|  |
| --- |
| **CHANGE REQUEST** |
|  | ETSI EN 302 636-4-1 | **Version** | 1.4.1 | **CR** |  | **rev** |  |  |
|  |
| **CR Title** | Soft-state IS\_NEIGHBOUR flag |
|  |  |
| **Original Source** | Raphael Riebl (Technische Hochschule Ingolstadt), Q. Delooz (Halmstad University) |
|  |  |
| **Work Item Ref** | REN/ITS-00358 | **Submission date** | *20.01.2022* |
| **Approving TB**  | ITS | **Approval date** |  |
| **Category:** | **F** | **Release** | 1 |  |
|  | Use **one** of the following categories:**F** (correction)**A** (correction in an earlier release)**B** (addition of feature) **C** (functional modification of feature)**D** (editorial modification) |  |
|  |  |
| **Reason for change** | IS\_NEIGHBOUR flag is never reset to FALSE |
|  |  |
| **Consequence if not approved** | LocTEs can be erroneously considered as direct neighbours and thus adversely affect packet handling and forwarding algorithms |
|  |  |
| **Summary of change** | Turn IS\_NEIGHBOUR flag into a soft-state attribute |
|  |  |
| **Clauses affected** | 8.1.2, Annex H |
|  |  |
| **Linked Change Requests** |  |  |
|  |  |  |
|  |  |
| **Other comments** |  |
|  |  |

## Problem description

During packet handling (section 10.3), the IS\_NEIGHBOUR flag is never set to FALSE for an already existing LocTE. As long as a LocTE remains valid (see *itsGnLifetimeLocTE*), a station remains marked as direct neighbour if it has been within radio range once. LocTE updates may continuously extend the entry’s lifetime even if the station’s packets are only received indirectly via forwarders. Thus, a LocTE belonging to a moving-away station may be kept with IS\_NEIGHBOUR set for a long period. Any operation evaluating IS\_NEIGHBOUR may thus be flawed.

## Proposed change

The IS\_NEIGHBOUR flag itself shall become soft state, i.e., reset to FALSE if it has not been set to TRUE for a while.

1. In section 8.1.2, add to the description of the IS\_NEIGHBOUR flag: “The flag is soft-state, i.e., falls back to FALSE if not set to TRUE again for a duration of *itsGnNeighbourFlagExpiry*.”
2. Add the novel protocol constant *itsGnNeighbourFlagExpiry* to Annex H. A reasonable default duration is *itsGnBeaconServiceRetransmitTimer* + *itsGnBeaconServiceMaxJitter* (= 3.75s).

## Backward compatibility

1. Q: What is the impact if a station does not implement this functionality, i.e., the IS\_NEIGHBOR Flag is not reset? What would be the consequences and which implications does it have?

A: In this case this station considers other stations as neighbours, i.e., being in direct communication range even though they are already (considerably) out of range. This wrong behavior effects all forwarding algorithms that evaluate/make us of the IS\_NEIGHBOR flag.
2. Q: What are the effects if stations with two different implementations exist, i.e. one resets the IS\_NEIGHBOR Flag and the other does not?

A: In this case, the "legacy stations" in some situations will make wrong forwarding decisions. A problem with two different implementations is not seen. The forwarding gets better with a growing number of stations with correct implementation of soft state IS\_NEIGHBOUR.

8.1.2 Minimum data elements of a *Location Table Entry*

A *Location Table Entry* (LocTE) shall contain at least the following data elements:

* GeoNetwork address of the ITS-S *GN\_ADDR*.
* LL address of the ITS-S *LL\_ADDR*.
* Type of the ITS-S (e.g. vehicle ITS-S, roadside ITS-S).
* Version of the GeoNetworking protocol used by the ITS-S.
* Position vector *PV*, i.e. *Long Position Vector* *LPV* (clause 9.5.2), of the ITS-S, comprised of:
	+ Geographical position *POS(GN\_ADDR)*;
	+ Speed *S(GN\_ADDR)*;
	+ Heading *H(GN\_ADDR)*;
	+ Timestamp of the geographical position *TST(POS, GN\_ADDR)*;
	+ Position accuracy indicator *PAI(POS, GN\_ADDR).*
* Flag *LS\_PENDING(GN\_ADDR)*: Flag indicating that a Location Service (LS) (clause 10.2.4) is in progress.
* Flag *IS\_NEIGHBOUR(GN\_ADDR)*:Flag indicating that the GeoAdhoc router is in direct communication range, i.e. is a neighbour.
The flag is soft-state, i.e., falls back to FALSE if not set to TRUE again for a duration of
‘*itsGnNeighbourFlagExpiry*.
* *DPL(GN\_ADDR)*: Duplicate packet list for source GN\_ADDR.
* Timestamp *TST(GN\_ADDR*): The timestamp of the last packet from the source *GN\_ADDR* that was identified as 'not duplicated'.

Annex H (normative):
GeoNetworking protocol constants

The GeoNetworking protocol constants and their default/initial values shall be as specified in table H.1.

The protocol constants represent MIB attributes specified in annex I.

Table H.: GeoNetworking protocol constants

|  |  |  |  |
| --- | --- | --- | --- |
| **Item** | **GeoNetworking protocol constant** | **Default/initial value** | **Comment** |
| .. | … | … | … |
|  | itsGnDefaultTrafficClass | 0x00 | Forwarding: Default traffic class |
| 36 | itsGnNeighbourFlagExpiry | 3,75 | Lifetime of *IS\_NEIGHBOUR* flag [s]Default value of 3,75 s: *itsGnBeaconServiceRetransmitTimer* + *itsGnBeaconServiceMaxJitter* (= 3.75s). |