IEEE P802.11
Wireless LANs

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| Proposed Resolution to CID 1548 |
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| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Michael Fischer | NXP Semiconductors | 6501 William CanonAustin, TX 78735, USA | +1-210-240-4096 | maf88@mac.com |
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Abstract

This document contains a proposed resolution to CID 1548, which pertains to the name and definition of Homogeneous ESS.

The comment is in reference to Draft IEEE P802.11REVmd\_D1.0. The proposed resolution uses the text, page, and line numbering from Draft IEEE P802.11REVmd\_D1.5.

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| 1548 | The definition given for Homogeneous ESS is almost certainly not correct (assuming the definition of Extended Service Set is correct), because the Homogeneous ESS is stated to be a "collection of BSSs within the same ESS in which every ..." Whereas the definition of ESS is "A set of one or more interconnected basic service sets (BSSs) that appears as a single BSS to the logical link control (LLC) layer at any station (STA) associated with one of those BSSs." If all BSSs in an ESS appear the same to associated stations, the criteria which are supposed to be homogeneous in the HESS are implicit for an ESS, hence the term "ESS" can be used and a form with an extra adjective is unnecessary. If there is an actual difference between an ordinary ESS and a Homogeneous ESS, the definition should make this difference clear (or the definition of ESS should be changed so that the definition of Homogeneous ESS is not redundant). Resolution of this comment may affect subsequent subclauses where Homogeneous ESS and/or HESSID is mentioned. There does not appear to be a problem with the concept of an HESSID, in the manner currently used for interworking with exteral networks, but its name may need to change if the Homogeneous ESS concept proves to be redundant. | The "correct" resolution of this conflict is neither simple nor obvious, and the ARC SC has an agenda item to discuss this very issue. It is likely that incorporation of what is decided for this matter by the ARC SC will satisfy this comment. The simplest change would be to eliminate the concept of Homogeneous ESS and to rename HESSID to something that reflects the identification of a set of available subscription services (which is how HESSID is used). However, preliminary discussion in ARC SC suggests that ESS and HESS may actually be two, distinct things, in which members of the HESS might not necessarily be in a single ESS, in which case a proper definition, and likely a new name for HESS, would be appropriate. |

**Comment**

The definition given for Homogeneous ESS is almost certainly not correct (assuming the definition of Extended Service Set is correct), because the Homogeneous ESS is stated to be a "collection of BSSs within the same ESS in which every ..."  Whereas the definition of ESS is "A set of one or more interconnected basic service sets (BSSs) that appears as a single BSS to the logical link control (LLC) layer at any station (STA) associated with one of those BSSs."  If all BSSs in an ESS appear the same to associated stations, the criteria which are supposed to be homogeneous in the HESS are implicit for an ESS, hence the term "ESS" can be used and a form with an extra adjective is unnecessary.  If there is an actual difference between an ordinary ESS and a Homogeneous ESS, the definition should make this difference clear (or the definition of ESS should be changed so that the definition of Homogeneous ESS is not redundant).  Resolution of this comment may affect subsequent subclauses where Homogeneous ESS and/or HESSID is mentioned.  There does not appear to be a problem with the concept of an HESSID, in the manner currently used for interworking with exteral networks, but its name may need to change if the Homogeneous ESS concept proves to be redundant.

**Proposed Change:**

The "correct" resolution of this conflict is neither simple nor obvious, and the ARC SC has an agenda item to discuss this very issue.  It is likely that incorporation of what is decided for this matter by the ARC SC will satisfy this comment.  The simplest change would be to eliminate the concept of Homogeneous ESS and to rename HESSID to something that reflects the identification of a set of available subscription services (which is how HESSID is used).  However, preliminary discussion in ARC SC suggests that ESS and HESS may actually be two, distinct things, in which members of the HESS might not necessarily be in a single ESS, in which case a proper definition, and likely a new name for HESS, would be appropriate.

**Discussion**

The comment appears to identify an actual problem. The definition of ESS reads “A set of one or more interconnected basic service sets (BSSs) that appears as a single BSS to the logical link control (LLC) layer at any station (STA) associated with one of those BSSs.” This has not changed since IEEE Std 802.11-1997, hence can be considered a well-established and fully-stable part of the standard at the time “homogeneous ESS” was added. Under this definition of ESS, there is no reason to have a separate term that identifies a subset of BSSs within a single ESS based on external reachability criteria.

Therefore, it is appropriate to look at how the term homogeneous ESS is used, which appears to be limited to interworking. Since there is no text in 802.11 that justifies the need for the homogeneous ESS concept, it is necessary to look elsewhere. On place where behavior dependent on a homogeneous ESS is described is in the Wi-Fi Alliance Passpoint™ specification. An example is in *Wi-Fi CERTIFIED Passpoint™ (Release 2) Deployment Guidelines*, Rev 1.1, which states (on pages 24-25):

In typical Wi-Fi deployments, if two APs have different SSIDs, they are considered to be different wireless networks. If two APs have the same SSID, they are considered to be part of the same wireless network. But because SSIDs are not globally administered, it is possible that two APs with the same SSID are, in fact, in different wireless networks. The homogeneous extended service set identifier (HESSID) element allows mobile devices to detect this condition. When two APs have the same SSID but from different wireless networks, the two networks have different HESSIDs.

This indicates that the (identify of a) homogeneous ESS serves to distinguish sets of BSSs that are, in fact, part of the same “wireless network” (a term which the cited document does not define). The need for such identification is stated to be the fact that SSIDs are not globally administered, and therefore cannot be relied upon for this purpose.

In contrast, IEEE Std 802.11 requires that all BSSs in an ESS do use the same SSID. Clause 4.3.5.2 (page 220 in REmd D1.5) states: “An ESS is the union of the infrastructure BSSs with the same SSID connected by a DS.”

Therefore, it appears that the actual problem exposed by this comment is the requirement that all BSSs in a homogeneous ESS be part of the same ESS. On that basis, the smallest change that would correct this problem would be to change the definition of homogeneous ESS to read:

**homogeneous extended service set (ESS):** A collection of basic service sets (BSSs), ~~within the same extended service set (ESS),~~ in which every subscription service provider network (SSPN) or other external network reachable at one BSS is reachable at all of them.

It is unclear, from an 802.11 point of view, why the “… or other external network …” provision is relevant, but that portion of the definition does not appear to conflict with any normative part of 802.11.

However, the ordinary expectation of a reader would be that a construct named “homogeneous ESS” is a particular, more specialized, kind of ESS. In particular, the reader is likely to assume that other characteristics of an ESS, such as the use of a common SSID, and/or the ability of a STA to reassociate between different BSSs of the ESS, are characteristics of a homogeneous ESS. However, there is nothing within 802.11 which requires these ESS characteristics to apply, and clear indication that the Wi-Fi Alliance does not expect that all ESS characteristics will be uniformly available in situations where the (identity of) the “homogeneous ESS” is significant.

Therefore, it seems appropriate to change the name of “homogeneous extended service set” (and of HESSID) within the 802.11 standard. Given that the 802.11 construct that remains in the modified definition above is the SSPN, the new name of ought to reflect this. An appropriate name would be “homogeneous provider service set”. The resulting definition would read:

**homogeneous ~~extended~~ provider service set ~~(ESS)~~:** A collection of basic service sets (BSSs), ~~within the same extended service set (ESS),~~ in which every subscription service provider network (SSPN) or other external network reachable at one BSS is reachable at all of them.

It then becomes necessary to replace the acronym of HESSID with HPSSID.

However, there are too many external documents that refer to “HESSID” to make the terminology change, as much as we would like to, because doing so would create a different form of confusion.

**Proposed Resolution**

Revised.

Change the definition of homogeneous extended service set on page 160, line 20 to read:

**homogeneous extended service set (ESS):** A collection of basic service sets (BSSs), which may or may not be within the same extended service set (ESS), in which every subscription service provider network (SSPN) or other external network reachable at one BSS is reachable at all of them.