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**From:** Adamiak, Mark (GE EntSol, Digital Energy) [mailto:mark.adamiak@ge.com]  
**Sent:** November 6, 2009 9:47 AM  
**To:** Ron J. Farquharson  
**Cc:** FitzPatrick, Gerald J. Dr.  
**Subject:** RE: NIST PAP-13 Actions

Ron,

Just left you a message on your cell phone. I'm finally in the office (after 3 weeks). Do give me a call back.

Do note that the joint WG met in Bilbao this week and reviewed the functional requirements document. In addition, I proposed several profiles (included below) that would meet the requirements I supplied.

Mark

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## **Draft Profile Proposal for SynchroPhasor Communications using IEC 61850**

1. The mapping of Synchrophasor Data Items into GOOSE for Relay to Relay communication. GE Multilin has already taken a first pass at this. The implementation was quite simple as we directly mapped the exact same Synchrophasor that we were streaming into a GOOSE message - along with the exact same Time Stamp. This avoided having to reconcile the differences between the 61850 Time Stamp and the C37.118 Time Stamp. For the record, the 61850 Time Stamp does not have an explicit mechanism for identifying the "time error" as does C37.118. The one recommendation from Bruce Muschlitz - which I would reject - is to dynamically change the accuracy of the reported data. This is extremely messy from a PDC perspective wherein every time stamp must then be converted to a common base.

The time base issue must also be addressed. At present, both standards do allow up to a 24 bit Fraction of Second, however, as you know, C37.118 allows for the definition of a "BASE" value. In the GE PMUs, we chose 1,000,000 as a base so that each count in the FOS represents 1usec. I am aware that there are other implementations out there. The clear "common denominator" in both standards would be to force both to use all 24 bits for the time stamp which is basically mandating that the "BASE" value is always set to  $2^{24}$ .

Note that in the above implementation, there needs to be a additional mechanism implemented to "Launch" the GOOSE - which I suggest be the existing trigger - dupd - which is Data Update. This trigger was designed to send data after a "Freeze" operation - which is effectively what a Synchrophasor calculation is - a "frozen" set of data.

2. To address the issue of data coherence, I suggest either the definition of a new Logical Node - a "Synchronized" LN or a new Calculation Type - clctype - which would be "Sync". With the ClcType being equal to Sync, the user would be guaranteed that all the data in the LN is "coherent" and is from the same instant of time. Again, to address the Time Stamp issue, I suggest adding the Synchrophasor Time Stamp - SyncTime - as an attribute to the data items. SyncTime would be the existing C37.118 Time Stamp. I do note that the Second of Century piece of the time stamps is identical so only the Fraction of Second would have to be issued.

3. There is now a need to stream data out of a Logical Node. To implement this, I suggest adding a new control bit called Stream or strm. When set, data would be streamed at at the rate strmRate - another new data item. To determine as to whether data is streamed via TCP or UDP, I suggest another attribute to allow the user to select either TCP or UDP as the streaming profile (perhaps, there are 2 Stream attributes - TCPstrm and UDPstrm). I note that is UDP is chose, there needs to be a new setting for an IP address (or 2 or three or 4) to which the UDP stream will be sent. I also note that ONS has requested the ability to implement a Multicast IP address.....