Configuration messages periodically refresh the set of nodes that are in charge of forwarding data packets and are identified by an incremental sequence number. Once a node receives a CM with newer sequence number, it sets the sender of that CM as parent node. Afterwards, it starts a parent node selection process based on a backoff timer. Among all the nodes that have received the CM from the same sender, the node that has the lowest backoff timer can regenerate the CM (i.e., updating some fields but keeping the original sequence number value) and send it, becoming part of the parent nodes set. All the nodes that receive a CM with an already processed sequence number (i.e., sent by a node with a shorter backoff time) cancel their scheduled retransmission.

The tree composed by the parent nodes set has to be as stable as possible. Therefore the backoff time is calculated using motion-related information, such as the position and the speed of the vehicles. The downstream tree is updated by the parent nodes on the reception of data packets from the children. Each node while acting as parent inspects the traffic it is forwarding and builds a table collecting information about its descendants. The forwarding state is hence updated, associating to every child node that is forwarding datagrams, the information about the original sender. As stated in the beginning of this section, VANET nodes must be configured with a valid IP address, used by the routing protocol to forward packets to the Internet. Although many different address configuration protocols for VANETs can be used to achieve this functionality, SILVIO exploits an additional feature of TREBOL. As all the nodes within a certain area receive CMs to accordingly update their next hop to the RSU, these messages can also convey IPv6 prefixes. Then, using the standard IPv6 SLAAC [20] mechanism, vehicles can configure a valid IPv6 address, ready to be used for Internet connectivity.

SILVIO assumes the use of TREBOL as defined in [14] to enable routing and addressing within the VANET, although it is integrated with the flow handover intelligence of SILVIO to decide when to opportunistically perform traffic offloading to the WLAN-based VANET (as explained in Section 2.6). Further details about TREBOL are included in [14].

2.5 Seamless Interface Management: vehicular-aware IEEE 802.21

Since WLAN connectivity is intermittent, the mechanisms must efficiently detect when it is available, and also predict when it is expected to disappear (e.g., because the terminal is leaving the coverage area of its current point of attachment). This prediction should be done with enough anticipation, so the handover can be prepared and performed in such a way that packet losses are minimized.