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Hybrid-MAC Model for CAPWAP
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Abstract

The CAPWAP protocol supports two modes of operation: Split and Local MAC (medium access control), which has been described in [RFC5415].There are many functions in IEEE 802l.11 MAC layer that have not yet been clearly defined whether they belong to either the WTP (Wireless Termination Points) or the AC (Access Controller)in the Split and Local modes. Because different vendors have their own definition of these two models, depending upon the vendor many MAC layer functions continue to be mapped differently to either the WTP or AC. If there is no clear definition of split MAC and local MAC, then operators will not only need to perform vendor specific configurations in their network but will continue to experience difficulty in interoperating WTPs and ACs from different vendors.

Status of This Memo

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1. Introduction

The CAPWAP protocol supports two modes of operation: Split and Local MAC (medium access control), which has been described in [RFC5415].In Split MAC mode, all L2 wireless data and management frames are encapsulated via the CAPWAP protocol and exchanged between the AC and the WTP. The Local MAC mode of operation allows for the data frames to be either locally bridged or tunneled as 802.3 frames. The latter implies that the WTP performs the 802.11 Integration function. Unfortunately, there are many functions that have not yet been clearly defined whether they belong to either the WTP or the AC in the Split and Local modes. Because different vendors have their own definition of the two models, many MAC layer functions are mapped differently to either the WTP or the AC by different vendors. Therefore, depending upon the vendor, the operators in their deployments have to perform different configurations based on implementation of the two modes by their vendor. If there is no clear definition of split MAC and local MAC, then operators will

continue to experience difficulty in interoperating WTPs and ACs from different vendors.

2. Conventions used in this document

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL","SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC2119].

3. The difference between Local MAC and Split MAC

The main difference between Local MAC and Split MAC lies in the processing of the wireless frames. This is shown in Figure 1 where depending upon the mode, either the WTP or the AC performs the 802.11 Integration function. According to the 802.11 protocol definition, the 802.11 wireless frame is divided into three kinds of frames, including wireless control frames, wireless management frames, and wireless data frames.

Wireless control frames, such as TS, CTS, ACK, PS-POLL, etc., are processed locally by WTP in both Local MAC and Split MAC. However, wireless management frames, including Beacon, Probe, Association, Authentication, are processed differently in the Local MAC and the Split MAC. In the Local MAC, depending upon the vendor wireless management frames can be processed in the WTP or the AC. In the case of Split MAC, the real-time part of wireless frames are processed in WTP, while the non-real-time frames are processed in the AC. This is shown in Figure 1 quoted from [RFC5416]. In Split MAC mode, the wireless data frames received from a mobile device are directly encapsulated by the WTP and forwarded to the AC. The Local MAC mode of operation allows data frames to be processed locally by the WTP and then forwarded to the AC.

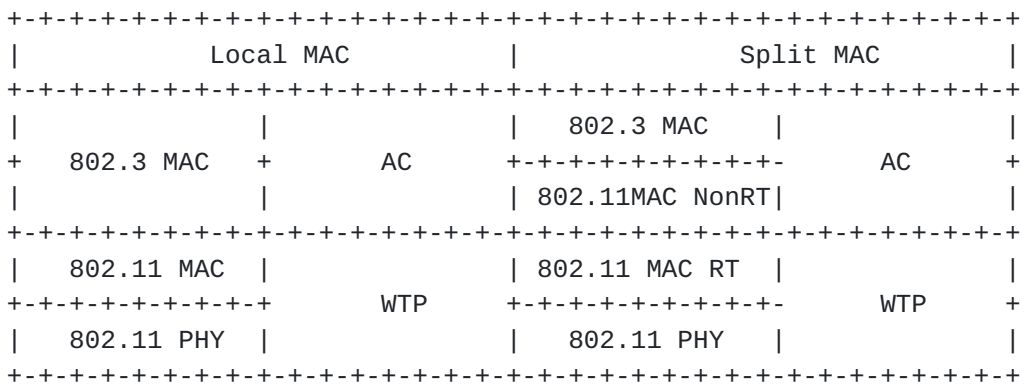


Figure 1: The comparison between Local MAC and Split MAC

4. Functions in Local MAC and Split MAC

As shown in Figure 2 quoted from [RFC5416], main functions are processed in different places in the Local MAC and Split MAC. In addition, for some functions (for example, the Frag. / Defrag. Assoc. / Disassoc / Reassoc., Etc.) the protocol does not explicitly map processing of such functions to the WTP or the AC. Therefore the location of these features becomes vendor specific and this increases the difficulty of interoperability between WTPs and ACs from different vendors.

Functions describe		Local MAC	Split MAC
Function	Distribution Service	WTP/AC	AC
	Integration Service	WTP	AC
	Beacon Generation	WTP	WTP
	Probe Response Generation	WTP	WTP
	Power Mgmt /Packet Buffering	WTP	WTP
	Fragmentation /Defragmentation	WTP	WTP/AC
	Assoc/Disassoc/Reassoc	WTP/AC	AC
	Classifying	WTP	AC

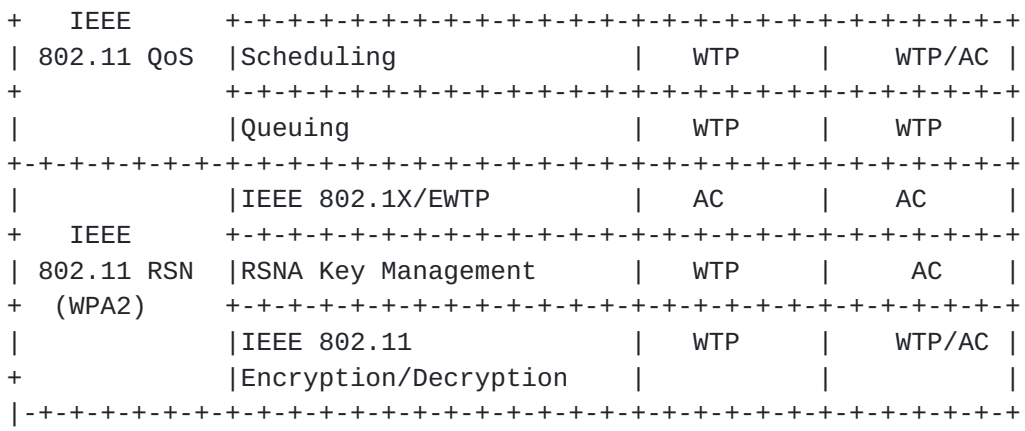
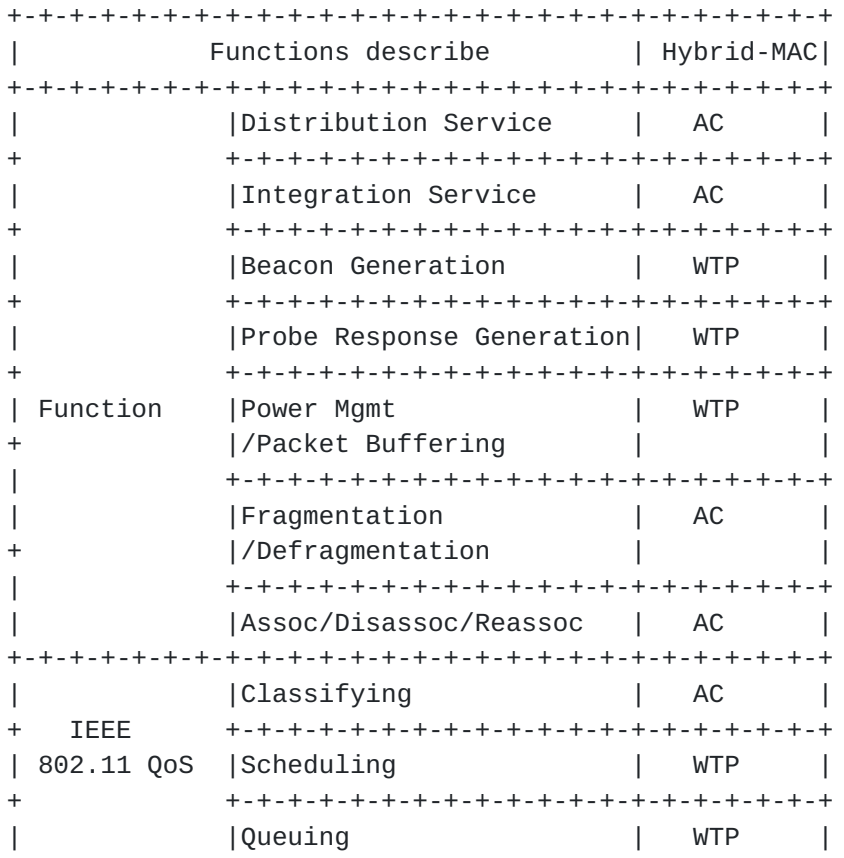


Figure 2: Functions in Local MAC and Split MAC

5. Hybrid-MAC model recommendation

As discussed above, if the functions have been clearly defined to be implemented in WTP or AC, the interoperability will be much better between different vendors products. To achieve this goal a common Hybrid-MAC model, as shown in Figure 3, is proposed.



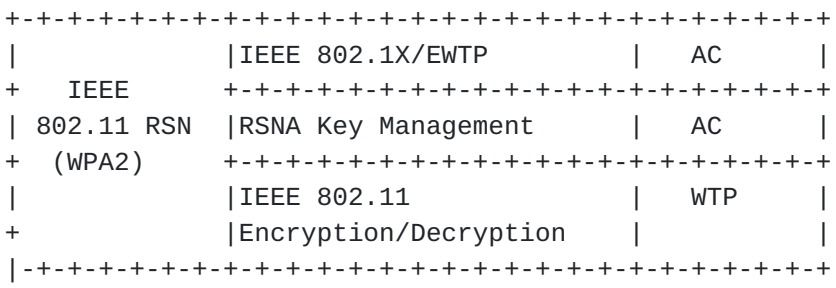
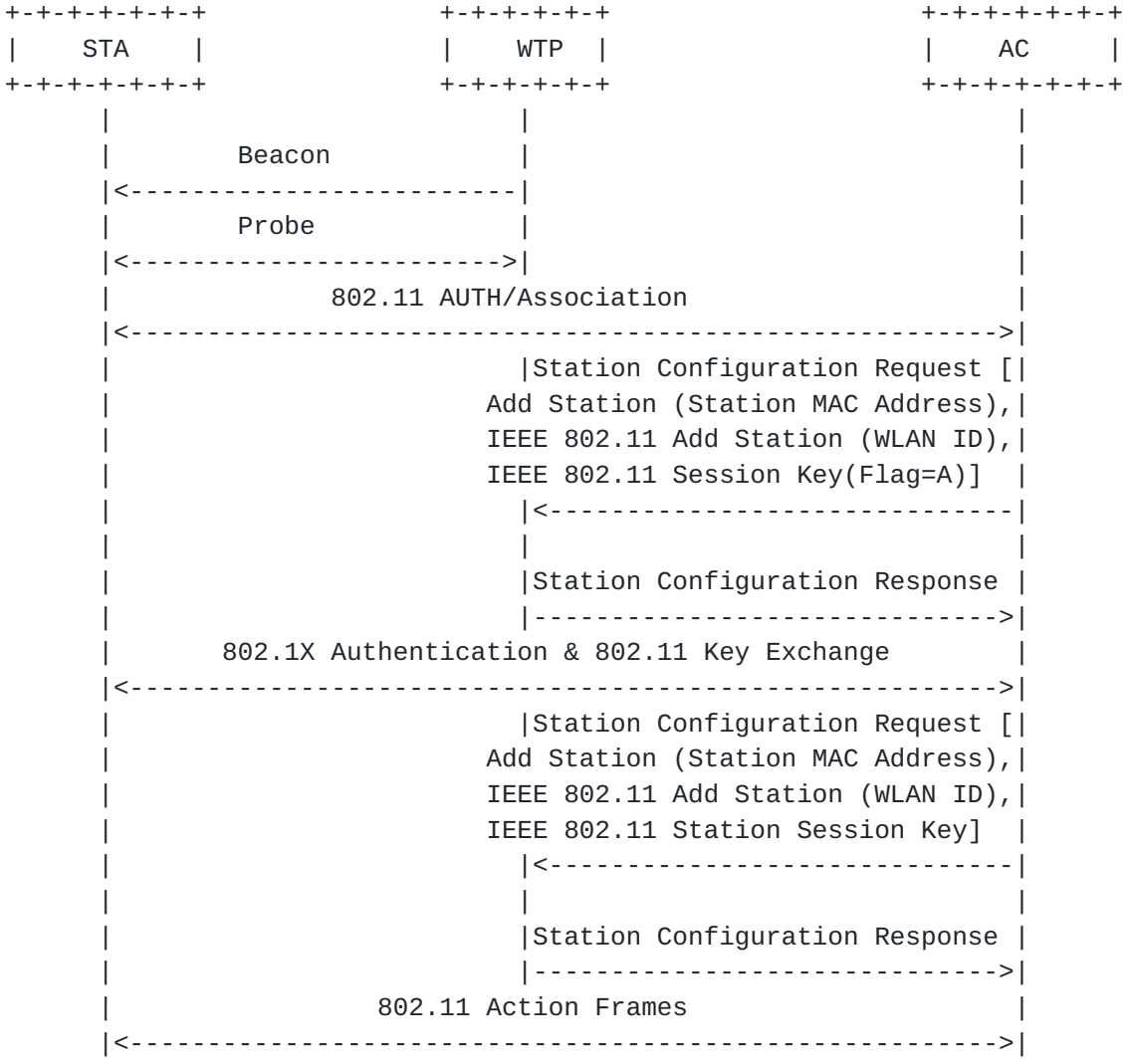


Figure 3: Functions in Hybrid MAC

6. Hybrid-MAC model Frames Exchange

An example of frame exchange using the proposed Hybrid-MAC Model shown in Figure 4.



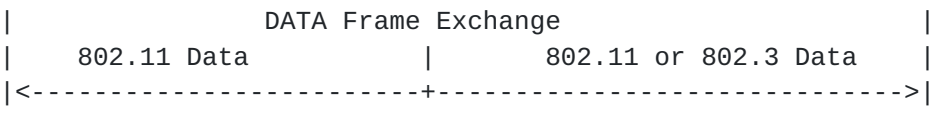


Figure 4: Hybrid-MAC model Frames Exchange

7. Security Considerations

This document doesn't specify security risk difference from [RFC5416]. It could directly refer to Security section of [RFC5416]

8. IANA Considerations

This document make no request for IANA registration.

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