

Functional PDC Requirements

- SCOPE:
- It is noted there is a complete standard for synchro-phasor measurement (C37.118) but there is no complete standard for the phasor data concentrator (PDC) which is defined as correlating data from the PMU(s) by time tag and then broadcasting the combined data for processing. The goal of this task team will be to provide a generalized reference for the PDC which could be used by industry and manufacturers to aid in the education of the function of the PDC and to aid in the creation of PDC specifications that could be used for wide area measurement systems. This reference might later be used to create a standard but that will not be addressed by this group.

- The schedule, deliverables, and estimated workload is expected to be tallied by an external consultant and this group will act as leads and owners of the final document. For the present time this document will not include IEC 61850 as other documents yet to be produced will encompass that area of integration.

PDC Requirements – Core functionality:

- Aligning data into a comprehensive data block
 - Ability to accept data sources with different data rates. This includes both downsampling and upsampling. In the case of downsampling, the topic of aliasing needs to be addressed and handled properly within a tolerance or error. In the case of upsampling, interpolation should be within a tolerance of error.
 - Ability to handle missing and/or corrupted input data. The PDC should specify a quality flag that data is missing (whether this flagging capability should also be a core functionality or just an option has not yet been decided).
 - Latency requirements should be defined (how long should one wait before the PDC decides the data is missing?)
-

PDC Requirements – Core functionality (cont'd):

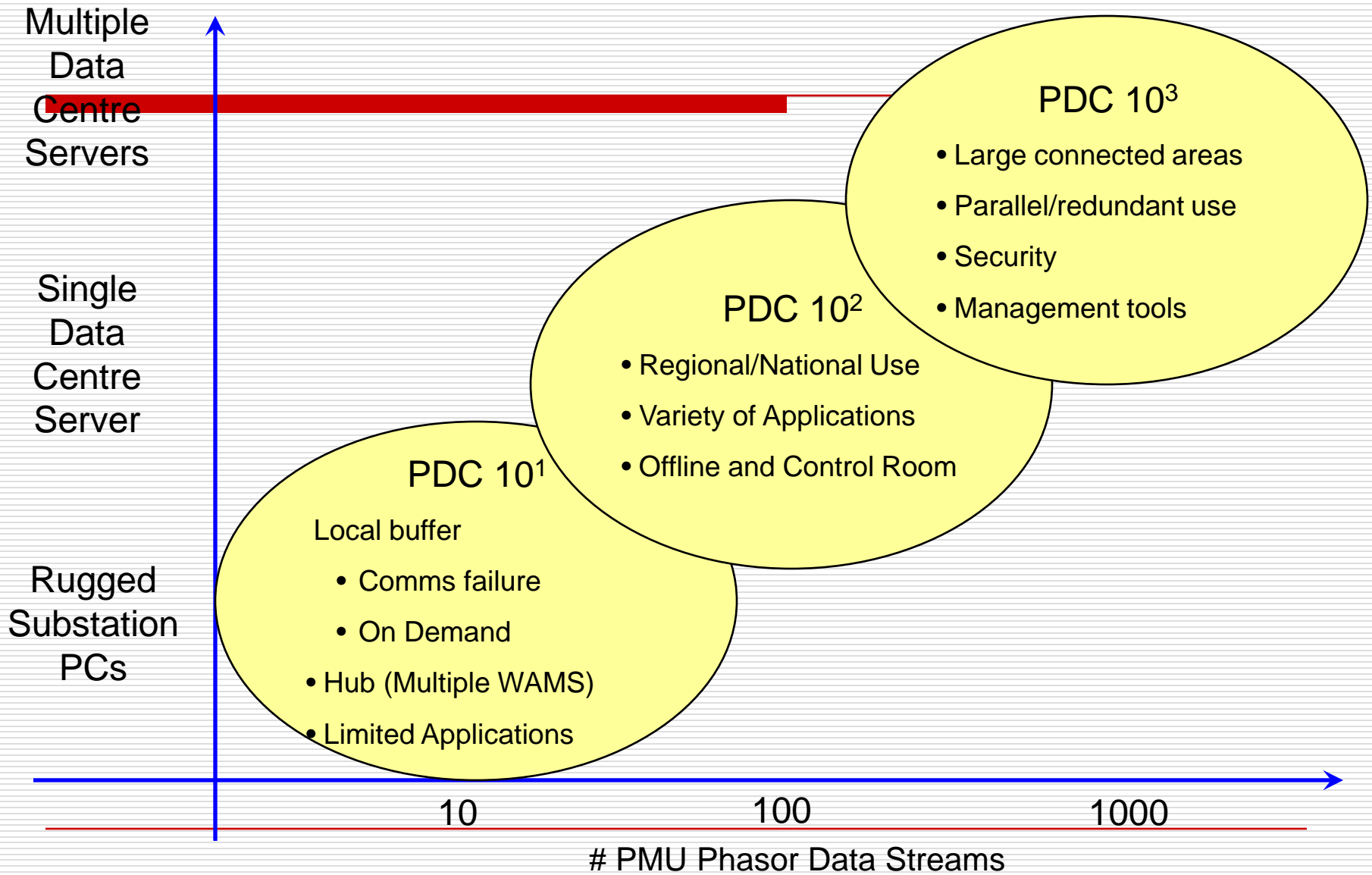
- Distributing data to various users
 - Ability to distribute received data to multiple users simultaneously, each of them may have different requirements on the data
 - Ability to process and repack received data into different data rates from that of received
 - Ability to repack data with different subset of data from the received data
-

PDC Requirements – Core functionality (cont'd):

- Providing system management functions such as performance history and trouble alarms
 - Ability to log PMU availability statistics
 - Ability to alarm operators about PDC and other system problems
 - Ability to detect PMU lost with customer configurable delay (either absolute or relative)
 - Ability to cross trigger commands for recording/storing of events of interest
-

Appendix – Architecture, Hardware and Functional Considerations

- Direct connection.
 - Tiered Regional Operation.
 - Peered Operation.
 - Data on demand.
 - Different Formats other than C37.118-2005
 - Handling of Different Data Rates
 - Ability to remote configure and control PMUs
 - PDC Signal Processing Requirements
-



Applications

OS – Oscillatory Stability

AF – Angle & Frequency

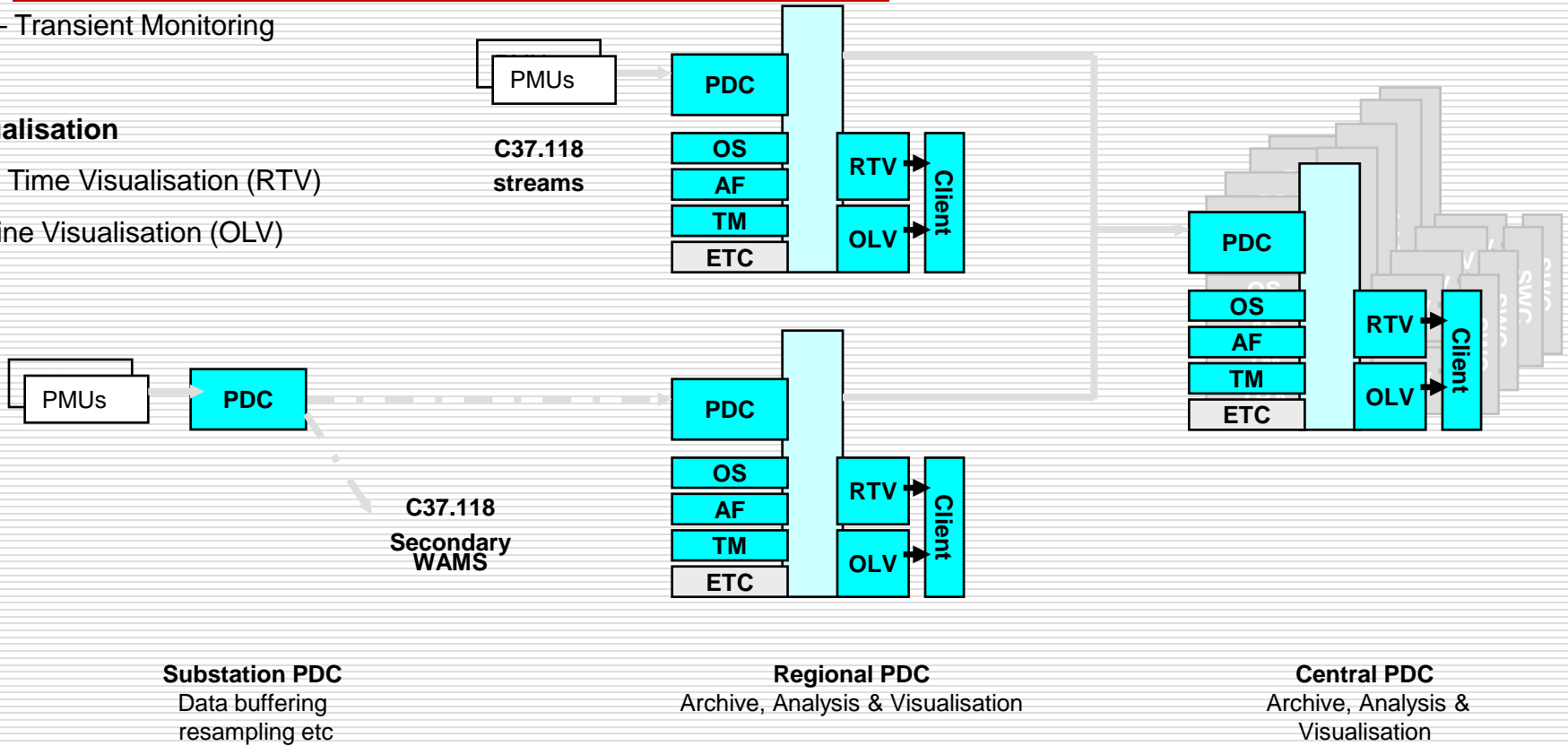
TM – Transient Monitoring

ETC

Visualisation

Real Time Visualisation (RTV)

Off-line Visualisation (OLV)



Appendix – Architecture, Hardware and Functional Considerations

- Different formats other than C37.118-2005
 - Outputs to EMS SCADA in the form of ICCP or ASCII or other formats is an option that utilities may want to explore
 - Inputs from devices that use older protocols like IEEE1344 may need to be incorporated into the PDC and is an option utilities may want to explore
-

Appendix – Architecture, Hardware and Functional Considerations

- Handling Different Data Rates
 - In applications where one is going to a State estimator down sampling may be required at the output of the PDC. Some sort of aliasing error should be defined as acceptable by the User. Utilities should consider this error when they construct their system architecture (depends of the applications). It should be also be noted that when re-sampling is done there is a need to flag that the data has been re-sampled.
 - In applications where older PMUs on their system cannot all be adjusted to a common 30 frames/second or a protection and control application that needs inputs of 60 frames/second or higher, it is useful that the PDC be capable of handling these different input rates. This is a core requirement but the utility may want, as an option, to define how they handle the combining (averaging, holding data etc.)
-

Appendix – Architecture, Hardware and Functional Considerations

- Ability to Remote Configure and Control PMUs
 - There is the simple stopping and starting of the data stream into the PDC which is considered a core requirement.
 - There is the ability to remotely stop and restart the PMU in the field which is considered a core requirement but would require that the existing multifunction capability of the PMU not be disturbed (that is you cannot restart the PMU without sufficient permission to override protective or recording function)
 - There is the ability to remotely configure parameters on the PMU like frames/second or phasing of voltages or line-neutral vs line to ground or perhaps filtering modes. These are not core requirements of the PDC but important for the utility to explore as an option for their specific requirement.
 - The User should in all cases above explicitly inform the vendor what types of PMUs are on their system as the incorporation of any of these options may not be possible (ie. proprietary or simply not available).
-

Appendix – Architecture, Hardware and Functional Considerations

- PDC Signal Processing Requirements
 - Include document in entirety
-

Questions?

- Contacts: Tony Weekes
Robert Folkes
Yi Hu
Suchil Cherian
Ken Martin
Jim Hackett
Henry Huang
-