

Mr. Thompson has voiced concerns over the scope and CSD of the IEEE P802.3cg draft and has asked the EC to consider blocking the progress of the draft to sponsor ballot. As the Chair of the IEEE P802.3cg Task Force, I would like to point out that Mr. Thompson has voiced these concerns since at least the initial working group ballot and the group has carefully considered them throughout the ballot process. His concerns have been aired both with considerable task force time, and in direct access to the larger IEEE 802.3 ballot pool. In all this, both the ballot resolution committee (IEEE P802.3cg Task Force) and the larger ballot pool have disagreed technically with Mr. Thompson's conclusions.

Architecturally, PLCA provides the physical layer's inputs to the IEEE 802.3 Clause 4 MAC and performs functions, such as alignment, consistent with architecture in IEEE Std 802.3-2018, and existing within other IEEE 802.3 reconciliation sublayers. These are the roles delegated to the Physical Layer as a reconciliation sublayer, consistent with the PAR and CSD responses. The Physical Layer provides carrier sense, collision detect and alignment to the physical layer transmission characteristics, while the MAC provides frame-level addressing, error detection, and responds to the collision detect and carrier sense to avoid collisions, as per the text of IEEE Std 802.3 clauses 4.1.1 (MAC Overview) and 4.1.2.1.1 paragraph 2, which covers normal operation of the half duplex MAC. Additionally, the resulting sublayer has been shown to be compatible with and depend on the functionality of the detailed specification of the IEEE 802.3 MAC found in subclause 4.2. However, this is not, as Mr. Thompson asserts, a matter of implementation. It is easy to blur high-level distinctions of 'media access' functionality. However, as engineering distinctions, understanding the relationship between the physical layer functionality in PLCA and the MAC functionality in clause 4 required and benefitted from Task Force members' careful study of the IEEE 802.3 text and requirements, and are not high-level classifications.

While the distinctions are subtle, individuals both by themselves and collectively in meetings have taken a significant amount of time and effort in considering Mr. Thompson's concerns. References and more discussion may be found in the attached. The ballot pool and the ballot resolution committee have expressed overwhelmingly, disagreement with Mr. Thompson. Members of the group have listened and labored long and hard considering Mr. Thompson's objections and attempting to make clear the points of disagreement, referencing the text of IEEE Std 802.3, the history of other 802.3 projects, ISO/IEC layering models, consistency with other IEEE 802.3 reconciliation sublayers, compatibility with the physical layer portion of the text and the existing IEEE 802.3 MAC specification, as well as demonstrated compatibility with existing IEEE 802.3 networks and equipment. Selected references are in the attached. Based on these analyses, the ballot resolution committee (IEEE P802.3cg Task Force) has consistently reaffirmed their disagreement on the key technical issue - Mr. Thompson's assertion that the PLCA functionality constitutes a new MAC.

Further detail follows below, on this technical disagreement. I believe it is not a proper exercise of our process for the EC to block the progress of a ballot on a technical disagreement, especially after the ballot process has resulted in a clear decision affirming the draft, the CSDs, and its scope.

The IEEE P802.3cg task force and ballot resolution committee has heard Mr. Thompson's concerns over many ballot cycles and has overwhelmingly disagreed with the technical conclusion at its root. Through many straw polls they have consistently disagreed with his position that PLCA is a new MAC. Further, they have agreed that his other concerns all stem from the conclusory statement that PLCA constitutes a new media access control mechanism. Participants have not only disagreed but have further tried to convince Mr. Thompson that PLCA is rather the functionality needed by the physical layer for the MAC to function. Many of these arguments are summarized in the presentation that Mr. Law mentioned - http://www.ieee802.org/3/cg/public/Jan2019/Tutorial_cg_0119_final.pdf; however,

many more nuanced arguments, demonstrations and discussions have been presented by multiple parties, and are within the IEEE P802.3cg website (in addition to the comment responses). The ballot resolution group has continued to listen to Mr. Thompson's arguments, but has also continued to overwhelmingly disagree with Mr. Thompson on a technical basis. The remedy for a technical disagreement is the ballot, not to ask the EC to block the progress of the draft.

On a technical level, the task force has spent a sizable part of its time discussing Mr. Thompson's assertions and many reasons why they are incorrect. These include discussion of similar functionality in other IEEE 802.3 physical layers, discussion of how the text in IEEE 802.3 describing the relationship of the Clause 4 MAC functions and the physical layer services required for the MAC to operate apply in the case of PLCA, and architectural discussions of how OSI layering maps to the PLCA case. This is in addition to analyses, demonstrations, and reports of demonstrated results (from multiple independent parties) showing existing Ethernet media access control working with PLCA. All have led to the same conclusion - PLCA, while involved media access control, is not the primary media access control functionality delegated to the MAC sublayer.

One area of confusion is that the functions performed by the clause 148 reconciliation sublayer (PLCA) are those the IEEE 802.3 MAC requires of the physical layer - such as providing carrier sense, collision detect, and alignment of the atomic data from the MAC to the physical layer's capabilities, and that these are not identical to Ethernet before 1990, but rather are more in line with layering in more recent revisions of the standard and present in IEEE Std 802.3-2018 today. Mr. Thompson appears to claim that if it is involved in media access control it must be MAC functionality, or that avoiding collisions is not IEEE 802.3 functionality. The ballot group and the text of IEEE Std 802.3 clause 4 disagrees with that position. As one member of the IEEE 802.3 ballot pool said to me recently, "The MAC cannot perform its function all by itself, because it doesn't connect directly to the medium." He went on to state that it needs the physical layer to provide certain functions, and how those functions were performed was up to the physical layer. In short, that is what PLCA does, and why it works with existing IEEE 802.3 MACs, as a physical layer adjunct.

Mr. Thompson has asserted the fact that PLCA is a separate reconciliation sublayer is merely a matter of implementation, not architecture, and the ballot pool has disagreed. One member of the community his disagreement with Mr. Thompson purely from the OSI layering model and the text of IEEE Std 802.3-2018 (http://www.ieee802.org/3/cg/public/adhoc/brandt_020619_3cg_01a_adhoc.pdf). Still others have pointed out that the constraint the architecture of IEEE P802.3cg must live with is that it must interface with the clause 4 MAC and the clause 147 PHY on purely a layered basis, serving the primitives assigned in either direction with the types of functionality found in reconciliation sublayers. Others have observed the obvious fact that, as architected, PLCA cannot work without the IEEE 802.3 Clause 4 half-duplex MAC and is compatible with the Clause 4 MAC and even noncompliant implementations. This has been stated several times, and most exhaustively by Mr. Beruto, in presentations (see, e.g., <http://www.ieee802.org/3/cg/public/July2018/index.html>, <http://www.ieee802.org/3/cg/public/July2018/PLCA%20overview.pdf>, as well as presentations in the task force ad hoc area). Despite Mr. Thompson's assertions that someday someone might write a new MAC by integrating and combining the functionality of Clause 4 and PLCA, that is not what is in the IEEE P802.3cg draft, and, to the best of my recollection, no one has ever discussed this within the IEEE P802.3cg project.

Several members have pointed out the required functions of the MAC not performed by the clause 149 PLCA sublayer, and still others have pointed to the examples where existing reconciliation sublayers

perform similar functions. The response to this has been to retreat from the details and specifications of what a MAC must do, and what the physical layer performs in concert, and instead to dismiss these as being 'implementation' vs. 'architecture', and when presenters have addressed OSI architecture, the argument shifted from MAC with a capital 'M' to 'media access control' with a lowercase 'm'. In the end, the issue is a technical disagreement.

I estimate that **at least 30% of the group's time has been taken up with either Mr. Thompson or the other disagreeing voter's comments** (including issues which are a little different), and that at least 20% of the (total) time has been taken up with discussion of specifically Mr. Thompson's assertion that PLCA is a new MAC. However, there has been little movement in positions. The ballot results, and the comment resolution record shows that there is not even a significant minority who support Mr. Thompson's assertion.

As far as our process is concerned, this is not a split decision or unheard concerns - this is a matter where the ballot group overwhelmingly disagrees with Mr. Thompson's position. It is a matter where Mr. Thompson has had generous amounts of time, probably more than is fair, to clarify his position and try to resolve it with others, either by convincing him or being convinced himself. It all leads back to the same impasse - a technical disagreement over whether the reconciliation sublayer proposed in clause 148 of the IEEE P802.3cg draft is a new media access control sublayer.

In the end, this is an issue that Mr. Thompson, after ample opportunity, has been unable to convince the ballot pool or the ballot resolution committee, and numerous members disagree with his conclusion that PLCA is a new MAC, for numerous reasons. The correct way to deal with this is through the ballot pool, not to ask the EC to block the progress of the draft.