Wireless and Wired Interoperability: Use Cases

IEEE 802 standards needed

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In a home or small studio, there may be many Ethernet-like links: 802.3, 802.11, MoCA, Ether/DSL, etc.

You expect wired stacks connected via wireless.

To ensure connectivity, every device with multiple ports is an **802.1 bridge**, and **stations are bridges, too!**
Example: WiFi as Just Another Medium

- Consider a possible industrial control network:

- Either Link Aggregation or SPB-V bridging technologies can make this a single MAC Layer network.

![Diagram showing network components including Backbone network, Access Points, Wireless "links", Non-AP Station/switches, Semi-mobile wired networks, and possible standards like IEEE 802.1AX-REV? and SPB-V?](image-url)
WiFi is not at the edge of the network!

- 802.11ac, gigabit WiFi, makes this even more imperative. **A Gb/s link is not always at the edge of the network!**

- Don’t build layers of ad-hoc solutions! Simply make these devices ordinary switches.

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**Diagram:**

- **.11ac Access Point**
- **1 Gb/s Wireless “links”**
- **.11g Access Points**
- **54 Mb/s Wireless “links”**
- **Wired bits of a single company in a multi-tenant building.**
WiFi is not at the edge of the network!

- As has been known for a long time, spanning tree has issues in simple networks with links of widely disparate data rates.

- This diagram illustrates the problem in the home.
WiFi is not at the edge of the network!

- But, the issue is more fundamental than “STP sucks”. **This configuration is illegal** according to the 802.11 architecture unless all three boxes are **Access Points**. (Just what an apartment building needs!)

- This absurd notion that 802.11 is always at the edge of the network has prevented any consideration of a standard means for accomplishing it, except the even-more-absurd 802.11S mesh.
WiFi is not at the edge of the network!

- There are ad hoc non-standard solutions for certain wired/wireless cases, such as when the second box does not have a wireless link.

- But, the general case of an arbitrary network of wired and wireless links has **no viable MAC Layer standard**.
So, just make each station a bridge!

- Why not just make the stations 802.1Q bridges?
- Short answer: The AP reflects my (a station’s) own broadcasts back to me, and that breaks MAC address learning.
- **802.11 and 802.1 have to fix this!**
  - **Fix 1:** Bridges use the 802.11N headers to suppress their own reflections. (Applies to any protocol.)
  - **Fix 2:** Use host MAC address routing instead of learning. (SPB-V can do this.)