# P802.1Qbz + P802.11ak Proposal for Division of Work

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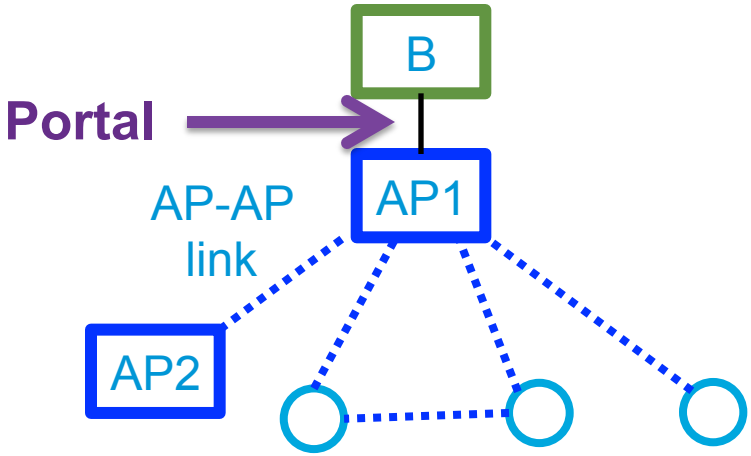
# Note

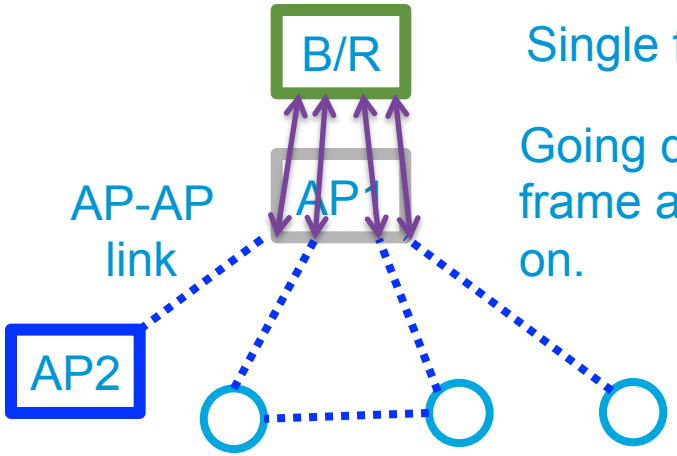
- This document is also available on the 802.11 document system (IEEE Mentor) as document 11-13/406.

# The Portal, today




- What 802.11 presents to the bridge/router is a **Portal**, which offers a single generic IEEE 802 MAC service to the Bridge (or Router).
  - This prevents the bridge/router from using the individual links optimally (for accurate forwarding), because the **bridge cannot access individual links**.
  - The Portal **does not reflect transmitted frames back to the bridge**. This is good, because otherwise, bridges cannot learn source addresses.
- Each non-AP station presents each of its multiple wireless associations as an **independent generic instance** of the MAC service.
  - That's just what we want, but the station also reflects back any multicasts or broadcasts to the upper layers, which **breaks source address learning**.

# What P802.11ak can provide




Single frames come up the stack.

Going down, bridge presents a single frame and a vector of ports to send it on.

- **New:** 802.11 presents to the bridge/router a **bundle of MAC service instances**, allow the bridge to send a frame to any combination of ports.
  - As is true today, the MACs **do not reflect transmitted frames**.
  - (Actually, a controlled and an uncontrolled port are provided for each.)
- As is true today, each non-AP station presents each of its multiple wireless associations as an **independent instance** of the MAC service.
  - **New:** he non-AP station **does not reflect** any frames back to the upper layers.

# Distribution System

- For the purposes of data forwarding (the “controlled”, or encrypted traffic), a Station attached to an AP, whether it is itself a bridge or not, or an AP or not, is attached **either** to the **Distribution System**, or is attached to a **bridge (or router)** via a link bundle, but **not** to **both**.
  - As long as this either/or condition is met, the Portal can still be implemented by the DS, and the bridges (or routers) can use it.
  - This does not eliminate or obsolete the DS, but the bundle of point-to-point links definitely do provide an alternative for connecting the stations to the wired world such that the data bypasses the DS.

# Summary of P802.1Qbz and P802.11ak changes

- **11ak**: Make a wired/wireless connection at a non-AP station legal.
- **11ak**: Do not reflect frames back to a non-AP station's upper layers (bridge, router, or host).
- **11ak**: Present a bundle of point-to-point interfaces to the upper layers (bridge, router, or host). Upper layers can offer a single frame with a port vector. AP optimizes multicast transmission or not, at its pleasure.
- **1Qbz** and **11ak**: When adding a tag to an LLC MSDU, change the MSDU to a Type/Length encoding, and then add the LLC-formatted tag. Similarly, expand things back out when removing tags.
- **11ak** or **1Qbz**: Define how to pick the "cost" of a point-to-point wireless link that is really not fixed, or even well-defined.
- **11ak** or **1Qbz**: Define basic model for heuristics to decide whether a (potentially flaky) wireless link is or is not visible in the network.

# What does this mean for implementers?

- The use cases for an AP **not** at the edge of the network, though very real, are not yet common.
- The use cases for a VLAN-aware or bridging non-AP station are more numerous. This is a common case, today, but there are several, non-interoperable ways to build it.
- The cost of implementing 802.11ak in an AP core or a non-AP station NIC. which enables them to support a bridge or router more efficiently, is small compared to the cost of the bridging or routing function, itself.
- So, I would expect 802.11ak to be widely implemented, even if a combined bridge/AP is an extra-cost feature.
- **But, we will now have the opportunity to apply every bit of IEEE, IETF, ITU-T, and other Ethernet networking technology to the Wi-Fi world, as well as the wired world.**

Thank you.