Physical Layer based Dynamic Node ID management

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Agenda

- 802.3da Objectives
- Review of Clause 148 PLCA
- DPLCA - Enhancements to Clause 148 PLCA
- Summary

802.3da Objectives

- This presentation addresses the following project objectives

  3. Specify an optional PLCA node ID allocation method

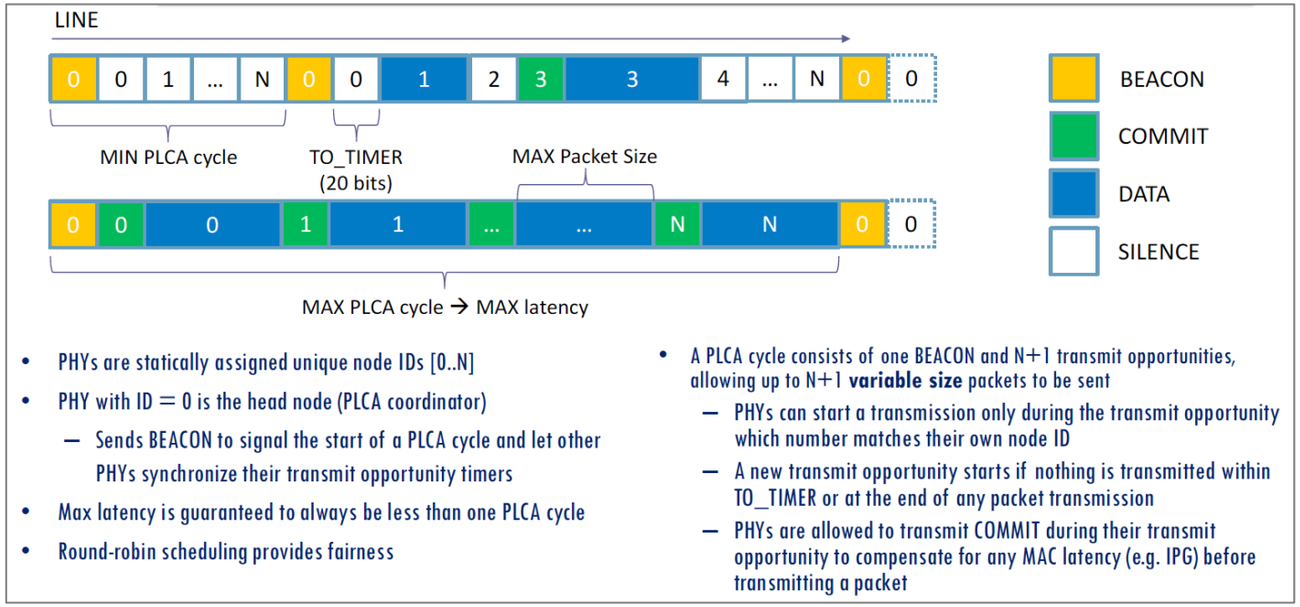
  4. Support interoperability with Clause 147 multidrop

  11. Support addition and removal of a node or set of nodes to a continuously operating powered mixing segment

- This presentation explores whether we can specify .3da PLCA node ID allocation method such that….
  - An all 802.3da network has full “plug and play” capability,
  - When a 802.3da Node is added to a Clause 147 network, it operates as a Clause 147 node
  - When a Clause 147 node is added to a 802.3da network, it co-exists

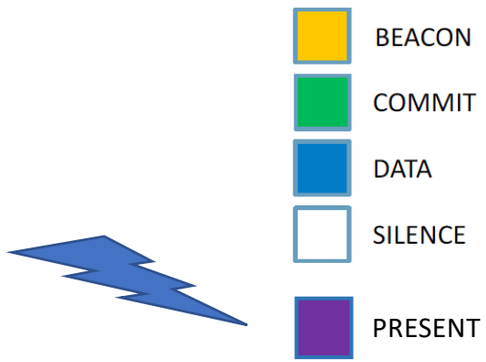
Review of Clause 148 PLCA

https://www.ieee802.org/3/cg/public/Nov2017/8023cg_plca_overview_revA.pdf



- Static IDs for all Nodes including Node 0
- Node 0 needs to know the number of nodes on the network to be able to complete the BUS cycle and transmit BEACON
- Silence on the wire if a node does not have DATA to transmit

Proposal: A new Special Symbol – “PRESENT”

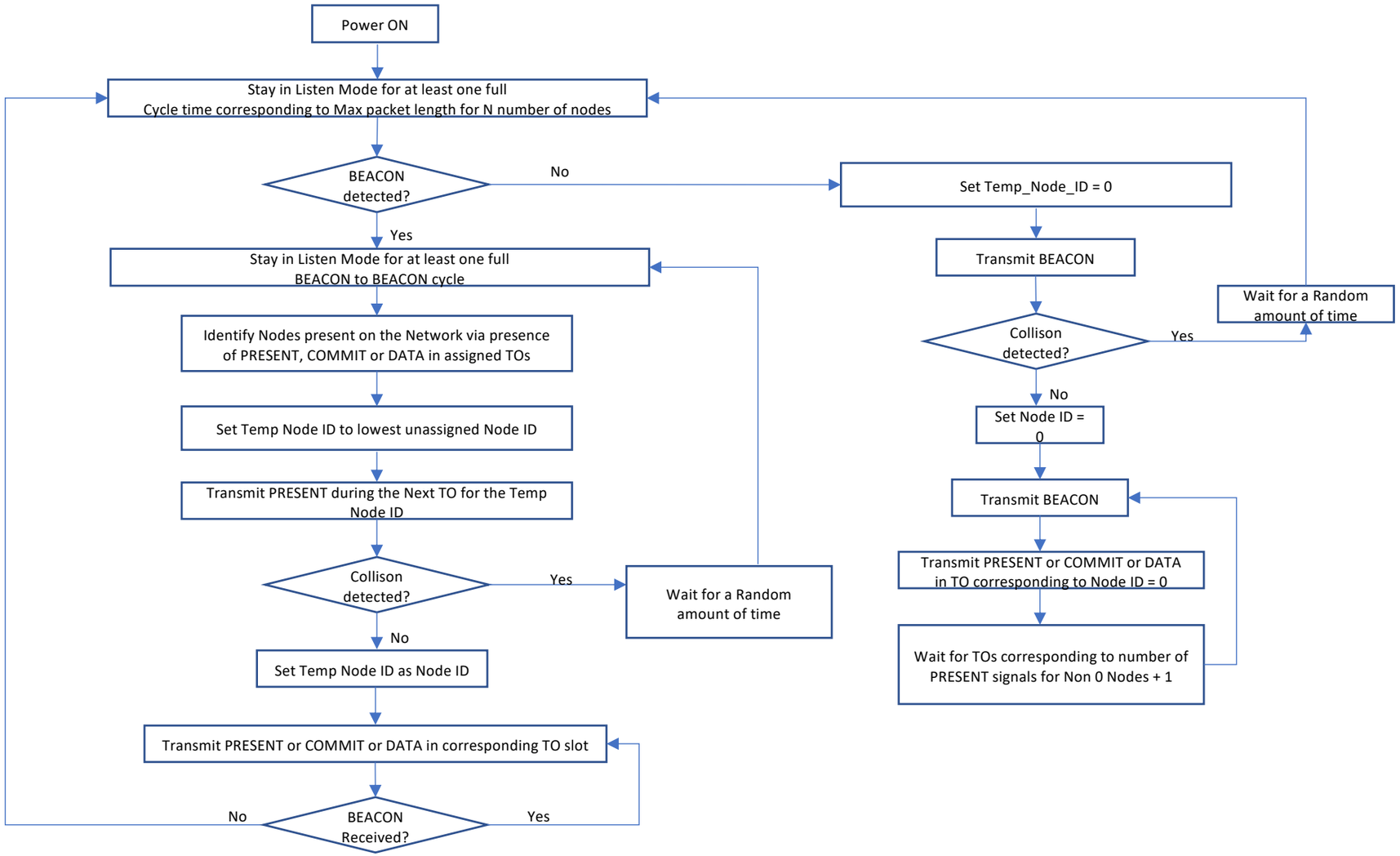


I	N/A	11111	SILENCE
J	N/A	11000	SYNC / COMMIT
K	N/A	10001	ESDERR
T	N/A	01101	ESD / HB / PRESENT?
R	N/A	00111	ESDOK / ESDBRS
H	N/A	00100	SSD
N	N/A	01000	BEACON
S	N/A	11001	ESDJAB

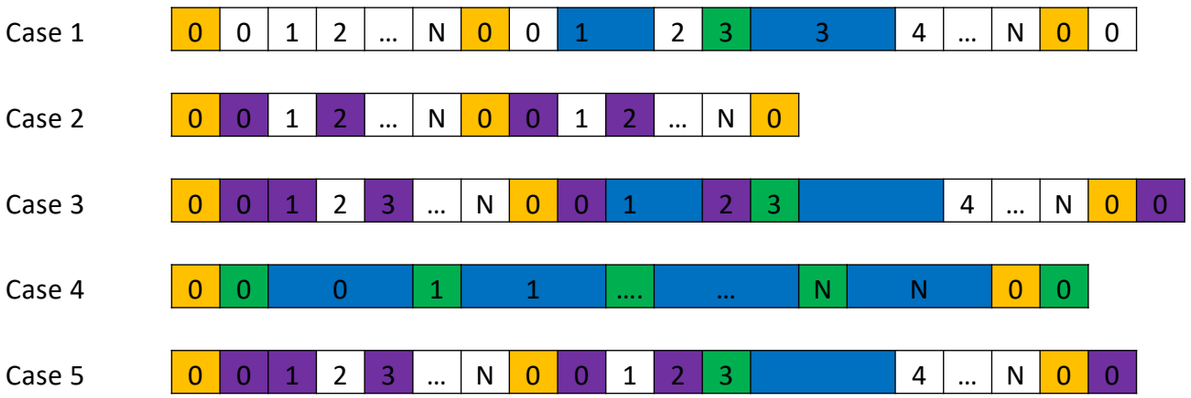
xxxxx PRESENT?

- BEACON, COMMIT, DATA are same as Clause 148
- Per Clause 148, when Node has no DATA to send, the line is silent during the node’s TO
- Instead, transmit “PRESENT” when not sending COMMIT or DATA
- Addition of “PRESENT” converts PLCA to Dynamic PLCA (DPLCA)
- The spirit of this approach is that a Node announces its presence rather than be silent
  - Use a new special code?
  - Or reuse an existing code with a new meaning in the context of 802.3da (e.g. Heartbeat)?

DPLCA (Dynamic PLCA)



Example usage of PRESENT



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N	N/A	01000	BEACON
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802.3da

Case 1 Clause 148 Network

Case 2 0 & 2 on the network. No one is transmitting DATA. Only BEACON and PRESENT signals on wire. Node 0 waits for all N slots. Can be alternatively implemented such that Node 0 completes cycle with occupied Node IDs only.

Case 3 0, 1 & 3 are on the network. 2 joins in the 2nd cycle. 1 transmits in 2nd cycle without needing COMMIT. 2 did not transmit DATA. 3 transmits DATA in 2nd cycle with COMMIT.

Case 4 0 to N are on the network. Every node transmitting max size packet with COMMIT. No overhead relative to Clause 147!

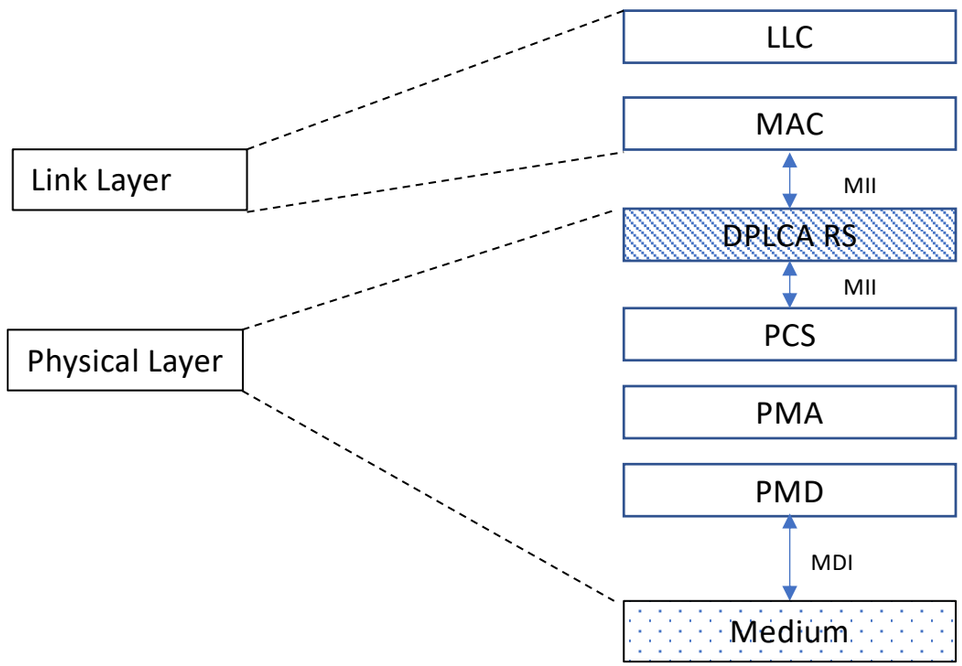
Case 5 1 was on Network. Drops out in 2nd cycle. ID can be taken by a new node that joins the network.

A Physical Layer solution….

Clause 148 PLCA is a part of RS

DPLCA is an enhancement of Clause 148 PLCA and allows Nodes to assign IDs to themselves at Physical Layer

Node 0 does not need to assign IDs. It tracks Node IDs!



Clause 148 -> PLCA
Functions: BEACON, Transmission Opportunity management

802.3da -> DPLCA
Functions: BEACON, Node ID management, Transmission Opportunity management

Some items to consider

- Compatibility
  - When a 802.3da node is added to a 802.3cg network, DPLCA would be configured into PLCA by disabling PRESENT.
  - When a 802.3cg node is added to a 802.3da network, should it be configured to operate in CSMA-CD mode?
- Length of PRESENT symbol
  - Should it be longer than 5 bits for better collision detection?
- Should the PRESENT be successfully transmitted for N cycles before the node can secure the corresponding ID?

Thank You