At the meeting of the IEEE Registration Authority Committee (RAC) on 2015-11-12, during discussion of P802c/D0.1, I suggested that, upon approval of the eventual standard, it would be appropriate for the RAC to amend Reference [B8] ["Guidelines for Use Organizationally Unique Identifier (OUI) and Company ID (CID)"]. Subsequent discussion by the RAC suggested that the IEEE 802.1 Working Group should propose the amendment. Note: It appears that the two related RAC tutorials: ["Guidelines for 48-Bit Global Identifier (EUI-48)" and "Guidelines for 64-bit Global Identifier (EUI-64)"] are not affected by P802c, since they consider only global addresses.

Suggested Remedy

Include draft amendments of Reference [B8] with packages circulated in Working Group ballot and Sponsor Ballot of P802c. The amendments should target the sections entitled "Structure of OUI and CID" and "Company ID" (under "Use of Terms"). It should define the Y and Z bits and and the four \([Y,Z]\) quadrants of the local space, indicating that RA CID assignments are expected to be limited to \([Y,Z]=[0,1]\), forming the basis of ELIs. It should also summarize the usage of the SAI and AAI quadrants, and it should specify that the SAI space is administered by the RA, with part of the space allocated for assignments administered by 802. Also, it should specify that the quadrant that remains unspecified in the 802c draft \([Y,Z]=[1,0]\) is reserved by the RA (not by 802).

Response

ACCEPT IN PRINCIPLE.

Include draft amendment of Reference [B8] with packages circulated in Working Group ballot and Sponsor Ballot of P802c. The amendments should target the sections entitled "Structure of OUI and CID" and "Company ID" (under "Use of Terms"). It should define the Y and Z bits and and the four \([Y,Z]\) quadrants of the local space, indicating that RA CID assignments are expected to be limited to \([Y,Z]=[0,1]\), forming the basis of ELIs. It should also summarize the usage of the SAI and AAI quadrants per the option described in P802c, and it should specify that the SAI space is administered by the RA, with part of the space allocated for assignments administered by 802. Also, it should specify that the quadrant that remains unspecified in the 802c draft \([Y,Z]=[1,0]\) is reserved by the RA (not by 802).

IEEE 802-2014 has a note that states "MA-L, MA-M, and MA-S assignments do not apply to local MAC addresses." Clause 8.4.3 does seem to change this statement in that an ELI uses an MA-L/OUI to be used as part of a local address. But isn't the statement still true for MA-M and MA-S? (The latter part of the Note referring the reader to the IEEE RA web site is obviously superceded by 802c and should not be carried forward.)

Suggested Remedy

Add a note or couple of sentences describing the relationship of MA-L, MA-M, and MA-S to local addresses.

Response

REJECT.

MA-L, MA-M, and MA-S assignments are applicable to universal addresses but do not apply to local addresses. As detailed in the draft, ELI is based on a CID, not on an OUI.

The draft has deleted the note.
This amendment concentrates on address assignment protocols and ignores the fact that a local administrator may wish to assign local addresses, and indeed that there can be multiple administrators (certainly if you count IEEE standards and the RAC). MAC Address assignment is (most regrettably) being moved inexorably in the direction of greater complexity and confusion. Since the AAI space will inevitably be completely consumed by randomized allocation procedures in support of privacy, and the design (and in some cases the use) of these procedures will be under vendor control and/or equipment user control and not the control of any local network administrator, this amendment effectively proposes removal of local administrative control over address assignment - unless each local administrator applies for a CID (which would be a very bad idea if it took hold, since having each end user organization - or even end user site location - have a CID could rapidly exhaust the whole CID space).

**Suggested Remedy**

Ensure that there is a space available for address assignment by local administrator that is separate from the proposed AAI space, preferably by removing the CID provisions and returning that space to local network administrator control (with some guidelines in space partitioning where the local network has multiple administrators).

**Response**

**ACCEPT IN PRINCIPLE**

Specify a block of CIDs for pure local administration, and request that the RAC reserve that block. That provides 16.7M addresses, per CID, for the local administrator, each of which will avoid conflict with other protocol-assigned addresses in the spaces specified in the standard. That should be enough and would eliminate the need for each administrator to get a unique CID. Ultimately, though, the administrator would need to guard against ingress of frames with arbitrary, non-administered local addresses, regardless of the administered space.

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**Response**

**ACCEPT IN PRINCIPLE**

Clay Bennett

Clarify, in 8.4.1, that the local administrator can assign addresses anywhere in the local space. Add to 8.4.1 a sentence introducing an optional Structured Local Address Plan. Add, as 8.4.3, a description of the optional Structured Local Address Plan, divided into four quadrants, to help distinguish that structure from the general administrator's of the entire space. Change 8.4.3, 8.4.4, and 8.4.5 (and a new subclause describing the fourth quadrant) into subclauses under the new 8.4.3.
This clause contains a number of apparent conformance recommendations without clarifying who or what needs to be in conformance or might claim conformance.

**Suggested Remedy**
Clarify the following: (a) the standard makes recommendations to be followed by a local administrator where the responsibility for address administration is to be divided (b) allows for a claims of conformance in respect of various address administration protocols and procedures, specifically: (1) a claim that an address administration protocol (or its implementation) uses only the space identified by CID within the ELI space [requirement on this claim is to provide a way that the local administrator can select which CID to use/permit]; (2) a claim that the address administration protocol allocates only addresses within the SAI space (3) a claim that the address administration protocol uses only addresses within the AAI space.

**Response**
ACCEPT IN PRINCIPLE.
See resolution of Comment #32.

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IEEE Std 802 lacks a conformance clause and a PICS and even a description of conformance terminology. Yet it would seem that the interpretation and force of some of the statements in this amendments depends on understanding that terminology. It is not a reasonable assumption that the reader will be familiar with the IEEE standards manual and its default terminology, as that differs from use in other standards bodies.

**Suggested Remedy**
Add a requirements terminology clause. Suitable boiler plate text can be found in IEEE 802.1Q-2014 (start first sentence with "Requirements placed ", leave out the NOTE, the PCS discussion unless a PICS is to be included, and the very last sentence about "allow") amongst other places.

**Response**
ACCEPT IN PRINCIPLE.
Normative language is specified in IEEE-SA Style Manual. Underlying standard (IEEE Std 802) already uses normative language without such definitions. Should be considered at the next revision. Normative language in the amendment will be carefully considered.

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This statement directly contradicts pg 5 line 10.

**Suggested Remedy**
Change "SAI" to "AAI".

**Response**
ACCEPT.

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This would seem to ban local address assignment by YANG/NETCONF unless an arbitrary restriction is imposed.

Suggested Remedy
Remove the restriction that a protocols assignment has to be restricted to one of the address pools. This can be a recommendation for certain types of protocol, but a blanket statement implies a constraint on local administrators that is unreasonable.

ACCEPT IN PRINCIPLE.

The restriction in the draft is limited to "LANs in which local MAC addresses are assigned by multiple address assignment protocols."

Clarify this to reflect the language inserted per Comment #28, indicating that this applies to assignment using the Structured Local Addressing Plan.

What does this "local administrator may" mean. Does it mean "without the benefit of an address protocol". What does it add to the conformance requirements in the Std 802. A local administrator is already permitted to do this.

Suggested Remedy
Use "can" instead of may if this statement is only reiterating an existing provision of the standard. Clarify what it actually means if this means "without using any protocol".

ACCEPT IN PRINCIPLE.

The summary statements with "shall" in 8.4.7 only repeat conformance requirements already stated elsewhere. This duplication is not useful.

Suggested Remedy
Use the definite statement "is" or "are" where requirements are simply repeated (either here or above) and insert a cross-reference to the one place where the normative requirement is made (i.e. where "shall" is used).

ACCEPT IN PRINCIPLE.

Remove duplicate and unnecessary "shall" statements, but retain the "shall statements" in the final subclause.
Comment Type: TR
Comment Status: A
"only ELIs, SAIs, or AAIs" is ambiguous in this context. If a protocol can assign an address that is any one of these then it can assign any local addresses. Unfortunately this might be read to mean that a protocol can assign addresses from only one of these pools, in which case it would be necessary for an administrator wanting unrestricted assignment by protocol to run three different protocols.

SuggestedRemedy: Disambiguate.

ACCEPT IN PRINCIPLE.
Remove "Address assignment protocols shall assign only ELIs, SAIs, or AAIs." Change requirements statements on ELI, SAI, and AAI into requirements statements on protocols that assign ELI, SAI, and AAI.

Comment Type: T
Comment Status: A
As the document mentions in Section 8.4.1, Uniqueness of MAC addresses is the fundamental premises of IEEE802 network operation and its breakage is fatal to the network. Until today, in order to keep the uniqueness, we depend on address assignment framework administrated by human network operators and manufacturers of network equipment, though some of switch boxes have functionalities to avoid duplication of MAC addresses. The new mechanism proposed by this section has the same assumption. IMHO, it is the time to incorporate an appropriate framework and protocol that detect and prevent duplication of MAC addresses within a network, MECHANICALLY rather than manually.
In this case, the procedure to obtain a MAC address is divided into two parts. The first part is 'assignment' and the other part is 'validation of uniqueness.' The first part is almost the same as mentioned in Section 8.4.2, however, less strict rules are allowed, for example, totally random addresses. The second part checks uniqueness of the MAC address the first part assigns. When it fails, that is, detects duplication, system goes back to the first part and repeats them.
Let me mention the technical feasibility of the protocol for 'validation of uniqueness.' We have IEEE802.1X which checks something before a host is connected to a network. It is an idea to enable this protocol to check MAC addresses. Another idea is to define a protocol to share a MAC address list by flooding data among switches if you don't like centralized servers such as authentication servers.
I am not sure that this idea is suitable for this task group because the current PAR looks to be constructed with some concrete means in mind. I, however, request to the members to discuss a protocol to assure uniqueness of MAC addresses.

SuggestedRemedy: Add the following sentences:
Instead of disjoint address pools, administrators can use a standardized protocol checking uniqueness of MAC addresses. This protocol avoid duplication of MAC addresses and assure the fundamental premises of IEEE802 network operation.

Response: ACCEPT IN PRINCIPLE.

Change "avoid duplicate assignments" to "avoid simultaneous use of duplicate addresses, per 8.4.1".
### Local MAC Address Usage

#### 1st Task Force review comments

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**Comment Type: E**  
**Comment Status: A**  
The sentence describing assignment by multiple protocols could be clearer.

**SuggestedRemedy**  
Replace the sentence beginning on line 27 with "For this reason, when multiple protocols assign local MAC addresses to devices on a LAN, each should be restricted to a disjoint subspace of the local MAC address space available on the LAN."

**Response**  
**Response Status: C**

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**Comment Type: E**  
**Comment Status: A**  
Typo (plural should be singular)

**SuggestedRemedy**  
Replace "A local MAC addresses" with "A local MAC address."

**Response**  
**Response Status: C**

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**Comment Type: E**  
**Comment Status: A**  
Typo (wrong word)

**SuggestedRemedy**  
Replace "may specific" with "may specify"

**Response**  
**Response Status: C**  
**ACCEPT.**

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**Comment Type: T**  
**Comment Status: A**  
Is it possible to take the OUI bits from an MA-L, and use them as the CID of an ELI?

**SuggestedRemedy**  
Add a NOTE to answer this question.

**Response**  
**Response Status: C**  
**ACCEPT IN PRINCIPLE.**

Add to the end of the paragraph: "Changing the X bit of an RA-assigned OUI is not authorized by the IEEE RA and does not result in a valid CID, and shall not be used as the basis of an ELI."

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**Comment Type: E**  
**Comment Status: A**  
Typo

**SuggestedRemedy**  
Replace "specific" with "specify".

**Response**  
**Response Status: C**  
**ACCEPT.**

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**Comment Type: E**  
**Comment Status: A**  
Typo

**SuggestedRemedy**  
Replace "specific" with "specify".

**Response**  
**Response Status: C**  
**ACCEPT.**
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<td>To answer implied question in Editor's note, I think that the suggested text should be added. The two NOTEs on page 23 of the base standard 802-2014 illustrate why this is important. Many standards inside and outside 802.1 use an &quot;OUI&quot; to create various code points and protocol identifiers. The G/L usage introduced by P802c amplifies the ambiguity of such usage, making the additional text relevant, needful, and within the scope of the amendment.</td>
<td>R</td>
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**Cl 8 SC 8.4.4**

Craig Gunther

Comment Type: E

Comment Status: A

Suggested Remedy:

Insert "by" or "in" in the following sentence: "...but may be specified _by_ other IEEE 802 standards."

Response Status: C

ACCEPT.

**Cl 9 SC 9**

Norm Finn

Comment Type: T

Comment Status: R

Suggested Remedy:

Replace "administrate" with "administrator."

Response Status: C

ACCEPT.

**Cl 9 SC 8.4.5**

Hal Keen

Comment Type: ER

Comment Status: A

Suggested Remedy:

Change "SAI" to "AAI".

Response Status: C

ACCEPT.

**Cl 9 SC 9**

Norm Finn

Comment Type: T

Comment Status: R

Suggested Remedy:

Add a new subclause to 9 for the use of "OUI" to create code point, as opposed to protocol identifiers, e.g., in IEEE Std 802.1AB LLDP TLVs.

Response Status: C

REJECT.

Out of scope.
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<td>Since Subclauses 1 and 2 are included in the amendment as useful placeholders. However, since they are currently without content, some readers might mistakenly believe that the intent is to delete the content of those subclauses from the base standard.</td>
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**Response Status:** O/open W/written C/closed Z/withdrawn

**Comment Status:** D/dispatched A/accepted R/rejected

**SORT ORDER:** Clause, Subclause, page, line

**TYPE:** TR/technical required ER/editorial required GR/general required T/technical E/editorial G/general