to 802.11 media is straightforward.

- Confidence in reliability.

  The reduced reliability of wireless media compared to wired media is well-known, but mechanisms will be introduced, if necessary, to protect the overall network integrity from frame loss over wireless media.

Economic Feasibility

For a project to be authorized, it shall be able to show economic feasibility (so far as can reasonably be estimated) for its intended applications. At a minimum, the proposed project shall show:

- Known cost factors, reliable data.

  This project introduces no hardware costs beyond the minimal and well-known resources consumed by an additional software protocol whose requirements are firmly bounded.

- Reasonable cost for performance.

  The cost of upgrading software and configuring the protocol is reasonable, given the improvement in connectivity and forwarding efficiency gained.

- Consideration of installation costs.

  The cost of installing enhanced software, in exchange for improved network performance, is familiar to vendors and users of bridged networks.