

# 802.1ah: Generation of Backbone Addresses

Version 2 (no changes other than new slide 12)

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# .1ah-d3.3 ways to generate B-DA (1)

- I-component FDB:
  - Dynamic Filtering Entries:
    - Learned association with C-MAC + S-VID
  - Static Filtering Entries:
    - Configured association with C-MAC + S-VID
  - Static VLAN Registration Entries:
    - Configured association with S-VID
- I-component Provider Instance Port:
  - Default Backbone Destination (per I-SID)
    - Used when no B-DA provided by I-component FDB
    - Default value is the broadcast address
    - Optionally configurable to a unicast or multicast address

# .1ah-d3.3 ways to generate B-DA (2)

- B-component Customer Backbone Port:
  - Optional Default Backbone MAC Address per I-SID
    - Used to translate Broadcast DA to a unicast or multicast address
    - Used for data indications only (not translated back to broadcast for data requests)
  - Optional MAC Address Translation Table
    - Table of 1:1 mapping between MAC addresses used at the EISS and MAC addresses used at the ISS.
    - For data indications, a B-DA matching an ISS address gets translated to the corresponding EISS address.
    - For data requests, a B-SA matching an EISS address gets translated to the corresponding ISS address.

# Two big changes in .1ah-d3.5

- Default value of B-DA changed from broadcast address to an I-SID specific multicast address:
  - Constructed from the 802.1ah OUI (to be assigned) and the I-SID
  - Becomes the default value of the PIP Default Backbone Destination (per I-SID).
    - Should broadcast address ever be allowed?
  - Change was incompletely incorporated into the draft:
    - Did not change the B-component CBP Default Backbone MAC address parameter. It is still an optional parameter per I-SID used to replace the broadcast address in data indications.
    - Neglected to translate the default multicast address when the I-SID gets translated.
- Eliminated CBP MAC Address Translation Table
  - Change was incompletely edited in the draft:
    - Still many references to MAC Address Translation in clauses 3, 5, 12, 17, and 26.

# Back to basics

- Everything works if PIP always sets B-DA to broadcast.
  - Everything else is an optimization.
  - Optimizations worthwhile to prevent flooding on backbone.
- First optimization: Learned associations of unicast backbone address with C-MAC + S-VID:
  - Add connection\_identifier to Dynamic Filtering Entries in I-component Filtering Database.
  - PIP still needs a default B-DA for unknown addresses.
- Second optimization: I-SID specific default B-DA:
  - PIP constructs multicast address from .1ah OUI and I-SID.
  - CBP re-constructs address if translates I-SID.
  - Neither PIP nor CBP need any parameters (managed objects) to accomplish this.

# Further refinements (1)

- Allow configuration of a unicast default B-DA per I-SID
  - Useful for point-to-point backbone service instances.
    - Eliminate flooding on backbone for this I-SID.
    - Eliminate need to learn address associations on this I-SID.
  - This is primary purpose behind having a parameter (managed object) for the Default Backbone Destination per VIP.
  - Should capability be in CBP as well, or instead?
    - Seems logical to be in PIP as this is where the B-DA first gets generated, and PIPs are the endpoints of the backbone service instance. Also simpler than translating at CBP.
    - Putting it in CBP would allow backbone provider to make this optimization if PIP does not (perhaps useful over I-tagged service interface when I-component not under provider control). Would CBP need to reverse the translation? Would it insert the unicast address of the destination PIP or the CBP at the destination edge?

# Further refinements (2)

- Allow configuration of multicast default B-DA per I-SID:
  - Perhaps useful to allow multiple multi-point I-SIDs to use the same multicast address for a default B-DA.
    - Used when the I-SIDs have largely the same set of endpoints.
    - Reduces state in backbone core bridges when prune mcast tree.
  - Could be in PIP or in CBP or both
    - Can use same parameter that would be used for configuring a unicast default B-DA per I-SID.
    - If this capability is in CBP then need to translate from I-SID constructed multicast on data indications and translate back to I-SID constructed multicast on data requests.
    - Implementing in CBP would allow providers to use multicast addresses locally while using the I-SID constructed multicast across E-NNI.

# Further refinements (3)

- Why have Static Filtering and Static VLAN Registration Entries in I-component FDB?
  - Static VLAN Registration Entries allow configuring a unicast or multicast value of the B-DA per S-VID.
    - May be useful for bundled S-tagged service interfaces.
    - For unbundled S-tagged services this is redundant with the Default Backbone Destination per I-SID.
  - Static Filtering Entries allow configuring a unicast or multicast value of the B-DA for C-MAC + S-VID combinations that are not learned.
    - May be useful for limiting the distribution of a customer multicast within an I-SID by assigning a backbone multicast for this distribution, but introduces a significant complication in that clause 6.10 in desired endpoints needs to be configured to recognize this distribution.

# Suggested Resolution (1)

- I-component PIP:
  - Retain Default Backbone Destination parameter per I-SID.
    - Default value is I-SID constructed multicast.
    - Optionally configurable to other (unicast or multicast) value.
  - Addresses recognized on data indications:
    - PIP unicast address, broadcast (?), I-SID constructed multicast, and Default Backbone Destination parameter value.
- B-component CBP:
  - Retain optional Default Backbone Destination parameter per I-SID
    - On data indications, if B-DA is I-SID constructed multicast (or broadcast?) then replace it with the Default Backbone Destination.
    - On data requests, if B-DA matches the Default Backbone Destination then replace it with the I-SID constructed multicast.
  - In either direction, if B-DA is the I-SID constructed multicast and the CBP translates the I-SID then it must also translate the B-DA.

# Suggested Resolution (2)

- Remove the `connection_identifier` in Static Filtering Entries and Static VLAN Registration Entries (?)
  - Motivation for having these is a little weak, but they do little harm. They don't compromise interoperability or place a burden on other bridges. Removing them would be only a slight simplification to the document.
  - However allowing Static Filtering Entries means there may be a number of multicast addresses that need to be recognized by I-components receiving the frames. Will require a per I-SID address table of indefinite length in the PIP which contains B-MAC addresses that will be received. Or make PIP promiscuous receive.
- Delete all references to a MAC Address Translation table.
  - The only translation of B-MAC addresses will be those associated with the Default Backbone Destination parameter.

# Suggested Resolution (3)

- Rename subclause 26.4 to “Backbone Addressing” and expand it’s scope to include:
  - All the ways described on previous slides that backbone addresses are configured, learned, generated, and modified.

# Committee discussion

- In discussion at 802.1 Interim 5/28/07 decided to accept the suggested resolutions with one modification:
  - Default Backbone Destination parameter not configurable at PIP.
    - Rationale was that if it was going to be at either PIP or CBP then want at CBP. This way it is assured to be under Backbone Provider control at an I-tagged service interface (including E-NNI). If going to be in CBP then don't also need it in PIP.
    - There is an argument that when configuring the default to a unicast address identifying the endpoints of a point-to-point backbone service instance, and since the endpoints are at PIPs, it make sense to configure the default address of one endpoint in the PIP at the other endpoint. Functionally, however, configuring the default into the CBP to which the PIP attaches works just as well.
  - Questions raised:
    1. Having made this decision, it is not clear there is any value in having the PIP use the constructed ISID multicast address for a default versus using the broadcasts address. CBP can modify the address either way. Since either appears to work, and it is as easy to use one well-known address as another, leave it as the constructed ISID multicast.
    2. When the default backbone destination address is being configured to a multicast, should it be restricted to one of the ISID constructed multicasts (with 802.1ah OUI)? This would allow multiple backbone service instances to share a multicast tree, but ease requirements for recognition of multicast addresses to anything with the 802.1ah OUI (wouldn't need full address check since need to verify I-SID anyway). Concern raised that this might raise problems if translating the address at ENNI. The validity of this concern was not fully examined. For now, no restriction on what multicast address may be configured as a default at the CBP.
    3. It seems this will result in the proper/desired addressing on CFM frames, however there are some people believing there special accomodations are needed in some cases. Needs investigation.

# Resolves d3.5 ballot comments:

- 322, 219, 226, 208, 25, 44, 291, 298, 82, 189, 99, 179, 211, 180, 47, 181, 177, 123, 266, 69