

IEEE C37.118 and IEC

Resolution process of joint logo request
by IEEE (harmonization)

NASPI Meeting
Arlington, VA

Joint IEEE and IEC Task force has decided:

- IEEE C37.118 is being split into:
 - Measurement/testing section (e.g. how to take/calculate a synchrophasor)
 - Communications
 - Current C37.118 protocol will be documented and “frozen”
 - IEC 61850-90-5 will be a new part
 - Neither will address serial based synchrophasor communications.
 - IEC 61850-90-5 will be developed to address new features/functions.
- Need to develop a migration roadmap and document it as part of IEC 61850-90-5.

How to migrate from C37.118 to IEC 61850-90-5

C37.118		61850	
Current State + Error Corrections	C37.118 Initial Migration	<u>“Lite”</u> 61850	“Full” 61850
Enable/Disable data frames	+ SCL CID file	Preconfigured in SCL <u>CID file</u> and automatically enabled.	Control Blocks + SCL
Header exchange	+ SCL CID File (description fields for C37.118 have header information)	SCL CID File (description fields)	File Transfer + SCL CID File (description fields)
CFG-1 Exchange	+ SCL ICD File	SCL ICD File	SCL ICD File + Discovery
CFG-2 Exchange	+SCL CID File	SCL CID File	SCL CID File + <u>DataSets</u> + <u>DataObjects</u>
Extended Frame	No migration indicated	Not Standardized but could use GOOSE or other 61850 Mechanism	Not Standardized but could use GOOSE or other 61850 Mechanism
Data Frame	No change	GOOSE or SV over UDP/IP	GOOSE or SV over UDP/IP

IEC 61850-90-5 (still under development)

- Allows for transmission of time aligned and non-time aligned information (e.g. multiple PDU transmission support).
- Use of UDP/IPv4/IPv6 allows for the use of multicast addresses,
- Should allow for “late” information to be delivered.
- Will support event driven messaging and streaming.

Other features being discussed...

- Needs to provide substation-to-substation and substation-control center
- Designed for control center-to-control center
- Does not require/expect time alignment to be provided by PDCs or other intermediate systems
- Needs to be able to support 120 samples/second (might need 240/second)
- Security
 - Application level digital signature on data to detect tamper and to provide “chain” of trust capability.

Assumptions

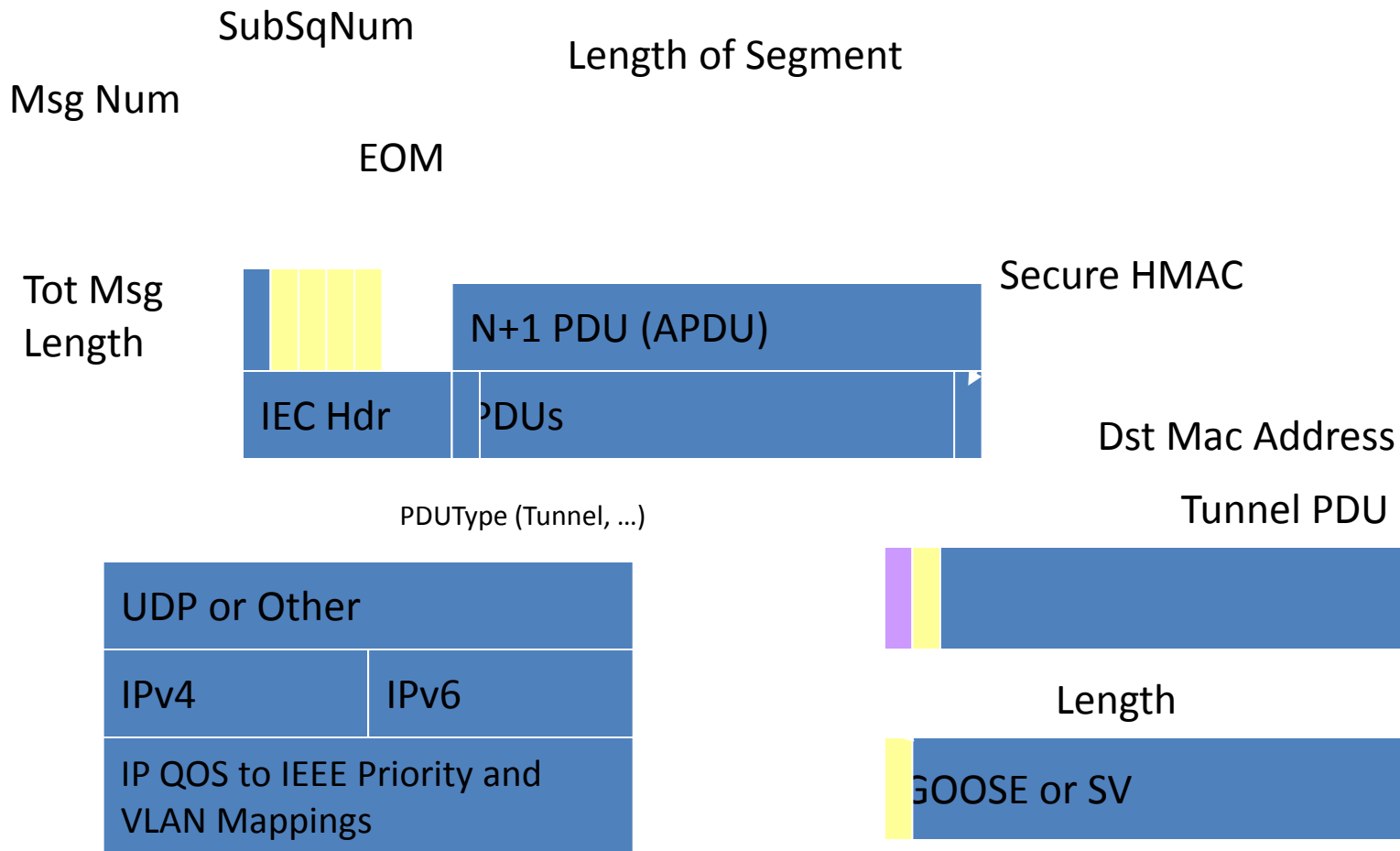
- What goes out comes in for Relays and PMUs
 - Minimizes protocol support
 - Eases debug/diagnostics
- Intermediate Systems (e.g. PDCs and Phasor Gateways)
 - Provide up/down sampling
 - May not provide time alignment function
 - Implication: Applications/System designers must provide a time alignment function.

Phasor Gateways can (based on IEC 61850-90-5):

- Deliver of late arrival information. Increases operational awareness.
- Are basically publish/subscribe/event emitters.
 - Can also support streaming of analogs if needed*.
- Addresses one of the deficiencies in C37.118 based PDCs of not being able to indicate that information has not been delivered (done by implementation agreement for Not-A-Number/NAN). NAN does not help with digitals!
- Use of IEC 61850 DataSet constructs can allow subsets of information to be disseminated.
- Can function in a PDC like mode.

* - The other competing technology is only publish/subscribe (non-standards based).

How it will probably work (IEC 61850-90-5)



A closer look at the A-Profile

Modeled after
connectionless
Session:
SI=80 (Tunnel)
SI=81 (GOOSE)
SI=82 (SV)

IEC 61850-8-1 GOOSE	IEC 61850-9-2 Sampled Values
IEC 61850 Protocol for sending GOOSE and SV over OSI Connectionless Transport	
ITU X.234 (OSI Connectionless Transport)	
RFC-1240 (OSI Connectionless Transport over UDP)	

Reserves Port 102 (same port as used by other parts of IEC 61850)