

6. Media access control data path

This clause describes per-ringlet behavior, unless explicitly mentioned otherwise.

6.1 Ringlet selection

This section describes how a ringlet is chosen. All sections of this clause following this section (i.e. 6.2 and later sections) assume the ringlet has already been selected.

6.1.1 Position of ringlet selection

Ringlet selection is a function of the MAC Control Sublayer, as shown in Figure 5.3. Ringlet selection is performed only for client add traffic. Ringlet selection occurs prior to any other action on the add traffic inside the MAC.

6.1.2 Ringlet selection actions

The primary action for ringlet selection is to choose the appropriate ringlet for each client data packet. The choice is based on the ringlet_id parameter, the MAC_protection parameter, the topology database, and the protection database.

During a non-IDLE protection state, ringlet selection optionally re-steers add packets for steering rings or for local attachment failure in wrapping rings. Additionally, for steering rings, when ringlet selection chooses to send a multicast packet on 2 ringlets, ringlet selection performs the packet replication and sends the packet to both chosen ringlets.

Ringlet selection also determines whether to set the Wrap Eligible (WE) bit, based on the optional MAC_protection parameter.

Additionally, once the ringlet choice has been made, the TTL is set based on the destination's location on the chosen ringlet(s), as determined from the topology database.

6.1.3 Relationship to other clauses

Ringlet selection makes use of the RPR MAC database which contains the topology and protection information for each ringlet.

The protection control unit provides protection summaries for each ringlet for use by the ringlet selection function.

6.1.4 Client Control Of Ringlet Selection

Ringlet selection is specified via the optional ringlet_id parameter and the optional MAC_protection parameter of the MA_DATA.request primitive for each packet supplied by the client.

The values for ringlet_id are:

- left
- right
- default_ringlet

If unspecified, the value for ringlet_id shall default to default_ringlet.

The values for MAC_protection are:

MAC_protected
MAC_unprotected

If unspecified, the value for MAC_protection shall default to MAC_protected.

6.1.4.1 left, MAC_protected

A packet with a ringlet_id value of left and a MAC_protection value of MAC_protected will be sent on the left ringlet, if the destination address is reachable. If the destination address is not reachable to the left, and is reachable to the right, the packet will be sent to the right.

If the destination address is a multicast address, the packet may be sent either or both directions, as necessary to reach all of the destination addresses.

For wrapping rings, the Wrap Eligible bit will be set. For steering rings, the Wrap Eligible bit has no meaning and will not be set.

6.1.4.2 left, MAC_unprotected

A packet with a ringlet_id value of left and a MAC_protection value of MAC_unprotected will be sent to the left ringlet, regardless of state of left ringlet. No allowance will be made for unicast or multicast addresses beyond any non usable links.

For unicast addresses, the packet will make it to the destination address only if the destination is closer than any non usable link.

For multicast addresses, the packet may make it to all of the destination addresses, some of the destination addresses, or none of the destination addresses, depending upon whether any non usable links exist before the (final) destination of the packet.

For all rings, the Wrap Eligible bit will not be set.

6.1.4.3 right, MAC_protected

A packet with a ringlet_id value of right and a MAC_protection value of MAC_protected will be sent on the right ringlet, if the destination address is reachable. If the destination address is not reachable to the right, and is reachable to the left, the packet will be sent to the left.

If the destination address is a multicast address, the packet may be sent either or both directions, as necessary to reach all of the destination addresses.

For wrapping rings, the Wrap Eligible bit will be set. For steering rings, the Wrap Eligible bit has no meaning and will not be set.

6.1.4.4 right, MAC_unprotected

A packet with a ringlet_id value of right and a MAC_protection value of MAC_unprotected will be sent to the right ringlet, regardless of state of right ringlet. No allowance will be made for unicast or multicast addresses beyond any non usable links.

For unicast addresses, the packet will make it to the destination address only if the destination is closer than any non usable link.

For multicast addresses, the packet may make it to all of the destination addresses, some of the destination addresses, or none of the destination addresses, depending upon whether any non usable links exist before the (final) destination of the packet.

For all rings, the Wrap Eligible bit will not be set.

6.1.4.5 default_ringlet, MAC_protected

A packet with a ringlet_id value of default_ringlet and a MAC_protection value of MAC_protected will be sent on either or both ringlets, as chosen by the MAC.

The algorithm used to choose ringlets is implementation specific. The only constraint on the algorithm is that it chooses the same direction for all packets addressed with the same destination address, until protection or topology changes.

For wrapping rings, if the packet is not replicated, the Wrap Eligible (WE) bit is set. For wrapping rings, if the packet is replicated, the Wrap Eligible (WE) bit is not set. For steering rings, the Wrap Eligible bit has no meaning and will not be set.

6.1.4.6 default_ringlet, MAC_unprotected

A packet with a ringlet_id value of default_ringlet and a MAC_protection value of MAC_unprotected will be sent on either or both ringlets, as chosen by the MAC, with no allowance for unicast or multicast addresses beyond any non usable links.

For unicast addresses, the packet will make it to the destination address only if the destination is closer than any non usable link.

For multicast addresses, the packet may make it to all of the destination addresses, some of the destination addresses, or none of the destination addresses, depending upon whether any non usable links exist before the (final) destination of the packet.

The algorithm used to choose ringlets is implementation specific. The only constraint on the algorithm is that it chooses the same direction for all packets addressed with the same destination address, until topology changes.

The Wrap Eligible bit is not set.

6.1.4.7 Setting of TTL for unicast packets

Uniform provisioning stations shall set the TTL to no more than Max_Ring_Size.

NOTE—Smaller values are acceptable if they are known to reach the desired destination (e.g. a likely value would be rprIfNodesOnRing).

Spatial provisioning stations shall set the TTL to the distance to the desired destination in the chosen direction.

6.1.4.8 Setting of TTL for multicast packets

Non-replicated packets shall have their TTL set to no more than Max_Ring_Size.

NOTE—Smaller values are acceptable if they are known to reach the desired destinations (e.g. a likely value would be rprIfNodesOnRing).

Replicated packets shall have their TTLs for each direction set to no more than the distance in each direction to point of protection.

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