

IEC61850 Conformance Document for Kalki Substation Gateway and Kalki Protocol Gateway

Version – 1.0

KALKI Communication Technologies Pvt.. Ltd.,
#147, 2nd Floor, 5th Main, 7th Sector,
H.S.R. Layout, Bangalore,
INDIA – 560034.
Phone: 91-80-5721263
<http://www.kalkitech.com>

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1. Abbreviations

- ASCII Abstract Communication Service Interface
- SCSSM Specific Communication Service Mapping
- SCL Substation Configuration Language
- GSE Generic Substation Events
- GOOSE Generic Object Oriented Substation Events
- GSSE Generic Substation Status Events
- SVC Sampled Value Control
- LCB Log Control Block
- Y Indicates Feature Supported
- N Indicates Feature Not Supported
- F Indicates Future Support

2. Basic ACSI Conformance

Basic ACSI conformance		Client/ subscriber	Server/ publisher	Value/ comments
Client-server roles				
B11	Server side (of TWO-PARTY-APPLICATION-ASSOCIATION)	-	Y	
B12	Client side of (TWO-PARTY-APPLICATION-ASSOCIATION)	Y	-	
SCSMs supported				
B21	SCSM: IEC 61850-8-1 used	Y	Y	Mapping of objects & services of ACSI to MMS (ISO/IEC 9506) & ISO/IEC-8802-3
B22	SCSM: IEC 61850-9-1 used	F	N	Sampled values over serial point to point.
B23	SCSM: IEC 61850-9-2 used	F	N	Sampled values over ISO/IEC 8802-3
B24	SCSM: other	-	-	
Generic substation event model (GSE)				
B31	Publisher side	-	F	
B32	Subscriber side	F	-	
Transmission of sampled value model (SVC)				
B41	Publisher side	-	N	
B42	Subscriber side	F	-	

3. ACSI Model Conformance: -

ACSI Model Conformance		Client/ subscriber	Server/ publisher	Value/ comments
M1	Logical device	Y	Y	
M2	Logical node	Y	Y	
M3	Data	Y	Y	
M4	Data set	Y	Y	
M5	Substitution	N	N	
M6	Setting group control	N	N	
Reporting				
M7	Buffered report control	Y	Y	Require sufficient bRCBs to support primary and backup links to each remote client to enable remote clients to obtain all dynamic data via reports.
M8	Unbuffered report control	Y	Y	Require sufficient uRCBs to support primary and backup links to each remote client to enable remote clients to obtain all dynamic data via reports.
Logging				
M9	Log control	F	F	
M10	Log	F	F	
M11	Control	Y	Y	
M12	GOOSE	F	F	
M13	GSSE	F	F	

4. ACSI service conformance statement

ACSI Service Conformance		Client/ subscriber	Server/ publisher	Comments
Server (Clause 6)				
S1	ServerDirectory	Y	Y	

ACSI Service Conformance		Client/ subscriber	Server/ publisher	Comments
Application association (Clause 7)				
S2	Associate	Y	Y	
S3	Abort	Y	Y	
S4	Release	Y	Y	
Logical device (Clause 8)				
S5	LogicalDeviceDirectory	Y	Y	
Logical node (Clause 9)				
S6	LogicalNodeDirectory	Y	Y	
S7	GetAllDataValues	Y	Y	
Data (Clause 10)				
S8	GetDataValues	Y	Y	
S9	SetDataValues	Y	Y	
S10	GetDataDirectory	Y	Y	
S11	GetDataDefinition	Y	Y	
Data set (Clause 11)				
S12	GetDataSetValues	Y	Y	
S13	SetDataSetValues	Y	Y	
S14	CreateDataSet	Y	Y	
S15	DeleteDataSet	Y	Y	
S16	GetDataSetDirectory	Y	Y	
Substitution (Clause 12)				
S17	SetDataValues	N	N	
Setting group control (Clause 13)				
S18	SelectActiveSG	N	N	
S19	SelectEditSG	N	N	
S20	SetSGValues	N	N	
S21	ConfirmEditSGValues	N	N	
S22	GetSGValues	N	N	
S23	GetSGCBValues	N	N	
Reporting (Clause 14)				
Buffered report control block (BRCB)				
S24	Report	Y	Y	
S24-1	data-change (dchg)	Y	Y	
S24-2	qchg-change (qchg)	Y	Y	
S24-3	data-update (dupd)	Y	Y	
S25	GetBRCBValues	Y	Y	

ACSI Service Conformance		Client/ subscriber	Server/ publisher	Comments
S26	SetBRCBValues	Y	Y	
Unbuffered report control block (URCB)				
S27	Report	Y	Y	
S27-1	data-change (dchg)	Y	Y	
S27-2	qchg-change (qchg)	Y	Y	
S27-3	data-update (dupd)	Y	Y	
S28	GetURCBValues	Y	Y	
S29	SetURCBValues	Y	Y	
Logging (Clause 14)				
Log control block				
S30	GetLCBValues	F	F	
S31	SetLCBValues	F	F	
Log				
S32	QueryLogByTime	F	F	
S33	QueryLogAfter	F	F	
S34	GetLogStatusValues	F	F	
Generic substation event model (GSE) (Clause 14.3.5.3.4)				
GOOSE-CONTROL-BLOCK (GoCB)				
S35	SendGOOSEMessage	F	F	
S36	GetGoReference	F	F	
S37	GetGOOSEElementNumber	F	F	
S38	GetGoCBValues	F	F	
S39	SetGoCBValues	F	F	
GSSE-CONTROL-BLOCK				
S40	SendGSSEMessage	F	F	
S41	GetGsReference	F	F	
S42	GetGSSEElementNumber	F	F	
S43	GetGsCBValues	F	F	
S44	SetGsCBValues	F	F	
Transmission of sampled value model (SVC) (Clause 16)				
Multicast SVC				
S45	SendMSVMessage	F	N	
S46	GetMSVCBValues	F	N	
S47	SetMSVCBValues	F	N	
Unicast SVC				
S48	SendUSVMessage	F	N	

ACSI Service Conformance		Client/ subscriber	Server/ publisher	Comments
S49	GetUSVCBValues	F	N	
S50	SetUSVCBValues	F	N	
Control (17.5.1)				
S51	Select	Y	Y	
S52	SelectWithValue	Y	Y	
S53	Cancel	Y	Y	
S54	Operate	Y	Y	
S55	Command-Termination	Y	Y	
S56	TimeActivated-Operate	Y	Y	
File transfer (Clause 20)				
S57	GetFile	N	N	
S58	SetFile	N	N	
S59	DeleteFile	N	N	
S60	GetFileAttributeValues	N	N	
Time (5.5)				
T1	Time resolution of internal clock	1ms	1ms	Future Requirement for 1 usec
T2	Time accuracy of internal clock	+/- 0.1ms	+/- 0.1ms	Future Requirement for +/- .1usec
T3	Supported TimeStamp resolution	1ms	1ms	Future Requirement for 1 usec

5. Protocol Implementation Conformance Statement (PICS) for A-Profile support

A-Profile Description	Client	Server	Value/Comment
A1	Client/Server A-Profile	Y	Y
A2	GOOSE/GSE Management A-Profile	F	F
A3	GSSE A-Profile	F	F
A4	TimeSync A-Profile	Y	Y

6. PICS for T-Profile support

	T-Profile Description	Client	Server	Value/Comment
T1	TCP/IP T-Profile	Y	Y	
T2	OSI T-Profile	N	N	
T3	GOOSE/GSE T-Profile	F	F	
T4	GSSE T-Profile	F	F	
T5	TimeSync T-Profile	Y	Y	

7. SCL conformance degrees

degree	SCL Conformance	Client	Server	Comments
SCL.1	SCL File for Implementation Available (offline)	Y	Y	SCL files for an IEC61850 server is required by part 6
SCL.2	SCL File available from implementation online	N	N	
SCL.3	SCL implementation reconfiguration supported online	N	N	

8. Supported ACSI services for SCL.2 and SCL.3

SCL Conformance	Client	Server	Comments
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SCL Conformance	Client	Server	Comments
ACSI Services			
GetFileAttributeValues	N	N	
GetFile	N	N	
SetFile	N	N	
DeleteFile	N	N	
GetDataValues	N	N	
SetDataValues	N	N	
SCL Control Block	N	N	
SCL File Structure	N	N	
Remote Creation of SCL File	N	N	

9. Additional MMS services for SCL.2 and SCL.3

SCL Conformance	Client	Server	Comments
MMS Services			
GetCapabilityList	N	N	
GetDomainAttributes	N	N	
LoadDomainContent	N	N	
StoreDomainContent	N	N	

10. Definition of SCL control block

IEC 61850-8-1 Component Name	Client	Server	Comments
Validate	N	N	
ValState	N	N	
Activate	N	N	

11. IEC61850-7-4 Logical Nodes Required for Servers

LN Name	Description	Server / Clients	Comments
(L) System Logical Nodes			

LN Name	Description	Server / Clients	Comments
LLNO	Common Logical Node Zero	Y	Required by IEC61850
LPHD	Physical Device	Y	
(P) Protection Functions			
PDIF	Differential	Y	
PDIR	Directional	Y	
PDOP	Directional Over Power	Y	
PDUP	Directional Under Power	Y	
PFRC	Rate of Frequency Change	Y	
PHAR	Harmonic Constraint	Y	
PHIZ	Ground Detection	Y	
PIOC	Instantaneous Over Current	Y	
PMRI	Motor Restart Inhibition	Y	
PMSS	Motor Starting Time Supervision	Y	
POPF	Over power Factor	Y	
PPAM	Phase Angle Measuring	Y	
PSCH	Protection Scheme	Y	
PSDE	Sensitive Directional Earth Fault	Y	
PTEF	Transient Earth Fault	Y	
PTOC	Time Over Current	Y	
PTOF	Over Frequency	Y	
PTOV	Over Voltage	Y	
PTRC	Protection Trip Conditioning	Y	
PTTR	Thermal Overload	Y	
PTUC	Under Current	Y	
PTUV	Under Voltage	Y	
PUPF	Under Power Factor	Y	
PTUF	Under Frequency	Y	
PVOC	Voltage Controlled Time Over Current	Y	
PVPH	Volts per Hertz	Y	
PZSU	Zero Speed or Under Speed	Y	
(R) Protection Related Functions			
RDRE	Disturbance Recorder Function	Y	
RADR	Disturbance Recorder Channel Analogue	Y	
RBDR	Disturbance Recorder Channel Binary	Y	
RDRS	Disturbance Record Handling	Y	
RBRF	Breaker Failure	Y	

LN Name	Description	Server / Clients	Comments
RDIR	Directional Element	Y	
RFLO	Fault Locator	Y	
RPSB	Power Swing Detection/Blocking	Y	
RREC	Auto Reclosing	Y	
RSYN	Synchronism Check or Synchronizing	Y	
(C) Control			
CALH	Alarm Handling	Y	
CCGR	Cooling Group Control	Y	
CILO	Interlocking	Y	
CPOW	Point on Wave Switching	Y	
CSWI	Switch Controller	Y	
(G) Generic References			
GAPC	Generic Automatic Process Control	Y	
GGIO	Generic Process I/O	Y	
GSAL	Generic Security Application	Y	
(I) Interfacing and Archiving			
IARC	Archiving	Y	
IHMI	Human Machine Interface	Y	
ITCI	Telecontrol Interface	Y	
ITMI	Telemonitoring Interface	Y	
(A) Automatic Control			
ANCR	Neutral Current Regulator	Y	
ARCO	Reactive Power Control	Y	
ATCC	Automatic Tap Changer Controller	Y	
AVCO	Voltage Control	Y	
(M) Metering and Measurement			
MDIF	Differential Measurements	Y	
MHAI	Harmonics or Interharmonics	Y	
MHAN	Non-Phase Related Harmonics or Interharmonics	Y	
MMTR	Metering	Y	
MMXU	Measurement	Y	
MSQI	Sequence and Imbalance	Y	
MSTA	Metering Statistics	Y	
(S) Sensors and Monitoring			
SARC	Monitoring and Diagnostics for arcs	Y	
SIMG	Insulation Medium Supervision (gas)	Y	

LN Name	Description	Server / Clients	Comments
SIML	Insulation Medium Supervision (liquid)	Y	
SPDC	Monitoring and Diagnostics for Partial Discharges	Y	
(X) Switchgear			
XCBR	Circuit Breaker	Y	
XSWI	Circuit Switch	Y	
(T) Instrument Transformers			
TCTR	Current Transformer	N	
TVTR	Voltage Transformer	N	
(Y) Power Transformers			
YEFN	Earth Fault Neutralizer	Y	
YLTC	Tap Changer	Y	
YPSH	Power Shunt	Y	
YPTR	Power Transformer	Y	
(Z) Further Power System Equipment			
ZAXN	Auxilliary Network	Y	
ZBAT	Battery	Y	
ZBSN	Bushing	Y	
ZCAB	Cable	Y	
ZCAP	Capacitor Bank	Y	
ZCON	Converter	Y	
ZGEN	Generator	Y	
ZGIL	Gas Insulated Line	Y	
ZLIN	Power Overhead Line	Y	
ZMOT	Motor	Y	
ZREA	Reactor	Y	
ZTCF	Thyristor Controlled Frequency Converter	Y	
ZTCR	Thyristor Controlled Reactive Component	Y	