

# Appendix-A

Part 7-4: Basic communication structure for substations and feeder equipment –  
Compatible logical node classes and data classes

<b>System Logical Nodes</b>	<b>Group L</b>
<b>Physical device information</b>	<b>LPHD</b>
<b>Common Logical Node</b>	<b>Logical node zero - LLN0</b>
<b>Application Logical Nodes for</b>	
<b>protection functions</b>	Group P
Differential	PDIF
Direction comparison	PDIR
Distance	PDIS
Directional overpower	PDOP
Directional under power	PDUP
Rate of change of frequency	PFRC
Harmonic restraint	PHAR
Ground detector	PHIZ
Instantaneous over current	PIOC
Motor restart inhibition	PMRI
Motor starting time supervision	PMSS
Over power factor	POPF
Phase angle measuring	PPAM
Protection scheme	PSCH
Sensitive directional earth fault	PSEF
Transient earth fault	PTEF
Time over current	PTOC
Over frequency	PTOF
Overvoltage	PTOV
Protection trip conditioning	PTRC
Thermal overload	PTTR
Undercurrent	PTUC
Under voltage	PTUV
Under power factor	PUPF
Under frequency	PTUF
Voltage controlled time over current	PVOC
Volts per Hz	PVPH
Zero speed or under speed	PZSU
<b>Logical Nodes for protection related functions</b>	<b>Group R</b>
Disturbance recorder function	RDRE
Disturbance recorder channel analogue	RADR
Disturbance recorder channel binary	RBDR
Disturbance record handling	RDRS
<b>Breaker failure</b>	<b>RBRF</b>

Directional element	RDIR
Fault locator	RFLO
Power swing detection/blocking	RPSB
Auto-reclosing	RREC
Synchronism-check or synchronizing	RSYN
<b>Logical Nodes for control</b>	<b>Group C</b>
Alarm handling	CALH
Cooling Group Control	CCGR
Interlocking	CILO
Point-on-wave switching	CPOW
Switch controller	CSWI
<b>Logical nodes for generic references</b>	<b>Group G</b>
Generic automatic process control	GAPC
Generic process I/O	GGIO
Generic security application	GSAL
<b>Logical Nodes for interfacing and archiving</b>	<b>Group I</b>
Archiving	IARC
Human machine interface	IHMI
Tele control interface	ITCI
Tele monitoring interface	ITMI
<b>Logical Nodes for automatic control</b>	<b>Group A</b>
Neutral current regulator	ANCR
Reactive power control	ARCO
Automatic tap changer controller	ATCC
Voltage control	AVCO
<b>Logical Nodes for metering and measurement</b>	<b>Group M</b>
Differential measurements	MDIF
Harmonics or inter harmonics	MHAI
Non phase related harmonics or inter harmonics	MHAN
Metering	MMTR
Non phase related Measurement	MMXN
Measurement	MMXU
Sequence & imbalance	MSQI
Metering Statistics	MSTA
<b>Logical Nodes for sensors and monitoring</b>	<b>Group S</b>
<b>Monitoring and diagnostics for arcs</b>	<b>SARC</b>
Insulation medium supervision (gas)	SIMG
Insulation medium supervision (liquid)	SIML
Monitoring and diagnostics for partial discharges	SPDC
Logical Nodes for switchgear	Group X
<b>Circuit breaker</b>	<b>XCBR</b>
<b>Circuit switch</b>	<b>XSWI</b>
<b>Logical Nodes for instrument transformers</b>	<b>Group T</b>
Current transformer	TCTR
Voltage transformer	TVTR

## Appendix-B:

### IED Services model

Service model	Description	service
<b>Data set</b>	Allow to group various data together	Get data set value Set data set value Ceate data set Delete data set Get data set directory
<b>Substation</b>	This client can request the server to replace a process value by a value set by the client . for example in the case of an invalid measurement value .	Set data values
<b>Setting group control</b>	Define how to switch from one set of setting value to another one and how to edit setting groups.	Select active SG Select Edit SG Set SG values Confirm edit SG values Get SG value Get SGCB values
<b>Reporting and logging</b>	<p>Describes the conditions for generating reports and logs based on a parameter set by the client. Reports may be triggered by changes of process data values (for example state change or deadband or by quality change. Logs can be queried for later retrieval</p> <p>Reports may be sent immediately or defferd (buffered) report provide change of state and sequence of</p>	Buffered RCB : Report Get BRCB values Set BRCB values Unbuffered RCB : Report Get URCB values

	<p>events information exchange.</p>	<p>Set URCB values</p> <p>Log CB</p> <p>Get LCB values</p> <p>Set LCB values</p> <p>Log</p> <p>Query log by time</p> <p>Query log after</p> <p>Get log status values</p>
<p><b>Generic substation events (GSE)</b></p>	<p>Provides fast and reliable system wide distribution of data peer to peer exchange of IED binary status information.</p> <p>GOOSE means Generic Object Oriented Substation</p> <p>Event and supports the exchange of a wide range of possible common data organized by a DATA SET</p> <p>GSSE means Generic Substation State Event and provides the capability to convey state change information (bit pairs)</p>	<p><b>GOOSE CB:</b></p> <p>Send GOOSE message</p> <p>Get GO reference</p> <p>Get GOOSE element number</p> <p>Get GoCB values</p> <p>set GoCB values</p> <p><b>GSSE CB:</b></p> <p>Send GSSE message</p> <p>Get Gs reference</p> <p>Get GSSE element number</p> <p>Get GsCB values</p> <p>set GsCB values</p>

<p><b>Transmission of sampled values</b></p>	<p>Fast and cyclic transfer of samples for example of instrument transformers</p>	<p><b>Multicast SVC:</b>  Send MSV message  Get MSVCB values  set MSVCB values</p> <p>unicast SVC:  Send USV message  Get USVCB values  set USVCB values</p>
<p><b>Control</b></p>	<p>Describes the services to control for example. Devices or parameter setting groups</p>	<p>Select  Select with value  Cancel  Command termination  Time activated operate</p>
<p><b>Time and time synchronisation</b></p>	<p>Provide the time base for the device and system.</p>	<p>Service in SCSM</p>
<p><b>File transfer</b></p>	<p>Define the exchange of huge data blocks such as programs</p>	<p>Get file  Set file  Delete file  Get file attribute values</p>