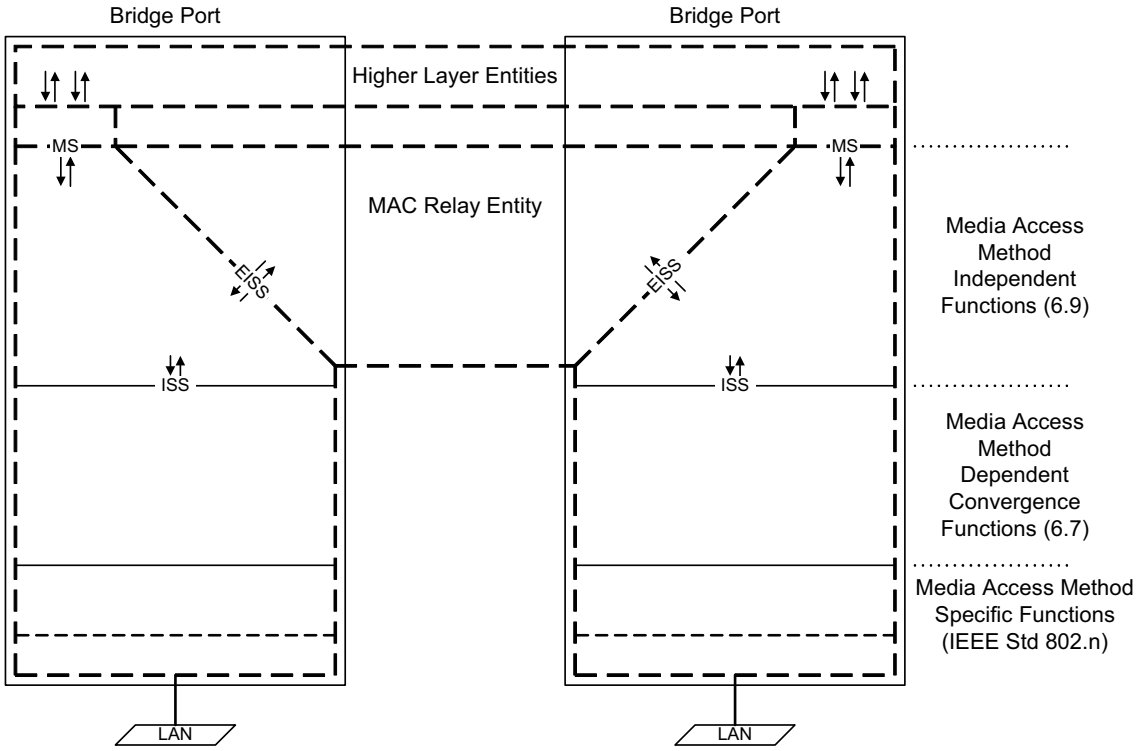
Service mapping between the ISS and 802.11

Norman Finn
Cisco Systems

Version 1, August 1, 2013

The Virtual Bridge Architecture

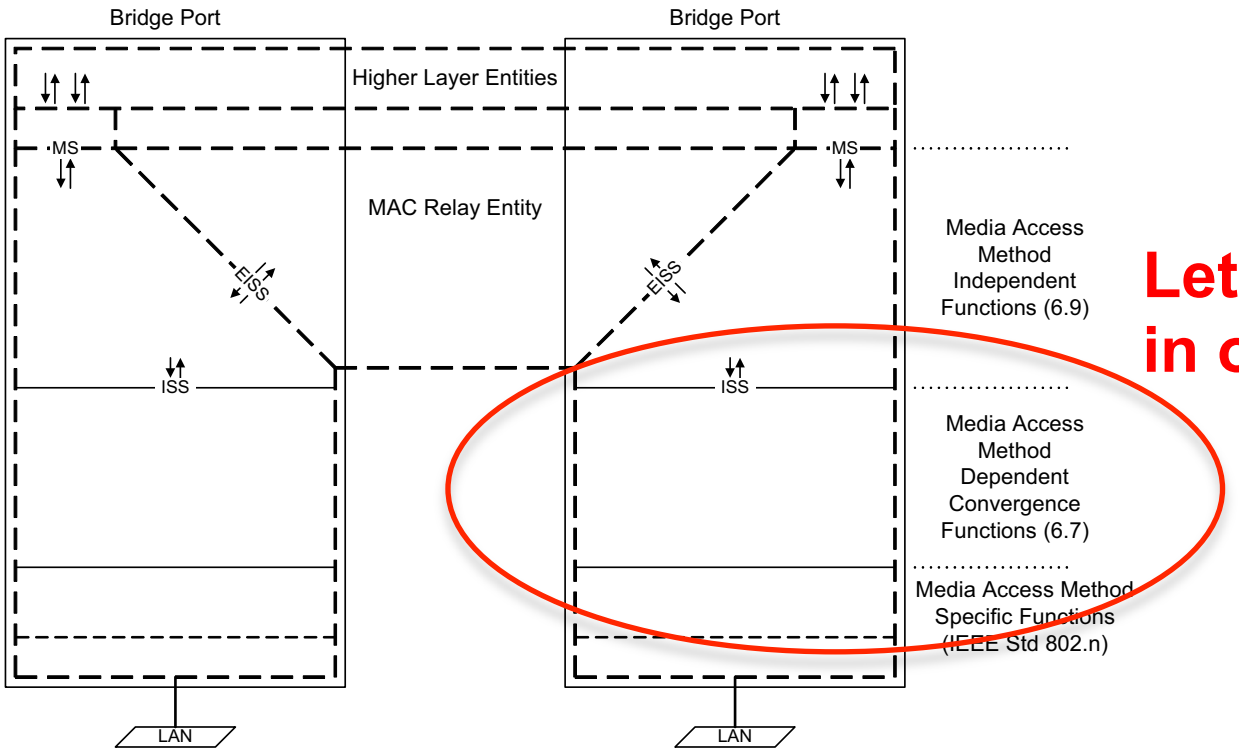


NOTE—The notation "IEEE Std 802.n" in this figure indicates that the specifications for these functions can be found in the relevant standard for the media access method concerned; for example, n would be 3 (IEEE Std 802.3) in the case of Ethernet.

Figure 8-2—VLAN-aware Bridge architecture

- IEEE Std 802.1Q-2011

The Virtual Bridge Architecture



Let's zoom in on this

NOTE—The notation "IEEE Std 802.n" in this figure indicates that the specifications for these functions can be found in the relevant standard for the media access method concerned; for example, n would be 3 (IEEE Std 802.3) in the case of Ethernet.

Figure 8-2—VLAN-aware Bridge architecture

- IEEE Std 802.1Q-2011

Three methods for connecting a Bridge to 802.11 media

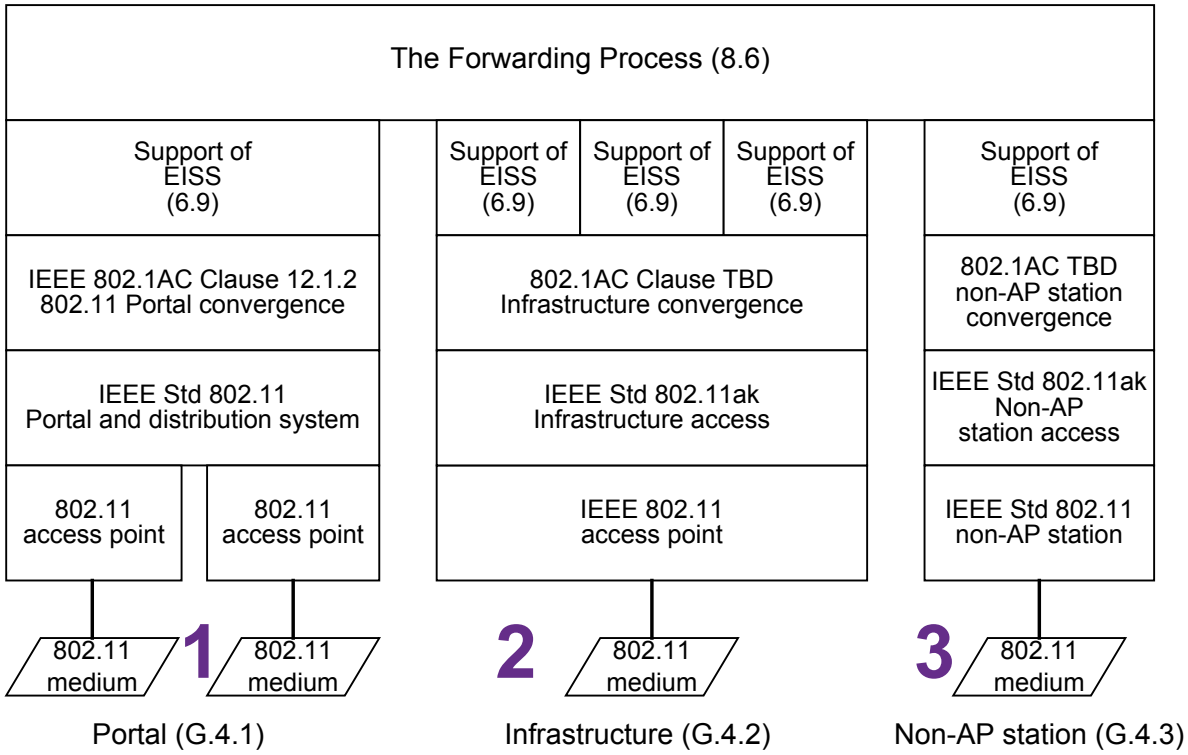


Figure G-2—Methods for Bridge access to IEEE 802.11 media

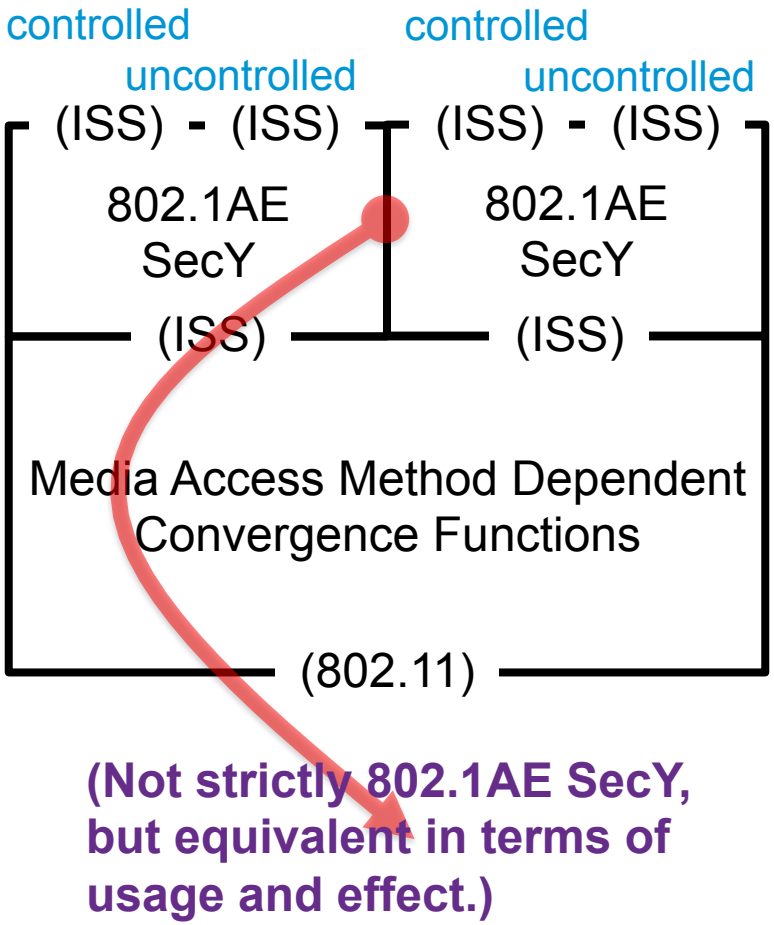
DONE **NEW** **NEW**

- P802.1Qbz Draft 1.2 (still in early Task Group balloting stage)

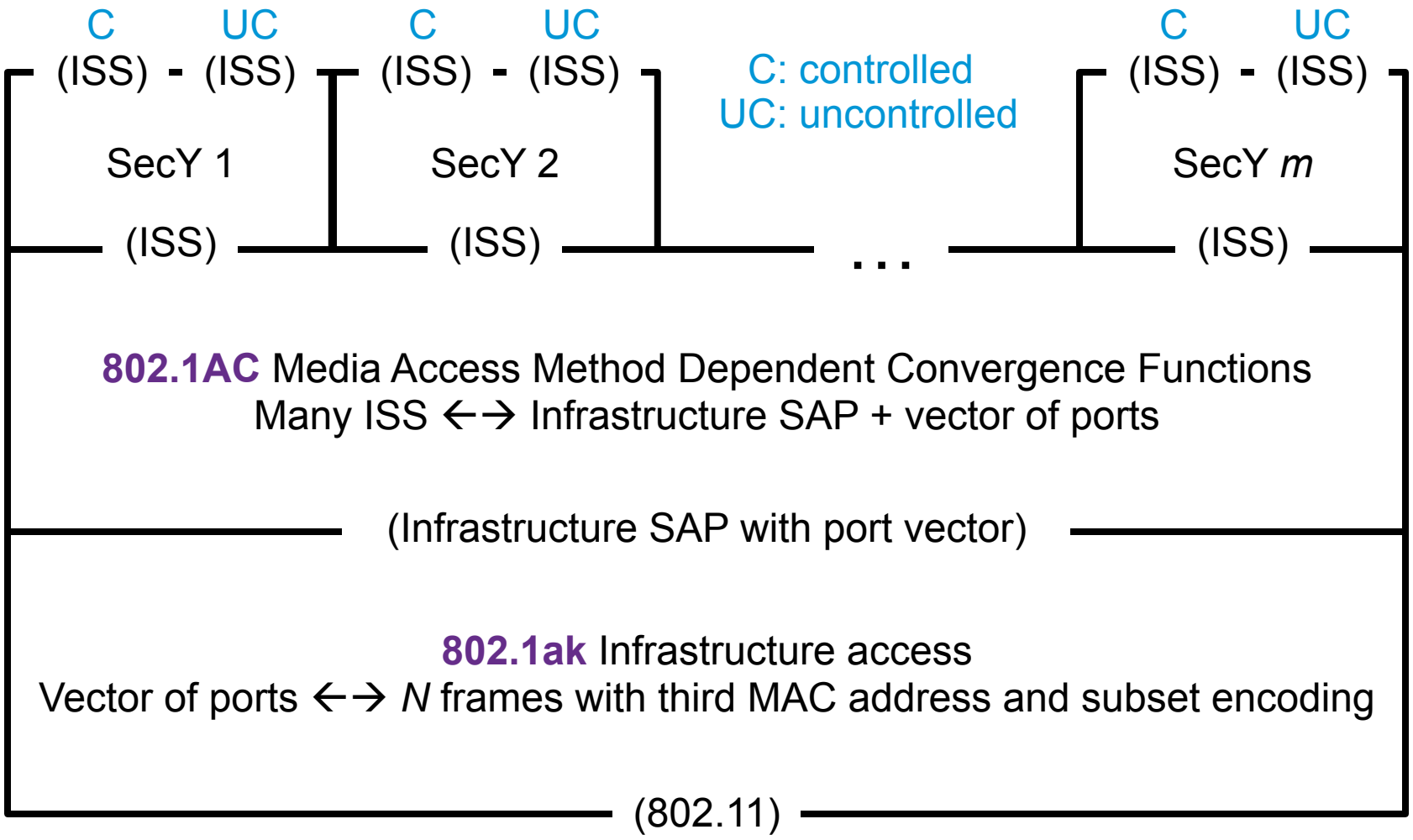
Infrastructure side

Convergence Functions for **2**: 802.11 infrastructure access

- For most media (e.g. 802.3, FDDI, MOST, or the 802.11 Portal interface) it is a relatively simple chore to map the ISS parameters to the particular medium's parameters.
- For P802.1Qbz / P802.11ak, convergence is more complex.
  - The security layer is necessarily down in 802.11, not above the ISS, because 802.11 secures fragments of frames.
  - There is one physical interface that can send a multicast, theoretically sent on multiple ports, with a single transmission.
  - This multiplexing involves the cooperation of the AP and the non-AP station; the non-AP station must decode the port selection encoded in the frame by the AP.

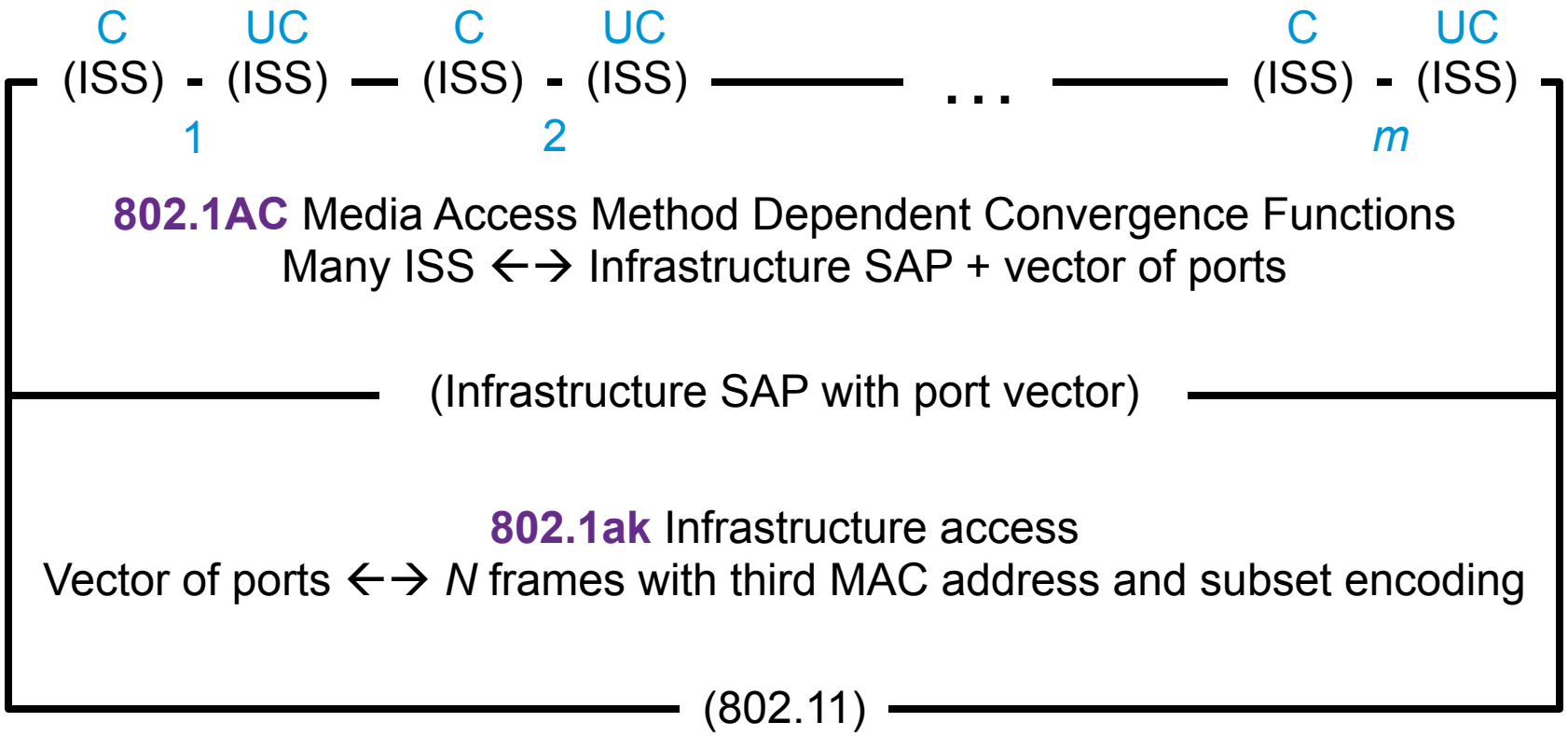


802.1Q + 802.1AC Convergence + 802.11ak infrastructure

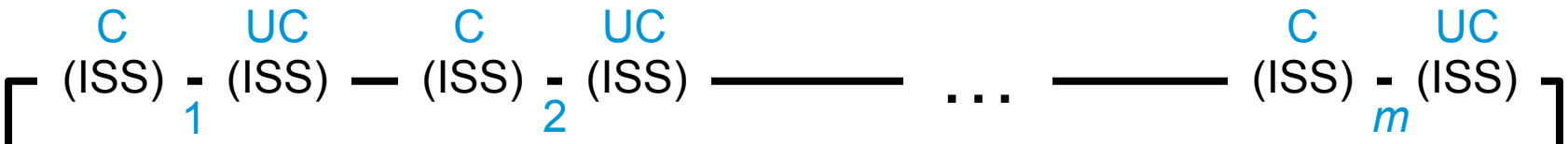


802.1Q + 802.1AC Convergence + 802.11ak infrastructure

Eliminate the SecY. Attach both controlled and uncontrolled ports to the convergence function. **(This trick goes in 802.1Qbz.)**



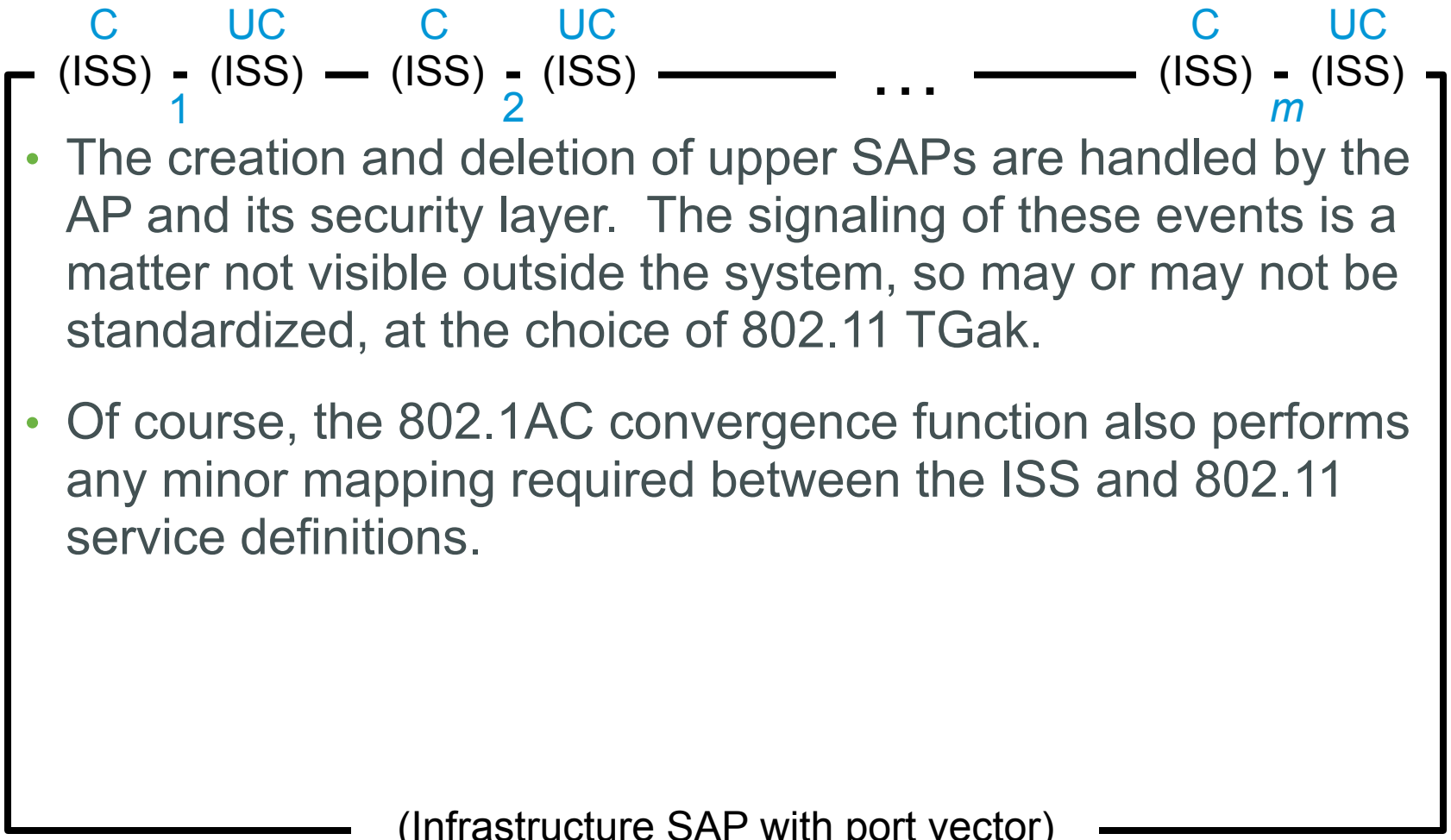
Infrastructure 802.1AC Convergence



- All of the ports associated with a given AP (or BSS, in the sense of a logical function) go through a single instance of the convergence function.
- For **.requests**: The convergence function turns some number of .requests presented "simultaneously" on some number of its upper SAPs into a single .request and a vector indicating on which SAPs it was presented.
- For **.indications**: The convergence function presents the frame on the SAP(s) indicated by the vector. (It so happens that this is always just one port.)

(Infrastructure SAP with port vector)

Infrastructure
802.1AC Convergence



- The creation and deletion of upper SAPs are handled by the AP and its security layer. The signaling of these events is a matter not visible outside the system, so may or may not be standardized, at the choice of 802.11 TGak.
- Of course, the 802.1AC convergence function also performs any minor mapping required between the ISS and 802.11 service definitions.

P802.11ak infrastructure access

(Infrastructure SAP with port vector)

- (Feel free to suggest better names for this function.)
- For **.requests**: The frame has only Destination and Source addresses. Every frame has a Source and Transmitter address both the AP's MAC address. Using the port vector, the infrastructure access function selects a Destination/ Receiver address (either a unicast to a non-AP station or a broadcast to all) and encodes the station list appropriately in the A-MSDU.
- For **.indications**: The Transmitter address and whether the frame was encrypted determine the single-bit vector passed up with the frame.

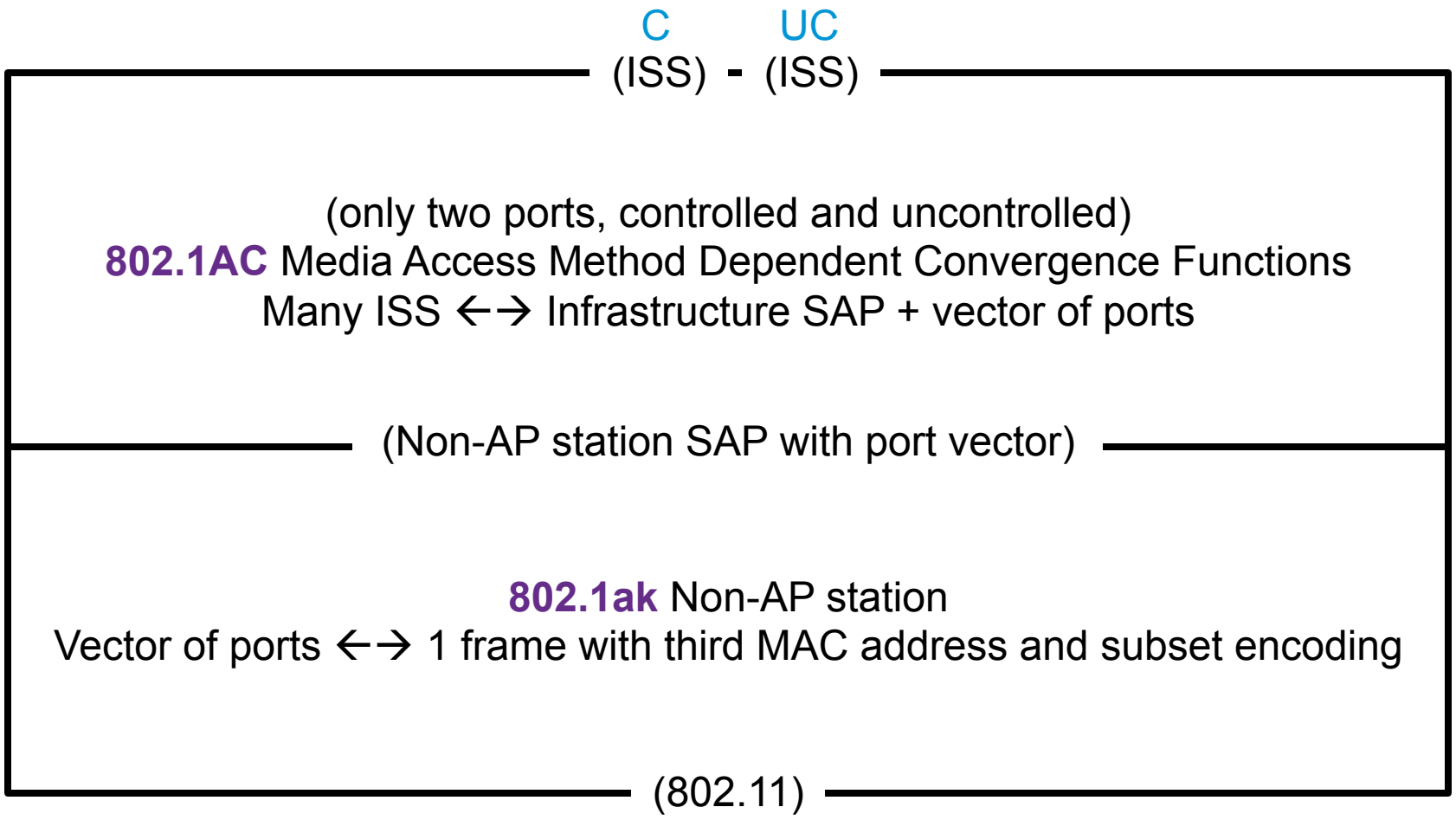
(802.11)

What about VLAN tag variances?

- As will be made clear in P802.1Qbz (and in P802.11ak, if TGak so desires), the purpose of the architecture is to specify outcomes, not internal processes.
- So, whether variances in VLAN tagging, VID mapping, or priority mapping cause a frame to be replicated above 802.1AC convergence function, or below the 802.11 infrastructure access function, is irrelevant to IEEE Std 802.1Q or to IEEE Std 802.1AC.
- If TGak chooses to add such mapping functions to the A-MSDU encoding, it will be documented in IEEE Std 802.11ak.

Non-AP station side

802.1Q + 802.1AC Convergence + 802.11ak Non-AP station



Non-AP station 802.1AC Convergence

C (ISS) - UC (ISS)

- The creation and deletion of upper SAPs are handled by the station and its security layer. The signaling of these events is a matter not visible outside the system, so may or may not be standardized, at the choice of 802.11 TGak.
- Of course, the 802.1AC convergence function also performs any minor mapping required between the ISS and 802.11 service definitions.

(Non-AP station SAP with port vector)

P802.11ak Non-AP station access

(Non-AP station SAP with port vector)

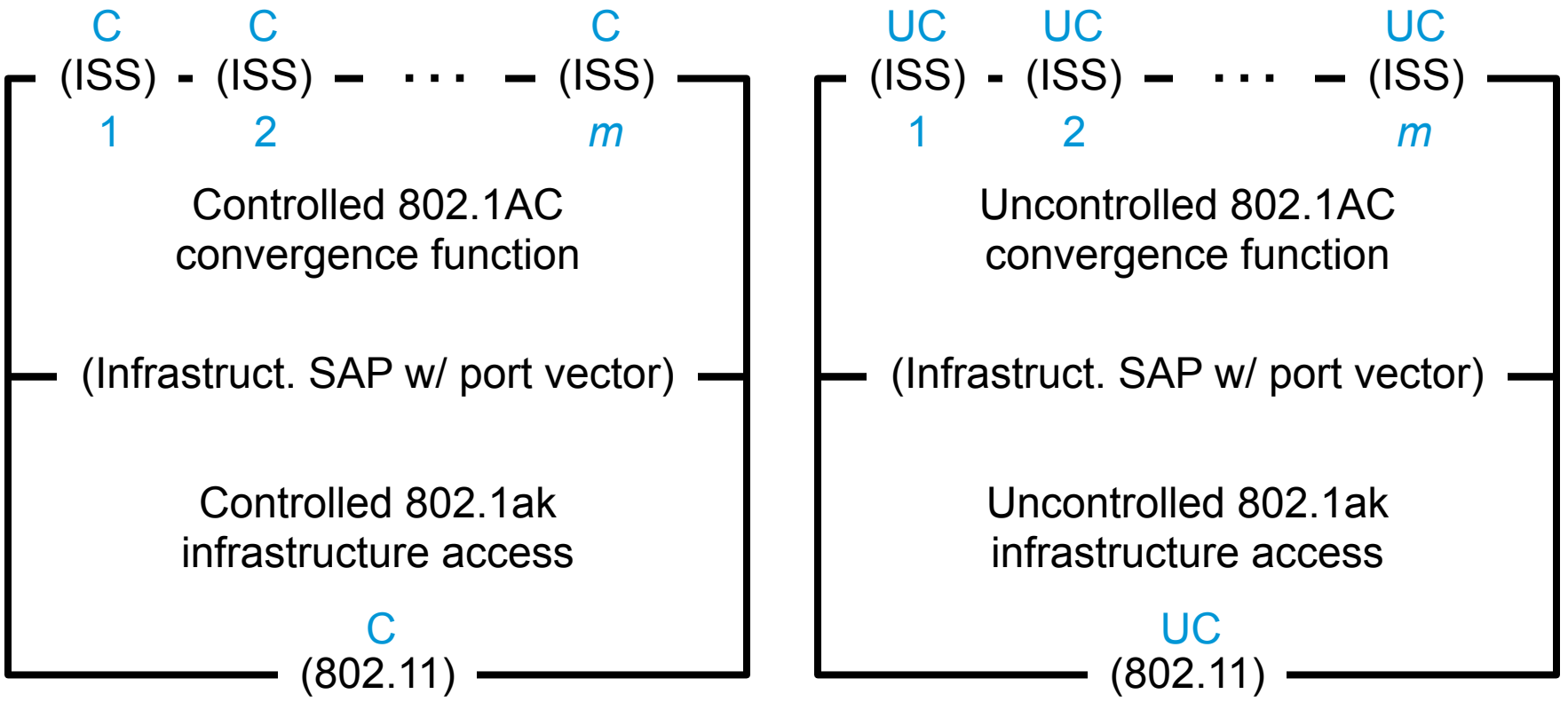
- For **.requests**: The frame has only Destination and Source addresses. The port vector simply indicates whether the frame is or is not encrypted. The outer Destination and Receiver addresses are the AP, the Source/Transmitter address the non-AP station. The A-MSDU does not carry any subset encoding.
- For **.indications**: Whether or not the frame was encrypted determines the single-bit vector passed up with the frame.

(802.11)

A final option

A final option

- If preferred by TGak, it would be just as easy to make separate controlled and uncontrolled ports at the 802.11 interface:



A final option

- Note that, because the non-AP station has only one SAP for the AP, this effectively reduces the 802.1AC non-AP station convergence function to be exactly the same as the current Portal convergence function.
- Of course, the anti-reflection part of the subset solution is still required.

Thank you.