# BAH 802.17 Frame Structure Requirements

## July 2002

# Outline

- Objective

- Requirements

- Frame Fields

- Recommendation

- Potential Frame Structure Options

# Objective

- List BAH requirements on 802.17 frame formats

- List evaluation criteria for 802.17 frame formats

- List set of Frame fields to support requirements

  - names, size, and function

- Make straw-man recommendations to 802.17 Frame Format technical prime(s) for consideration

# BAH Framing Requirements

1. Support explicit delivery of station identifiers (e.g., DSID and SSID)

    – A station identifier (SID) is an identifier associated with a station that can be unique on a ring. A SID is never a multicast or broadcast identifier*

2. Support a means of indication of packet flooding:
    – FLOOD_COPY (mandatory)
    – FLOOD_TOSS (desirable)

3. Support a means of identifying a "basic" and/or "enhanced" originated packet

4. TTL set at a fixed value and not used for destination stripping (e.g., 255)*

   * Based on BAH Flooding Analysis recommendations

# Framing Evaluation Criteria

1. Impact on currently defined Frame structure

   – Syntactic and Semantic

2. Frame overhead and frame header bit reservation

   – Fairness, Control, Local, Remote

3. Uniformity of definition (simplicity of specification)

4. Level of impact on MAC

   – Change to stripping rules, introduction of additional protocols, changes to MAC Service interfaces, etc.

5. Number of formats

   – Fairness, Control, Local, Remote

6. ~~Support of general RPR requirements~~

# Recommendation

Request Clause 8 (Frame format) Technical prime

1. Support listed BAH requirements

2. Consider Frame structure options provided and use Evaluation criteria to select
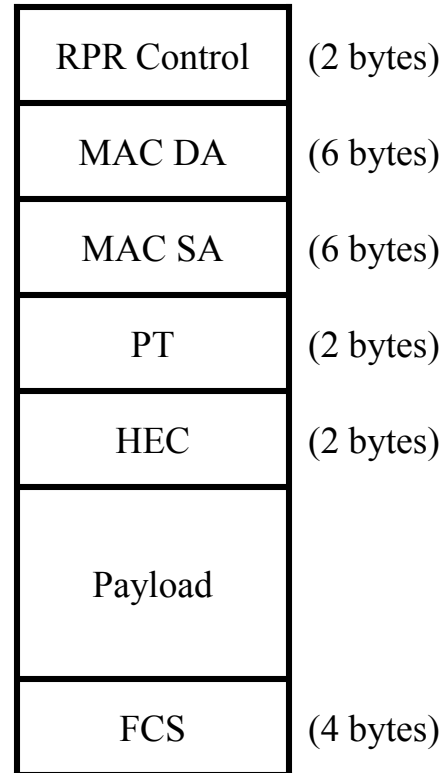
# Frame Structure Options

# Terminology

- ## Ring Local MAC
  - MAC addresses of the actual stations on a Ring

- ## Remote MAC
  - Global MAC addresses
  - End to end MAC addresses
  - End station MAC addresses

- ## Original Packet
  - Packet provided by the end station

- ## DSID: Destination Station Identifier
  - Could be 1 byte value or MAC address (6 bytes)

- ## SSID: Source Station Identifier
  - Could be 1 byte value or MAC address (6 bytes)
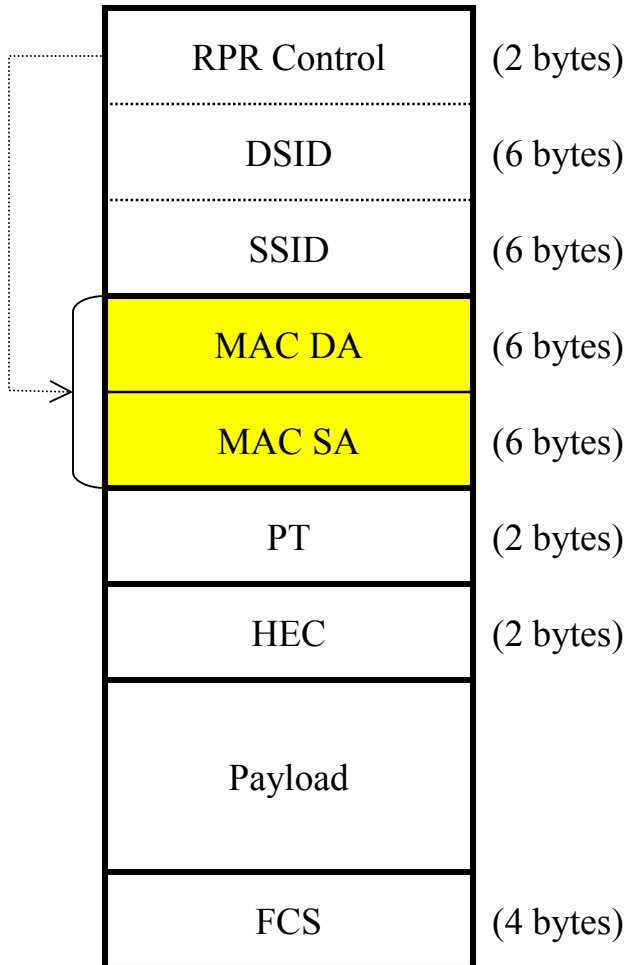
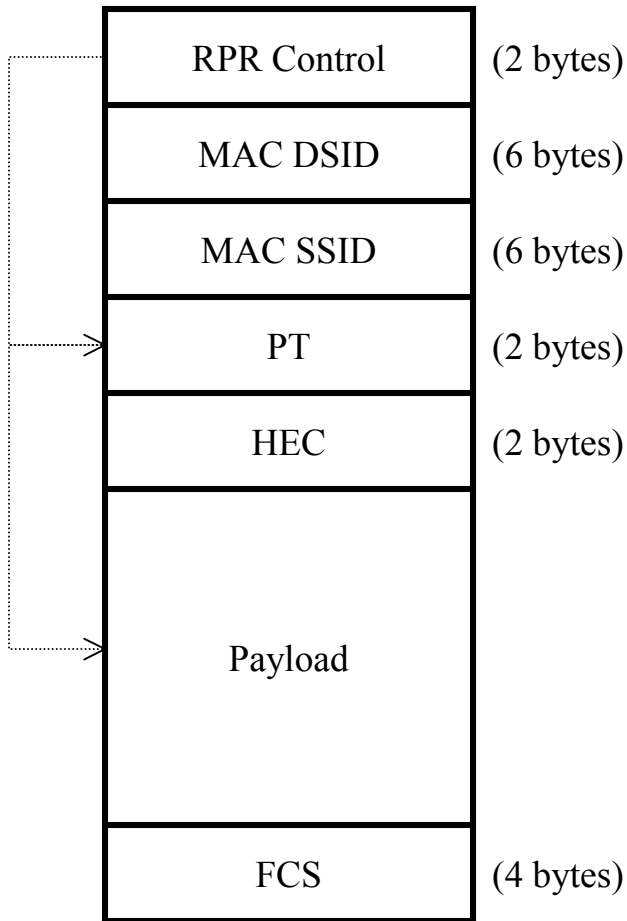# Frame Format

- Basic format as currently defined in 802.17 D0.3

| | |
|---|---|
| RPR Control | (2 bytes) |
| MAC DA | (6 bytes) |
| MAC SA | (6 bytes) |
| PT | (2 bytes) |
| HEC | (2 bytes) |
| Payload | |
| FCS | (4 bytes) |

# Frame Structure with Station Identifiers: Option #1

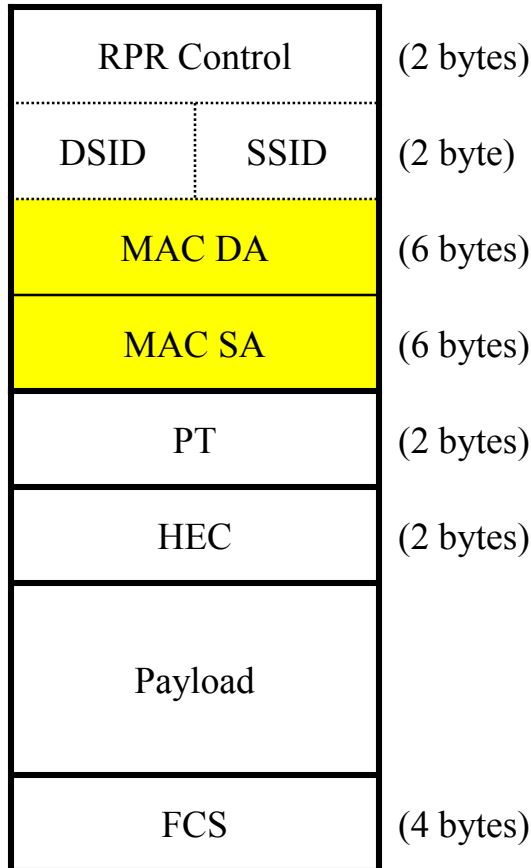| | |
|---|---|
| RPR Control | (2 bytes) |
| DSID | (6 bytes) |
| SSID | (6 bytes) |
| MAC DA | (6 bytes) |
| MAC SA | (6 bytes) |
| PT | (2 bytes) |
| HEC | (2 bytes) |
| Payload | |
| FCS | (4 bytes) |

- Bit in RPR Control indicates presence of remote/local MAC addresses in frame format (I.e., compact versus standard format)

- See DVJ "Frame Options" draft text

# Frame Structure with Station Identifiers: Option #2

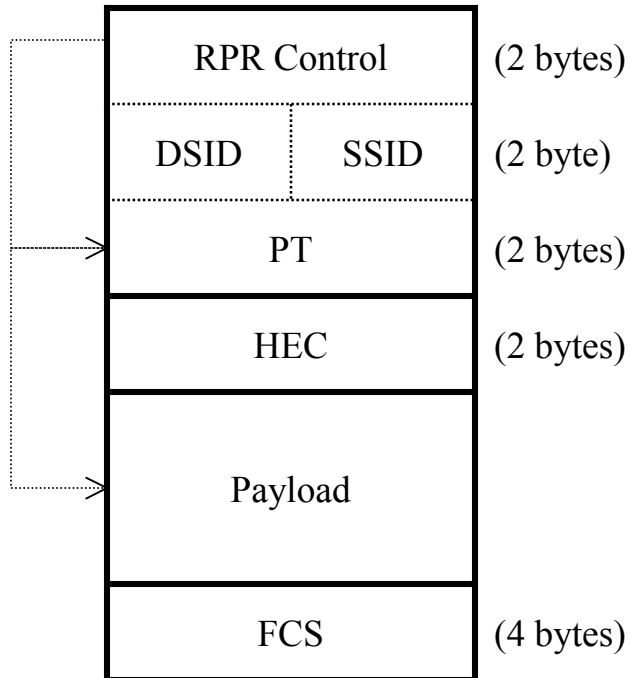| | |
|---|---|
| RPR Control | (2 bytes) |
| MAC DSID | (6 bytes) |
| MAC SSID | (6 bytes) |
| PT | (2 bytes) |
| HEC | (2 bytes) |
| Payload | |
| FCS | (4 bytes) |

- Frame syntax unchanged

- Frame semantics changed

- MAC SA and DA (prior to HEC) *always* in the Ring local address domain
  - All fields prior to HEC are specific to managing packet flow on the RPR LAN

- Client packets (with Remote MAC address) are carried in the RPR frame Payload
  - Field in RPR Control indicates RPR addressing hierarchy

- Local traffic (with local MAC addressing) use the Payload to carry Client data.

# Frame Structure with Station Identifiers: Option #3

| | |
|---|---|
| RPR Control | (2 bytes) |
| DSID      SSID | (2 byte) |
| MAC DA | (6 bytes) |
| MAC SA | (6 bytes) |
| PT | (2 bytes) |
| HEC | (2 bytes) |
| Payload | |
| FCS | (4 bytes) |

- Frame syntax changed due to DSID and SSID fields

- MAC reception rules changed to accommodate DSID and SSID (labels)
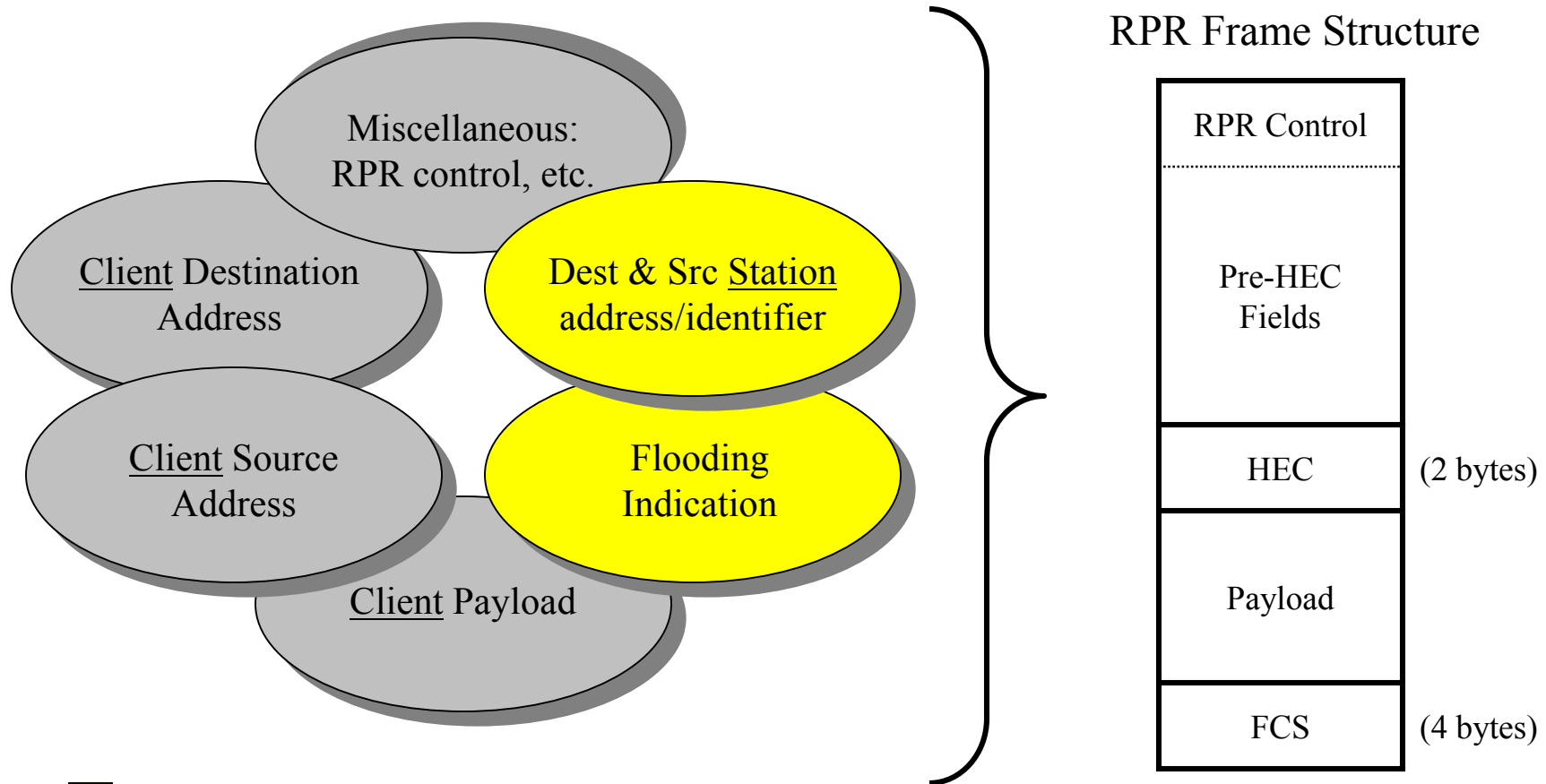
- See DVJ "Frame Format" draft text

# Frame Structure with Station Identifiers: Option #4

| Field | Size |
|---|---|
| RPR Control | (2 bytes) |
| DSID / SSID | (2 byte) |
| PT | (2 bytes) |
| HEC | (2 bytes) |
| Payload | |
| FCS | (4 bytes) |

- Frame syntax changed

- Client packets (with Remote MAC address) are carried in the RPR frame Payload
  - Field in RPR Control indicates RPR addressing hierarchy

- Local traffic (with local MAC addressing) use the Payload to carry Client data.

- See DVJ "Frame Format" draft text

# **Backup**

# 802.17 BAH Frame Fields

RPR Frame Structure

Miscellaneous:
RPR control, etc.

Client Destination
Address

Dest & Src Station
address/identifier

Client Source
Address

Flooding
Indication

Client Payload

| RPR Control |
| --- |
| Pre-HEC Fields |
| HEC  (2 bytes) |
| Payload |
| FCS  (4 bytes) |

New requirements on RPR Frame Structure

Existing capabilities supported by RPR Frame Structure

# BAH Framing Dependencies

1. **"Basic" Bridging Compliance proposal is dependent upon**

   - <u>Hard Requirement</u>: Support a means of indicating that the packet needs to be flooded (on the Ring)

   - <u>Soft Requirement</u>: Support explicit delivery of station identifiers (e.g., SSID and DSID

2. **Flooding Techniques and Packet Duplication/Misordering/Loss proposal is dependent upon**

   - <u>Hard Requirement</u>: Support explicit delivery of station identifiers (e.g., SSID and DSID)

3. **"Enhanced" Bridging Compliance proposal is dependent upon**

   - <u>Hard Requirement</u>: Support explicit delivery of station identifiers (e.g., SSID and DSID)

   - <u>Potential Requirement</u>: Support a means of indicating that the packet needs to be flooded (on the Ring)

# BAH Framing Dependencies

4. Interoperability between "Basic" and "Enhanced" Bridging compliance proposals may be dependent on

   – <u>Requirement</u>: Support identification of "basic" and "enhanced" originated packets

# Option Comparison

| Category | Option #1 | Option #2 | Option #3 | Option #4 |
|---|---|---|---|---|
| No syntactical change to existing frame format | | √ | | |
| No semantical change to existing frame format | | | | |
| Can use existing MAC stripping rules | | √ | | |
| Avoids introduction of distribution and uniqueness algorithm need to manage Station label identifiers. | | √ | | |
| Can support Bridging with Flooding proposals. | √ | √ | √ | √ |
| Can support Bridging with Spatial Re-Use proposals. | √ | √ | √ | √ |
| Can support multiple flooding techniques (e.g., source stripping, TTL scoping, etc.) | √ | √ | √ | √ |
| Does not impose impact to currently defined Service interface between 802.17 MAC and MAC Clients. | ? | √ | ? | ? |

# Option Comparison

| Category | Option #1 | Option #2 | Option #3 | Option #4 |
|---|---|---|---|---|
| Maximum Frame Tax (Ring Configuration dependent – Ring has at least 1 Bridge operating with Spatial Reuse) | **12 bytes** | 14 bytes | 2 bytes | **-10 bytes** |
| Minimum Frame Tax (Ring Configuration dependent – Ring does not have any Bridges resident, or has at least 1 Bridge but does not operates a Broadcast media) | **0 bytes** | **0** | 2 bytes | **-10 bytes** |
| Fixed pre-HEC fields | | √ | √ | √ |
| Bridge support for source stripping | √ | √ | √ | √ |
| Same frame structure for Bridge and non-Bridge devices | - | √ | √ | √ |
| Support Client data packets other than 802.3 (I.e., Client data packet agnostic) | - | √ | - | √ |
| Support multicasting on the Ring while achieving spatial reuse | √ | √ | √ | √ |

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