DPLCA – issues and resolution

Kamal Dalmia

Aviva Links

Fundamental qualities of a good network

- Quick onboarding of new nodes
- Avoids duplicate node IDs
- Able to distinguish between silent node and dead/removed node
- Quick detection of a removed node
- All of these attributes imply frequent transmission of “something” by nodes.
  - One of the options is to transmit a PRESENT symbol at every TO
  - Another suggestion is transmission of COMMIT - in conjunction with packet transmission only.

Where are we at?

- Option 1 – transmit PRESENT or an existing Special Code at every TO
  - PRESENT is a new symbol. How to deal with cg networks?

- Option 2 - transmit COMMIT, but in conjunction with packet transmission only
  - Packet transmission is arbitrary. Therefore, COMMIT transmission would be arbitrary.
  - May not happen for hours, days….

  This leads to some problems –
  - Long time to determine which slots are taken and hence grab an ID
  - May result in duplicate IDs for a while
  - May take a long time to detect a removed node
  - Harder to distinguish between quiet node and dead node

Proposed solution

- Non Node 0 nodes to transmit COMMIT at every N^{th} TO
  - Aim for reasonably frequent indication of presence of a node to other nodes (& node 0)
  - Generally speaking, TOs do not occur “periodically”. Therefore, COMMITs would not be “periodic”

- Concerns?
  1. PLCA nodes would react to COMMITs signaling a collision in case of concurrent TX

     Answer - DPLCA nodes would pick a different TO next time around

  2. non PLCA enabled nodes will assert CRS at each transmission, causing deferral on loaded networks this may prevent a node from transmitting forever

     Answer – There is no difference between a fully loaded PLCA network Vs a DPLCA network! Both behave the same way with non PLCA nodes!

  3. may impact EMC/EMI performance

     Answer – Not a significant difference. See next slide…

EMI Considerations

- COMMIT is an existing symbol!
- PLCA nodes are already allowed to transmit COMMIT every time a node has a TO.
- A DPLCA node would do what a PLCA node can also choose to do -> no difference in emissions!
- Immunity performance may improve due to frequent COMMITs. If a COMMIT is lost due to noise, the next COMMIT is observed relatively quickly.
- Overall, EMI is not a significant factor for DPLCA vs PLCA.

Conclusions

- DPLCA using COMMITs to indicate presence would be compatible with existing PLCA with minimal additions to cg

- Transmission of COMMITs at every (or every Nth) TO provides all the desired qualities
  - Quick onboarding of new nodes
  - Avoids duplicate node IDs
  - Ability to distinguish between silent node and dead/removed node
  - Quick detection of a removed node

Thank You