Solutions for P802.1Qbz / P802.11ak: Tagging

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Version 1

Introduction

- This presentation is available at:
  http://www.ieee802.org/1/files/public/docs2012/bz-nfinn-soln-tagging-0113-v01.pdf

- It attempts to answer one of the questions raised by:
  http://www.ieee802.org/1/files/public/docs2012/bz-nfinn-pt-to-pt-problem-list-1112-v02.pdf

Quick problem statement

- According to 802.1, all tags on LLC media are added by inserting a SNAP-encoded tag ahead of the existing LLC MSDU.

- A VLAN tag, for example, adds 10 bytes to the frame (8-byte SNAP encoding + 2 byte payload).

- Adding N tags to an LLC frame adds 6*N bytes of SNAP, compared to the Length/Type format. These extra bytes are bad for wireless media.

- Furthermore, when bridging between LLC and Type/Length media, **the bridge has to understand every possible tag**, so that it can change the first Type/Length to LLC or SNAP, and change all succeeding SNAPs (except the one encoding the data [which one is that???]) to Length/Type.

- This means that **no new tags can be developed without revising all LLC/Type translating bridges**.

Once a SNAP, always an EtherType

- We could change all documents, particularly 802.1Q, to say the following when adding a tag:
  - ➢ If this is an LLC medium, convert the MSDU to Length/Type encoding, then add the LLC-encoded tag to the beginning of the frame.
  - ➢ If the medium is not LLC, simply add the tag.

- And when removing a tag:
  - ➢ Remove the tag. If this is not an LLC medium, you are finished.
  - ➢ If this is an LLC medium, convert the Length/Type encoded MSDU to LLC encoding.

- On an 802.3-style medium, when adding a SNAP-encoded tag (non-0 OUI) to a Length-encoded (LLC) MSDU, the length field of the tag encompasses the entire frame. (A possible scenario – vendor-specific tags can be constructed in this manner.)

Encapsulating long LLC frames

- These rules raise, in theory, one issue that we **may** wish to address, but could ignore: it is currently not possible to carry an LLC non-SNAP frame over 802.3 if the frame is larger than 1535 bytes.

- Two ways of fixing this:
  - Define a new EtherType that means, "The next three bytes start an LLC frame".
  - Redefine the Length/Type field, saying, "A length of 1535 means that the frame is 1535 bytes or longer."

What this solution means

- After the first LLC, all media are Length/Type encoded.

- This certainly changes IEEE 802.1Q, and may change other documents.

- **If** any Wi-Fi devices currently in use follow the rule used by 802.5 Token Ring media and defined now in 802.1Q-2011, and encode a VLAN tag over Wi-Fi as {AA-AA-03, 00-00-00, Tag EtherType, tag value, LLC, SNAP or data}, then we have a **compatibility problem**. A device expecting one format (this one or the one proposed) will be completely confused if it receives a frame in the other format.