Summary of Major Items Needed for 802.1AS-Rev/D3.0

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Introduction - 1

- This presentation summarizes the major items needed for 802.1AS-Rev/D3.0 (i.e., the next draft of 802.1AS-Rev after D2.0)
- The items are based on:
  - The final comment resolution for D2.0 (see http://www.ieee802.org/1/files/private/as-rev-drafts/d2/802-1AS-Rev-d2-0-dis.pdf
  - 7 comments from the D1.0 comment resolution that were not included in D2.0 due to lack of time; these are listed on p. iii of D2.0 (lines 38 – 50)
  - Items f, g, h, j, and k listed on p. ii of D2.0 (lines 27 – 40)

Introduction - 2

- Note that only major work items are summarized here; these are technical and editorial items that, in the opinion of the editor, will involve a significant amount of work
- Some of the items are straightforward, but involve a significant amount of editing work, e.g.,
  - Insertion of a new feature that is straightforward but involves many new state machines and/or changes to many existing state machines
  - An editorial change to a large number of figures
- Other items involve development of new features or insertion of a new feature where integration with existing state machines is not trivial
  - Explicit port state configuration may be in this category

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- Items from the D2.0 comment resolution that can be added with little effort and time are not included here
  - For example, technical or editorial comments whose resolution is to simply add/modify text are not included, as these changes can be made simply and quickly
- The main point of this presentation is to identify the items that will require **significant amount of work**
  - Items that are significant from a technical standpoint, but do not involve a significant amount of work, are not included here

Major Technical Items - 1

1) Addition of Fine Timing Measurement (FTM) to 802.11 transport

- Unlike TM (and also the rest of 802.1AS and 1588), FTM is initiated at the slave
  - But, it appears that 6.3.58 of 802.11-RevMC contains FINETIMINGMSMT primitives that are analogous to TIMINGMSMT primitives in 6.3.57 and seem to cause the sending of Fine Timing Measurement frames from the master
  - This appears to be in contrast to 11.24.6 (and 9.4.2.167, 9.6.8.32, and 9.6.8.33) of 802.11-RevMC, which describes how the sending of Fine Timing Measurement frames is initiated at the slave
  - The editor will discuss this with clause 12 clause editors to clarify the consistency of these items
  - It will be attempted to make FTM as similar to TM as possible; however, any needed architectural changes will also be submitted to the P1588 committee
  - As part of this, comments 77, 78, and 79 of D2.0 will be addressed.

Major Technical Items – 2

2) Addition of a common service for measurement of mean path delay and neighborRateRatio, rather than having to run redundant instances of Pdelay for each domain

- An initial solution was included in D2.0
- However, certain aspects of backward compatibility still needed to be addressed (and were captured in editor's notes)
- In addition, the solution had not yet been submitted to the P1588 committee for inclusion in the next edition of 1588
- The solution was then presented to the P1588 WG
- Subsequently, a somewhat similar solution was developed and presented to the P1588 Architecture subcommittee (SC); this solution addresses backward compatibility
- A revision of this solution, to address several comments made by one participant of the Architecture SC, is being prepared
- This revision is planned to be presented to the current TSN TG meeting in a companion presentation
- If the revision is acceptable to the P1588 Architecture SC and plenary, it can be included in 802.1AS/D3.0

Major Technical Items – 3

2) Continued

- Once the P1588 solution is stable, it is necessary to reconsider what modifications are needed for D2.0 regarding the determination of asCapable on each port and domain, and issues related to backward compatibility
- It seems that these aspects should be simpler than in the D2.0 proposal, because now we can distinguish the 2011 domain 0 pdelay messages from the common service pdelay messages (as the latter have SDOId 0x200, which is owned by the P1588 committee, while the former have 0 (transportSpecific is renamed SDOId in the profile isolation feature proposed for the next edition of 1588).
  - Possibly new nodes would have to be capable of sending pdelay messages on domain 0 (with transportSpecific 0) for backward compatibility, in addition to invoking the common service. If there was no response to common service pdelay, a pdelay message would then need to be sent on domain 0. More work is needed on this, but this work should be done after the common service proposal is stable. This also will address comment 55/D2.0
- This item will also address comment 60/D2.0

Major Technical Items - 4

3) Comment 103 against D2.0 indicated the need for an 802.1AS version number. After item (2) above is handled, the need for and use of this should be considered again. This is because, with the new proposal for the common service, pdelay messages of the common service and of 802.1AS-2011 can now be distinguished.

Major Technical Item - 5

4) Explicit port state configuration

- Item 2 on p. iii of D2.0
- The feature is relatively straightforward in principle, but addition to 802.1AS-Rev is somewhat complicated due to the manner in which the BMCA is formulated (i.e., using RSTP methodology (state machines) instead of the explicit 1588 BMCA dataset comparison and state decision algorithms

5) Development of timing fidelity metrics, and incorporation of their use in the BMCA (see item (1) on p.3, item (g) on p.2, and item Z.3.2.1, all in D2.0)

- Note that there is a somewhat similar work item in 1588 – "Accumulated Inaccuracy TLV (Upkeep WI 106)
  - This item would define a TLV to accumulate maximum and standard deviations for grandmaster inaccuracy, transient path inaccuracy (i.e., offsetFromMaster, e.g., transient effects in PLLs, static path inaccuracy, and dynamic path inaccuracy
  - This work is still under development and, for now, would not be used by the BMCA; however, it could provide useful input for this 802.1AS-Rev feature
- **Presentations are needed on this**

Major Technical Items - 6

6) Item (g) on p. ii of D2.0 – Presentation to describe what must be added/changed (in draft) to address when the Sync, Announce, or Pdelay interval should be changed by a node a result of receiving a Signaling message that requests a rate change

- Sender should use the requested interval to change the timeout interval only after receiving confirmation that the new rate has been granted
- Receiver of the Signaling message can begin using the new rate immediately if it is faster; however, if the new rate is slower, the node should not start responding with the new rate until it has responded with N messages where the logMessageIntervalField has been changed to the new value but sent at the old, faster rate, where N is the number of messages that can be missed to get a timeout
- We must make this change for Sync, Announce, and Pdelay_Req separately
- It was agreed that the editor will prepare a presentation outlining the specific changes before making them

Major Technical Items - 7

7) Item (f) on p. ii of D2.0 – Incorporation of the 802.3bf timestamp model in clause 11

- The resolution of comment #20 against D1.0 indicated that this item is of lower priority and would be deferred to a draft after D2.0. It was also indicated it would be done for a later draft if there is time.

Major Technical Items - 8

8) Comment 2/D2.0 – Separation of SyncIntervalPdelayIntervalSetting state machine into 2 separate state machines, with Pdelay state machine now pertaining to the common service.

- But, we may need an instance of the PdelayInterval state machine for domain 0 (transportSpecific 0), if this must run for backward compatibility

9) Comment 31/D2.0, and Item 4 on p. iii of D2.0 – insertion of the condition !domainEnabled as an entry condition to all state machines that are per domain. In addition to this, a global ptpPortEnabled must be added as an entry condition to each state machine. The TSN TG must decide on a name for this variable (the resolution to comment 31/D2.0 indicates that 'globalPtpPortEnabled' may not be the best name because 'global' is used differently in referring to variables.

Major Technical Items - 9

10) Comment 33/D2.0 – This comment identifies a large number of text changes (at least 26 changes). In one case, the editor must obtain some background material from the clause 12 clause editors. In another case, a PICS entry must be added.

11) Comment 44/D2.0 – The current variable sourcePortIdentity used in variousl state machines must be changed to neighborSourcePortIdentity or gmSourcePortIdentity, depending on which we are referring to. This item is listed because it potentially involves edits to a number of state machines (i.e., Visio figures).

12) Comment 49/D2.0 – Clause 5 must now reference, at least indirectly, every “shall” in the document. In addition, each PICS item must reference a clause 5 subclause and other places where the respective "shalls" for that item are. The editor will use, as a starting point, the items pointed out by the commenter in the suggested remedy. The commenter indicated that the editor can ask him any necessary questions on this when the editor is preparing the next draft. Nonetheless, addressing this comment will involve a large amount of work, because there are many “shalls” in the document.

Major Technical Items - 10

13) Comment 52/D2.0 – for now, nothing will be done regarding this comments, as the item is still pending in the P1588 committee

14) Comment 61/D2.0 – We may need to create subclauses of clause 7 that list areas where 802.1AS-Rev is non-conformant with IEEE 1588 (and, if we do this, areas where 802.1AS-Rev narrows the 1588 options)

15) Comment 63/D2.0 – We will change the statement in 8.2.1 that domain 0 shall use the PTP timescale will be changed to say that it should use the PTP timescale. Note that we must check any compliance statements in clause 5 and Appendix A and change accordingly. We will check the other subclauses referenced in the comment as well for any needed changes. This item will potentially involve some amount of work.

16) Comment 85/D2.0 – Figure 10-1 must be redrawn in the style of Figure 7-1

17) Comments 102, 104 - 109/D2.0 – Some of the clause 7 figures must be edited to replace “clock client” with “clock target”

Major Technical Items

18) The managed objects and MIB must be updated to reflect new features of 802.1AS-Rev. In particular, we must consider how to represent managed objects and MIB variables that are common across all domains, rather than being per domain. It also must be decided whether there will be one instance of the MIB per domain, or a single MIB for all the domains.

19) We must go through and address all remaining editor's notes.

Major Editorial Items - 1

- Item 3 on p. iii of D2.0 – Fixing of odd numbered page numbers so they are not cut off at the bottom of the page
  - Information on how to do this has been provided to the editor
  - The necessary changes must be made to each Framemaker file
- Comment 93/D2.0 – A number of broken cross references must be fixed (it is necessary to go through the document to find them).
- Outstanding maintenance item 61 on variable names
  - The full details are not available as of the preparation of this presentation because the maintenance database pages seem to not be accessible
  - To the best of the editor's recollection, this has to do with not using the same local variable names in multiple state machines
  - Though purely editorial, this item potentially involves a very large amount of work; it was decided this would addressed in the draft after all other items have been addressed.

Thank you