[Feature #622: Parameters not available in standardized LN - IEC 61850 User Feedback Task Force - UCAIug Issue Tracking System](https://redmine.ucaiug.org/issues/622)

Some parameters needed for RTE functions are not available in normalized LN. Besides, we need to have some generic parameters (with threshold, delay, boolean), for example in LN GAPC.

As illustration of the use case, the LN LSET above contains parameters required for Rte functions and not covered by settings in LN included in the IEC 61850 standard.

| **LSET - Rte Extended Setting** |
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| **DO Name** | **CDC** | **T** | **Explanation** | **M-O-C nds/ds** |
| **Descriptions** |
| NamPlt | LPL |  | Inherited from: Domain LN | O/O |
| **Status Information** |
| Beh | ENS |  | Inherited from: Domain LN | M/M |
| Health | ENS |  | Inherited from: Domain LN | O/O |
| **Settings** |
| OpDlTmms | ING |  | Instance of Operate Delay Time | Omulti/Omulti |
| DlTmms | ING |  | Instance of DelayTime | Omulti/Omulti |
| StrVal | ASG |  | Instance of threshold | Omulti/Omulti |
| OnOff | SPG |  | Instance of Boolean parameter | Omulti/Omulti |
| SetNb | ING |  | Instance of integer parameter | Omulti/Omulti |
| SetPhNum | ENG |  | Phase (ph0, ph3, ph4, ph7, ph8, ph11, neutral), cf. §3.3.2 | O/O |
| SetPhsOrig | ENG |  | Indication of single phase or combined phase voltage (a, b, c, ab, bc, ca, a\_b\_c, ab\_bc\_ca) | O/O |
| NamAccRtg | VSD |  | Accuracy class rating according to 61869-9 | O/O |
| PhyConnITF | ENG |  | Indication of the type of a communication interface (e.g. for line differential protection). Possible values: FO\_850\_multimode, FO\_1310\_monomode, FO\_1550\_monomode, X21V11 | Omulti/Omulti |
| SetRef | ORG |  | Setting for indicating an IEC 61850 object reference | Omulti/Omulti |
| VRtg | ASG |  | Rated Voltage | O/O |
| ARtg | ASG |  | Rated Current | O/O |
| HzRtg | ASG |  | Rated Frequency | O/O |

We have 2 use cases:

* **Some generic parameters need to be introduced**. > WG10 comment: GPAC LN use cases: RTE to give more information
	+ In particular: delays, thresholds, Boolean and integer parameters (opDITmms, DITmms, StrVal, OnOff, SetNb). These kinds of parameters can already be found in existing LN, but with a specific semantic meaning, which cannot be applied to all users’ specific applications.

More details on use cases: for generic substation functions, which are specific to the utility, no generic LN is available. This requires thus the use of GAPC for certain features. Example:

* + - The duration for time delay of maintenance work before issuing a danger alarm if no reactualisation. It can be express with OpDITmms, DITmms of GAPC.
		- The treatment of incoming phone call in case of several operators in the same substation. It has to be indicated which incoming phone call has to be notified to each operator, and it can be express with OnOff setting of GAPC.
		- SetNb: generic enumerate for use cases where a dedicated enumerate is considered to be too specific. Use cases include:
			* Substation level functions for overload management: in case of overload in one feeder, it can be useful to either close or trip another feeder or the same feeder; or to issue an alarm. This corresponds to a setting with five cases that could be express with SetNb. Another SetNb could be used to identify the feeder to be opened or closed. It is preferred to add this as settings as it may changed depending on the operational conditions of the network.
			* Substation with several feeders connected to one generator hold by a different operator: the operator indicates, in case of de-energisation, the order of re-energisation of the generators. This depends of the state of generator and cannot be done by configuration.
		- StrVal: for the calculation of phasors, it might be of interest to verify that there is no transient in the time window used for the calculation of the phasor. This can be done by comparing the DC and harmonic components resulting from the FFT of the time window. The corresponding thresholds can be express by StrVal of GAPC, as long as this feature is not implemented in MMXU LN.
	+ SetRef: setting for indicating an IEC 61850 object reference. Some function need to have a setting indicating which input (for example SV streams, phasors, CB position…) has to be used. There is no setting DO defined in existing LN, it is proposed to add this DO in LN GAPC to make it generic.

More details on use cases:

* Use case 1: recloser function where it is necessary to use the line voltage and busbar voltage. The busbar voltage to be used depends on the topology of the substation. This means that an external function needs to indicate which voltage busbar is to be used. The SetRef is written by the external function and corresponds to the TVTR stream of the relevant merging unit. It cannot be done by configuration as the topology changes dynamically depending on the state of circuit breaker and disconnector switches.
* Use case 2: in case of redundant SV streams, several merging unit may be eligible to provide the SV stream use for the function.

Since the opening of the issue, RTE has chosen to use InRef and dynamically write the SrcCBRef (with an external function) to cover these use cases. No other uses cases that could not be covered this way have been identified. **There is no longer need to have implementation of SetRef**.

* + Proposal is to add these parameters to LN GAPC.
* **Some specific parameters are also proposed** :
	+ SetPhNum : Phase (ph0, ph3, ph4, ph7, ph8, ph11, neutral) to be used. Should be used in each specific LN related to voltage (RREC, PIOC, PTOC, PTOV, PIOV, FXOT, FXUT,…).
		- Use case 1 (configuration): indication of the phase to be use for recloser on voltage control. This allows to indicate which voltage transformer on the line side is to be used, to compare the line voltage to a single phase voltage provided by a VT installed on the busbar.
		- Use case 2 (setting): overcurrent protection in order to indicate the phase which is most loaded and shall be used at reference.

* + SetPhsOrig: Indication of single phase or combined phase voltage (a, b, c, ab, bc, ca, a\_b\_c, ab\_bc\_ca). Should be used in each specific LN related to voltage (PIOC, PTOC, PTOV, PIOV, FXOT, FXUT…).
		- Use case 1: setting for tap changer regulator, indicating which phase to ground or phase to phase voltage has to be used as input of the regulator.
		- Use Case 2: overvoltage protection, to choose phase to ground or phase to phase voltage to be used.

WG10 comment: SetPhNum/SetPhsOrig: Information should be taken from the source, using the connection between the source and the target P-Logical Nodes.

Use case of current overload protection: the current overload protection verifies if the phase current exceeds a threshold. In some application, the phase that has to be monitored can change depending on the network topology and constrains. In this case, the function has to subscribed to all phase’s currents in the SV streams, and the phase to be used needs to be indicated by a setting. This is dynamic and cannot be done by configuration. It can be done using SetPhNum or SetPhsOrig. It would be complicated to implement this as an external function outside the protection. Similar use cases can apply to several protection functions (under / overvoltage protections, …).

* + NamAccRtg: this is a setting already associated with TCTR, but it is also needed for some protection LN, in particular the LN PDIS. This enable to adapt the application to the accuracy of the CT.

WG10 comment: NamAccRtg: Should be taken from the SCL file. This setting is part of the TCTR/TVTR.

It is correct that this information should be taken from TCTR/TVTR. Nevertheless, this corresponds to a setting of certain protection function (in particular Line Differential Protection). It is thus necessary to express this information as setting information associated to the LN and it should be done using the same DO.

* + PhyConnITF: Indication of the type of a communication interface (e.g. for line differential protection). Possible values: FO\_850\_multimode, FO\_1310\_monomode, FO\_1550\_monomode, X21V11

WG10 comment: PhyConnITF: Clarification from RTE is needed, If the goal is to indicate the type of interface, Communication section could be used to model this interface.

The use case is to express the communication interface of line differential protections. It is true that this communication interface could be expressed in the communication part, but in this case it is not clear which SubNetwork protocol type should be used (enumeration restricted to IP, 8-MMS, and physical), if the communication interface is not an IP type. To be clarified by the TF: should proprietary communication between IEDs at the 2 ends of the line be expressed as AP?

* + VRtg – ARtg – HzRtg: some protection functions need the indication about the rated primary voltage, current and frequency. It is proposed to add these parameters to all protection LN using analogue input values.

WG10 comment: VRtg – ARtg – HzRtg: Similar to the other ones, this information should be part of the source to guarantee consistency of information, rather than having the same setting in all of the P-logical node instances. The question is how to be able to get this information and how to be sure that the information is in the CID file of the IED that needs the information. Possibilities: ExtRef with Poll method

From RTE, the use case here is different from NamAccRtg: it is not correct that these informations should be taken from TCTR/TVTR, since they correspond to the rated voltage / current of the instrument transformer. For protections functions, the rated voltage and current of the corresponding feeder has to be used, and it may be different from the instrument transformers rating.