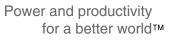


System 800xA IEC 61850 Connect Configuration

System Version 5.1





System 800xA IEC 61850 Connect Configuration

System Version 5.1

NOTICE

This document contains information about one or more ABB products and may include a description of or a reference to one or more standards that may be generally relevant to the ABB products. The presence of any such description of a standard or reference to a standard is not a representation that all of the ABB products referenced in this document support all of the features of the described or referenced standard. In order to determine the specific features supported by a particular ABB product, the reader should consult the product specifications for the particular ABB product.

ABB may have one or more patents or pending patent applications protecting the intellectual property in the ABB products described in this document.

The information in this document is subject to change without notice and should not be construed as a commitment by ABB. ABB assumes no responsibility for any errors that may appear in this document.

In no event shall ABB be liable for direct, indirect, special, incidental or consequential damages of any nature or kind arising from the use of this document, nor shall ABB be liable for incidental or consequential damages arising from use of any software or hard-ware described in this document.

This document and parts thereof must not be reproduced or copied without written permission from ABB, and the contents thereof must not be imparted to a third party nor used for any unauthorized purpose.

The software or hardware described in this document is furnished under a license and may be used, copied, or disclosed only in accordance with the terms of such license. This product meets the requirements specified in EMC Directive 2004/108/EC and in Low Voltage Directive 2006/95/EC.

TRADEMARKS

All rights to copyrights, registered trademarks, and trademarks reside with their respective owners.

Copyright © 2003-2015 by ABB. All rights reserved.

Release: July 2015 Document number: 9ARD171387-510 D

Table of Contents

About This User Manual

User Manual Conventions	12
Feature Pack	13
Warning, Caution, Information, and Tip Icons	13
Terminology	14
Released User Manuals and Release Notes	16

Section 1 - Introduction

800xA IEC 61850 Connect Package	19
Object Types	20
IEC 61850 Connect System Topology	23

Section 2 - 800xA IEC61850 OPC Server

IEC 61850 OPC Server Features	25
CET Alarm and Event Object Properties	
Event Categories	
Event Definitions	
CET Objects Properties	
IEC 61850 OPC Server Object Properties	
IEC 61850 Subnetwork Object Properties	
IEC 61850 Device Object Properties	
Logical Device Object Properties	42
Supported IEC 61850-Ed1 Data Objects	44
Data Object and Attribute Viewer	45
Measurement	48
Measurement Limit Supervision	

Common Data Class Object Properties	49
Other Common Data Class Object Properties	53
Report Control Block Object Properties	83
Data Sets	83
Data Reporting	83
Report Control Block	84
CET Project Configuration	88
Adding Computer Node Object	89
Adding OPC Server Object	90
SCL Import	93
Update and Reload Configuration	99
Redundant IEC 61850 OPC Server Configuration10	02
Affinity Configuration for IEC 61850 Projects with IEC 61850 Redundant	
Connectivity Server	
CET Feature Pack Update 10	
Updated Event Categories10	
Area Name and Area Description Configuration10	07
System Consistency Check during SCD file import10	
Event Template Tool	11
Event Template Tool at Computer Node Level1	11
Event Template Tool at IED Level1	13
Analog Alarm Limit Configuration1	16
Disturbance Recording	16
Disturbance Recording via MMS1	16
Disturbance Recording via FTP1	18
CET Project Maintenance	23
Export CET Project12	23
Import CET Project into Same CET Versions12	24
Import CET Project into Newer CET Versions12	27
IEC 61850 OPC Server Performance Data12	37
CET Diagnostics	38
IEC 61850 OPC Server Diagnostics12	38

Diagnostic AE Client	140
Monitoring and Controlling IEC 61850 Subnetwork Activity	141
Monitoring and Controlling IEC 61850 Device Communication	144
Monitoring and Controlling IEC 61850 Data Object Communication	146
Alarm and Event Configuration	148

Section 3 - 800xA IEC 61850 Uploader

Creating IEC 61850 OPC Server Node in Control Structure	
IEC 61850 Uploader Options	
Upload Using Standard Tab	
Upload Using Advanced Tab	
IEC 61850 Uploader Options - Feature Pack Update	
Substation Path in Functional Structure	
Unique Naming of the Objects	
IED Signal Mapping	

Section 4 - 800xA IEC 61850 Alarm and Event Configuration

Configuring Alarms and Events in Plant Explorer	180
Alarm Priority Configuration	191
Alarm Priority Configuration in Plant Explorer	191
Alarm Shelving	193
Redundant OPC AE Configuration	197
Redundant OPC DA Configuration	202
Sequence of Events	204

Section 5 - Addition and Modification of Graphic Elements

Faceplates and Graphic Elemen	nts Containing IEC 61850 Data	207
Faceplates and Graphic	Elements Containing Data from Other Conne	ectivity210
Configuring the Control	Connection Aspect of Functional Objects	211
Example		211

Section 6 - Guidelines to Import and Export

Exporting 800xA IEC 61850 Pro	ect
-------------------------------	-----

Importing 8	800xA IEC	61850 Project	t	
mporting		01000110100		_ 10

Section 7 - Reconfiguration

Overview	219
Reconfiguring SCD Files	
Importing Reconfigured SCD File to the IEC 61850 OPC Server	
Uploading Reconfigured SCD File to the Plant Explorer	

Section 8 - Object Type Specific Graphics for BAY

Configuration	
Define Property at Bay Level	
Procedure to Define Property	
Configuring Properties to Obtain Data fror	n Conducting Equipment227
Configuring Properties to Obtain Data from	n a Logical Node228
Configuring Properties to Obtain Data from	e ,
Conducting Equipment)	
Latebind Mechanism	
Latebind Mechanism to Refer to Attributes	s of Conducting Equipment230
Set Complete Path	
Set the Complete Path of Conducting Equi	pment to Each Property 233
Limitation	

Section 9 - Object Type Specific Graphics for IED

Configuration		
Object type specific g	raphics for IED	
Case 1		
Case 5		

Section 10 - Guidelines for Creating User Defined/BU Specific Libraries

Section 11 - SCD Information

SCD File Information for IEC 61850 Uploader	
Communication Section (Control Structure)	
Substation Section (Functional Structure)	
Private Section Handling in SCD file	
Data Subscription	
Data Format / Data Set	
Version Handling of SCD File	

Appendix A - Renaming Object Names

Renaming Object Names

Appendix B - Deleting OPC Server Instance

Deleting OPC Server Instance	251
Deleting IEC 61850 OPC Server from 800xA System	253
Deleting Unused IEC 61850 OPC Server Instances	253

Appendix C - Sequence for Faceplates

Deployment Sequence for Circuit Breaker Faceplate	255
Deployment Sequence for Transformer Faceplate	256
Deployment Sequence for Generator Faceplate	

Appendix D - System Status Viewer

System Status Reporter for IED Object	
The System Status Viewer Aspect	

Appendix E - Logical Nodes and Primary Object

Index

Revision History

Updates in Revision Index A	
Updates in Revision Index B	
Updates in Revision Index C	
Updates in Revision Index D	

About This User Manual



Any security measures described in this User Manual, for example, for user access, password security, network security, firewalls, virus protection, etc., represent possible steps that a user of an 800xA System may want to consider based on a risk assessment for a particular application and installation. This risk assessment, as well as the proper implementation, configuration, installation, operation, administration, and maintenance of all relevant security related equipment, software, and procedures, are the responsibility of the user of the 800xA System.

This user manual describes the configuration of the IEC 61850 Connect in 800xA.

The main topics covered in this user manual are:

- Introduction to IEC 61850 Connect.
- Workflow for Configuration of IEC 61850 Connect OPC Server.
- IEC 61850 Uploader Tool Workflow.
- Alarm and Event Configuration.
- Workflow for Addition/Modification of Graphic Elements.
- Guidelines for Import and Export.
- Backup Restore Guidelines.
- Reconfiguration of SCD files.
- Guidelines for Creating User Defined BU Specific Libraries.

The user should have adequate knowledge of the 800xA control system and IEC 61850 protocol in general.

The application engineers or the engineers who plan the design or implementation of IEC 61850 as a part of substation automation, are intended to use this user manual. The users should be familiar with the hardware and software functionalities of the 800xA system products.

The following are included in this user manual.

Section 1, Introduction, provides a brief overview of 800xA IEC 61850 Connect.

Section 2, 800xA IEC61850 OPC Server, describes the functionality of IEC 61850 Connect OPC Server and Configuration.

Section 3, 800xA IEC 61850 Uploader, describes the functionality and working procedure of IEC 61850 Uploader aspect of Plant Explorer.

Section 4, 800xA IEC 61850 Alarm and Event Configuration, describes the configuration of alarms and events with 800xA IEC 61850 Connect.

Section 5, Addition and Modification of Graphic Elements, describes how to create and modify user defined Faceplates and Graphic Elements.

Section 6, Guidelines to Import and Export, describes the guidelines on using Import and Export.

Section 7, Reconfiguration, describes the reconfiguration of SCD files.

Section 8, Object Type Specific Graphics for BAY, describes the development of Object type specific faceplate for BAY.

Section 9, Object Type Specific Graphics for IED, describes the development of Object type specific faceplate for IED.

Section 10, Guidelines for Creating User Defined/BU Specific Libraries, describes the guidelines for Creating User Defined BU Specific Libraries.

Section 11, SCD Information, describes provides the SCD information for the IEC 61850 Uploader and the OPC Server.

User Manual Conventions

Microsoft Windows conventions are normally used for the standard presentation of material when entering text, key sequences, prompts, messages, menu items, screen elements, etc.

Feature Pack

The Feature Pack content (including text, tables, and figures) included in this User Manual is distinguished from the existing content using the following two separators:

Feature Pack Functionality_

<Feature Pack Content>

Feature Pack functionality included in an existing table is indicated using a table footnote (*): *Feature Pack Functionality

Unless noted, all other information in this User Manual applies to 800xA Systems with or without a Feature Pack installed.

Warning, Caution, Information, and Tip Icons

This User Manual includes Warning, Caution, and Information where appropriate to point out safety related or other important information. It also includes Tip to point out useful hints to the reader. The corresponding symbols should be interpreted as follows:



Electrical warning icon indicates the presence of a hazard that could result in *electrical shock*.



Warning icon indicates the presence of a hazard that could result in *personal injury*.



Caution icon indicates important information or warning related to the concept discussed in the text. It might indicate the presence of a hazard that could result in *corruption of software or damage to equipment/property*.



Information icon alerts the reader to pertinent facts and conditions.



Tip icon indicates advice on, for example, how to design your project or how to use a certain function

Although Warning hazards are related to personal injury, and Caution hazards are associated with equipment or property damage, it should be understood that operation of damaged equipment could, under certain operational conditions, result in degraded process performance leading to personal injury or death. Therefore, fully comply with all Warning and Caution notices.

Terminology

A complete and comprehensive list of Terms is included in the *System 800xA*, *Engineering Concepts Instruction (3BDS100972*)*. The listing includes terms and definitions that apply to the 800xA System where the usage is different from commonly accepted industry standard definitions and definitions given in standard dictionaries such as Webster's Dictionary of Computer Terms. Terms that uniquely apply to this User Manual are listed in the following table.

Term/Acronym	Description
800xA	ABB automation system (eXtended Automation).
AC 800M	ABB Controller 800M series, general purpose process controller series by ABB.
AC 800M Controller	Any controller constructed from the units and units connected to the AC 800M hardware platform.
AE	Alarm and Event.
Append	Function for creating objects (based on Object Types) in the 800xA <i>Control Structure</i> .
ССТ	Communication Configuration Tool.
CDC	Common Data Class.
CET	Communication Engineering Tool.
DA	Data Access.
FBD	Feeder Block Diagram.
GCB	GOOSE Control Block.
ICD	IED Capability Description. A type of SCL file.

Term/Acronym	Description
IEC	International Electrotechnical Commission.
IEC 61850	IEC standard for Communication Networks and Systems in Substations.
	 800xA IEC 61850-Ed1 (Edition1) reference to the Edition1 of the specification is supported
	• Ed2 reference to the Edition 2. Parts of the specification are updated time by time and indicated with a new edition number.
IED	Intelligent Electronic Device.
IET	Integrated Engineering Tool.
LD	Logical Device: A virtual device which enables aggregation of Logical Nodes and Data sets for communication purposes. Additionally, Logical Devices contain convenient lists of frequently accessed or referred to information. For example, data sets.
LN	Logical Node.
LON	A communication protocol.
MMS	Manufacturing Message Specification (MMS) is an international standard (ISO 9506) dealing with messaging system for transferring real time process data and supervisory control information between networked devices and/or computer applications.
Node	A computer communicating on a network, for example the Internet, Plant, Control or IO network. Each node typically has a unique node address with a format depending on the network it is connected to.
OCS	Open Control System.
OPC	OLE for Process Control. A set of standard interfaces based on COM technology.
ОТ	Object Type, object template in Object Type Structure in 800xA.

Term/Acronym	Description
PPA	Process Portal A.
RCB	Report Control Block
Retrieve	Function for collecting information regarding a control network.
SA	Substation Automation.
SCD	Substation Configuration Description, type of SCL file.
SCL	Substation Configuration Language.
SLD	Single Line Diagram.
SPA	ABB proprietary communication protocol used in substation automation.
Upload	Retrieve + Append.
XML	eXtensible Markup Language.

Released User Manuals and Release Notes

A complete list of all User Manuals and Release Notes applicable to System 800xA is provided in *System 800xA Released User Manuals and Release Notes* (*3BUA000263**).

System 800xA Released User Manuals and Release Notes (3BUA000263)* is updated each time a document is updated or a new document is released. It is in pdf format and is provided in the following ways:

- Included on the documentation media provided with the system and published to ABB SolutionsBank when released as part of a major or minor release, Service Pack, Feature Pack, or System Revision.
- Published to ABB SolutionsBank when a User Manual or Release Note is updated in between any of the release cycles listed in the first bullet.



A product bulletin is published each time *System 800xA Released User Manuals and Release Notes (3BUA000263*)* is updated and published to ABB SolutionsBank.

Section 1 Introduction

IEC stands for International Electrotechnical Commission and IEC 61850 is an IEC standard for Communication Networks and Systems in Substations.

800xA IEC 61850 Connect Package

800xA IEC 61850 Connect integrates the IEC 61850 network with 800xA system. The solution is based on the Standard Connectivity functionality in 800xA where the subsystems are integrated to the 800xA system using the OPC Servers (Data Access and Alarm and Event). The IEC 61850 Connect uses the IEC 61850 OPC Server.

This section gives an overview of IEC 61850 Connect. The IEC 61850 Objects include the logical node objects that are specified in the IEC 61850 -Ed1 (Edition1) standard. It also includes additional generic objects and functional objects such as breakers and transformers, which represent the substation functional view in the 800xA. These object types act as a database for creation of communication structure and Substation structure of SCD file in 800xA. An Uploader creates these structures in 800xA system automatically by reading the SCD file. The IEC 61850 OPC Server provides data from IEC 61850 network to 800xA.

The IEC 61850 Connect is included as a system extension and the object types are bundled within this system extension. Configuration Wizard is used to load this system extension onto 800xA.

The following are the components of the IEC 61850 Connect package:

1. IEC 61850 OPC Server

IEC 61850 OPC Server consists of the IEC 61850 OPC DA Server and the IEC 61850 OPC AE Server. It also contains the Communication Engineering Tool (CET) which is used to configure the OPC Server.

- 2. IEC 61850 Connect
 - a. 800xA Object types representing IEC 61850 entities such as Substation, Voltage Level, Substation Network, IED, Conducting Equipments, Logical devices, Logical Nodes, and OPC Servers.
 - b. The **Uploader** Aspect.
 - c. Default Alarm Collection Definition Aspect.
 - d. All the above and other associated functionalities are delivered as IEC 61850 Connect system extension.
- 3. SCL Model Components

SCL Model components contain a set of libraries that are used to parse the SCD file during upload.

IEC 61850 OPC Server requires the SCD file describing the IEDs and the IEC 61850 subnetwork. The IEDs are expected to support reporting and control services.

Object Types

The IEC 61850 Object Type Library contains the following object types:

• Substation Object

This object contains an Control Connection aspect, which consists of attributes of the Substation.

• Voltage level Object

This object contains an Control Connection aspect, which consists of attributes of the Voltage level.

• OPC Server Object

This is the topmost object in the hierarchy, which contains the IEC 61850 **Uploader** aspect and **OPC Data Source Definition** aspects.

• Subnetwork Object

This represents IEC 61850 Subnetwork in 800xA. This contains **Control Connection** aspect, which consists of attributes of the Subnetwork.

• IED Object

This object type contains a **Control Connection** aspect, which consists of IED's attributes.

Logical Node Object

These object types are as per the IEC 61850-Ed1 standard. Each defined logical node type is mapped to an object type.

• Generic Logical Node Object

This serves as a generic object for Logical Nodes.

• Logical Device Object

This object contains an Control Connection aspect.

• Conducting Equipment Object

This object contains object types corresponding to the Functional Objects and the Conducting Equipment Objects.

Figure 1 shows a sample screen shot of Object Type Structure displaying the IEC 61850 Base Library with all objects.

8 Object Type Structure	Aspects of 'Conducting Equipments'					
		Modified	Desc	Inherited	Category name	
 J-H party OPC server support, Object Type Group J-H Bastystem, Object Type Group Control System, Object Type Group IEC61830 Object Types, Object Type Group Finderson Control System, Object Type Group Finderson Control System, Object Type Group Finderson Control System, Object Type Conducting Equipments, Object Type Group Control System, Object Type Conducting Equipments, Object Type Conducting Equipment, Object Type Substation, Object Type Substation, Object Type Conducting Equipment, Object Type Conducting Equipment, Object Type Conducting Equipment, Object Type Constant, Object Type Group Plant & Mil, Object Type Group SPC Viewer Setting, Object Type Group 	E. Aspect Category Definition Conducting Equipments Type Defi Ubrary Member Name Object Icon Object Type Structure Object Type Structure Object Type Reference Object Type Reference PCA Upload Type Conducting Equipments Type Info Create Info Aspect Control Supertype Info Supertype Subtrype From Following object type: Select	11/2/2012 11:21: 11/2/2012 11:21: 11/2/2012 11:25: 11/2/2012 11:25: 11/2/2012 11:25: 11/2/2012 11:25: 11/2/2012 11:25: 11/2/2012 11:25: 11/2/2012 11:25:	The Icon [Obj Obje Child Cont e Info be subtyp	ol Consisten		

Figure 1. IEC 61850 Base Library displaying all objects

IEC 61850 Connect System Topology

800xA IEC 61850 Connect integrates the IEC 61850 Network and 800xA systems using the IEC 61850 OPC Server. The data of the various IEDs on the IEC 61850 network is read by the IEC 61850 OPC Server facilitating the vertical communication as defined in the IEC 61850 -Ed1 standard. Only the MMS (Manufacturing Message Specification) based signals on the IEC 61850 bus are read by the IEC 61850 OPC Server and given to the 800xA client. Figure 2 shows the typical IEC 61850 Connect System Topology.

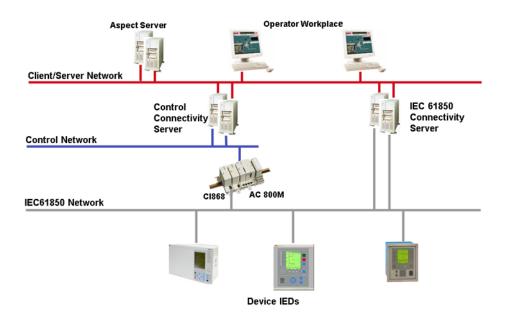


Figure 2. IEC 61850 Connect System Topology

Section 2 800xA IEC61850 OPC Server

The IEC61850 OPC Server enables Operator workplaces as 800xA OPC clients to access the process data from IEC 61850 IEDs, such as protection and control devices communicating through the IEC 61850 protocol.

The OPC Server implements both the DA (Data Access) and AE (Alarm and Events) functionality. To create a common data interface between the OPC server and the operator workplace in 800xA or IEC 61850 IED, the process data is modelled using the IEC 61850 protocol.

The IEC 61850 specifies the usage of Manufacturing Message Specification (MMS, ISO 9506) over TCP/IP as communication between the IEC 61850 server and client (device/IEC 61850 OPC Server).

After the IEC 61850 OPC Server and other required components have been installed, the SCD file containing hierarchically structured models of a substation can be imported into IEC 61850 OPC Server using the Communication Engineering Tool (CET).

The configuration data is stored in SCL (XML based) format. After the IEC 61850 OPC Server has been launched, it reads the configuration file and establishes communication with the IEC 61850 devices through the IEC 61850 protocol stack. Configured IEC 61850 devices and their data are then exposed to OPC clients through an OPC Data Access (DA) server and device reported changes in data with DA subscription are reported to OPC clients.

IEC 61850 OPC Server Features

The IEC 61850 -Ed1 OPC Server supports the following features:

- OPC Data Access v. 1.0/2.0.
- OPC Alarms and Events specifications v. 1.10.

- Communication diagnostics.
- IEC 61850 data modeling.
- System supervision:
 - IEC 61850 device communication
- Command handling:
 - The IEC 61850 OPC Server supports the IEC 61850 command services.
- IEC 61850 -Ed1 data objects:
 - SPS, DPS, INS, ACT, ACD, SEC, BCR, MV, CMV, SAV, WYE, DEL, SEQ, SPC, DPC, BSC, ISC, APC, SPG, ING, ASG, CURVE, DPL, LPL.
- IEC 61850 buffered and unbuffered reporting services.
- IEC 61850 File Transfer.
- Automatic Disturbance Recording upload using IEC 61850 file transfer or FTP.
- Time synchronization:
 - The IEC 61850 OPC Server can act as an SNTP client and server for time synchronization. When the IEC 61850 OPC Server is configured for receiving time synchronization, it updates the operating system time of the PC.
- Multiple instance support when installed on the same hardware platform.

CET Alarm and Event Object Properties

Event Categories

Event Categories are defined in the **Common Event Settings** node below the **Computer Node** object. Event categories are assigned to event definitions with the corresponding **Simple Event Category** and **Condition Event Category** properties on the event definition objects.

It is possible to create custom event categories and assign to event definitions. Based on the categories, OPC A&E clients filter events, such as process or system events.

G Local Server\Testing - ABB IEC 61850 OPC Server	
File Edit View Tools Window Help	
D 🚅 🚽 👗 🛍 🛍 🔛 🗃 🗉	
Project Explorer 👻 🗸	×
Communication	
Computer Node Computer Node Computer Node Indication Events Indication Event Event Indication Event Categories Indication Event Event Indication Event In	

Figure 3. Event Categories Definition

Event categories must be created for each event type (simple or condition). For example, categories **Process Simple Event** and **Process Condition Event** must be created for process events.

Event Definitions

Event definitions specify the type of events that are created for HMI event and alarm lists. It can be configured whether an event appears only on the event list, on both event and alarm lists, or none. Event texts can be added for the events specify whether alarms must be acknowledged by the user.

To create event definition:

- 1. Right-click any Events group in CET.
- 2. Select New > Event classes.
- 3. Select the event class to add.

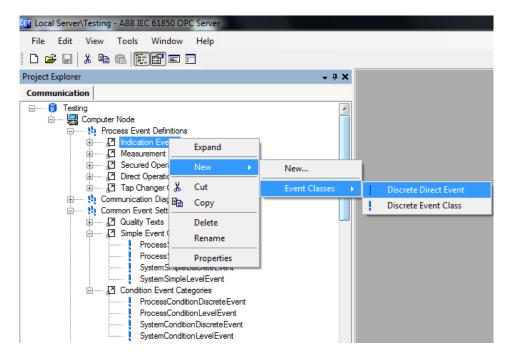


Figure 4. Example of Event Definitions - Event Class

The new event class appears in the Process Definitions below the selected event group. Enter a unique name for the event class by right-clicking it and selecting **Rename**. The new event class can be configured and connected to a data object.

To configure event definitions:

- 1. Select an event to configure in the object tree.
- 2. The object properties appear in the Object Properties window.

Object Properties	→ 쿠 ×
2 ↓ □	
∃ [010] Basic	
Base Type	Advanced Discrete Indication
Condition Category	ProcessConditionDiscreteEvent
Inactive Description	IEC61850_DSC_Inactive
Number Of States	Double Binary Information
Simple Event Category	ProcessSimpleDiscreteEvent
3 [011] State 0	
Event Generation Type	AlarmingEvent
State 0 Acknowledge Reguired	True
State 0 Description	IEC61850_DSC_Intermediate
State 0 Severity	600
State 0 Subcondition name	Intermediate
3 [012] State 1	
Event Generation Type for State 1	Non-AlarmingEvent
State 1 Acknowledge Reguired	True
State 1 Description	IEC61850_DSC_Open
State 1 Severity	400
State 1 Subcondition name	Open
3 [013] State 2	
Event Generation Type for State 2	Non-AlarmingEvent
Severity	400
State 2 Acknowledge Reguired	True
State 2 Description	EC61850 DSC Closed
State 2 Subcondition name	Closed
3 [014] State 3	
Event Generation Type for State 3	AlarmingEvent
State 3 Acknowledge Required	True
State 3 Description	IEC61850_DSC_Faulty
State 3 Severity	800
State 3 Subcondition name	Faulty
∃ Misc	
Caption	SwitchPosition
Description	Discrete Event Class

3. Assign the event with parameter values.

Figure 5. Example of Event Definition Properties

Event definitions are linked to data objects by configuring the event properties available for data objects. When importing IED configurations from IED SCL description files, event definitions are linked to data objects by default. For example switch position data object CSWIx.Pos is linked by default to switch position event definition. The default linking rules are specified in a *DOParamsDefaults.xml* file located in the *Program Files**ABB*\61850 OPC Server\CET\bin\Tools\SCLImport in the computer where CET is installed.

CET Objects Properties

Object properties of all imported objects can be configured from CET.

Perform the following steps to configure an object:

- 1. Select an object in the Communication structure's object tree and all available properties are listed on the right side window.
- 2. Select the required property to be configured.

According to the property value type, manually configure or select a predefined value from a drop-down combo box.

Objects with configuration from an existing SCD file can be imported using SCL import function.

IEC 61850 OPC Server Object Properties

Table 1 lists the configurable IEC 61850 OPC Server object properties and value ranges for them.

Name	Value/Value Range	Description
Basic		
AE Prog ID	-/-	Prog ID for OPC Alarm and Event Server (Automatically generated by management function).
DA Prog ID	-/-	Prog ID for OPC Data Access Server (Automatically generated by management function).
Enable reading of dattribute (description) from IED	True False Default: False	Specifies whether the d attribute (description) is read from the IED. Normally d is not reported from the IED. It is only read if read operation is requested e.g. with Online Diagnostics. When set to false, the text of the data object Description property is used.
SNTP Client		

Table 1. IEC 61850 OPC Server Object Properties

Name	Value/Value Range	Description	
Address for SNTP Server	-/-	IP address or node name for SNTP Server (Primary).	
		There are four sets applicable for this property.	
Port Number	(165535)	TCP/IP port number of SNTP Server.	
	Default: 123	There are four sets applicable for this property.	
Synchronization Interval	(03600) Default: 15	Time synchronization interval in seconds. If value is 0, no time synchronization will be done. There are four sets applicable for this property.	
	-		
SNTP Enable Client	True False	Controls if time synchronization client is initially in use or not.	
	Default: True		
SNTP Server			
Enable Time Synchronization server	True False Default: True	Controls if time synchronization server is initially in use or not.	
Port Number For Time Synchronization Server	(165535) Default: 123	Port number for time synchronization server.	
Communication Control			
Report Control Identity	Default: Client1	Report Control Identity is the OPC server name and it must identical with the name given under each IED Report control Block configuration. Only when the names are equal the communication between IED server and OPC client will be established.	

Name	Value/Value Range	Description
Server Originator Category	Control operation issued from an operator using a client located at station level .	Specifies the default originator category that is used for changing values and IEC 61850 control services. This can be overridden by the OPC Client for DPC control.
	Control operation issued from an unknown location.	
	Control operation from a remote operator outside the substation (for example network control center).	
	Default: Control operation issued from an operator using a client located at station level.	

Table 1. IEC 61850 OPC Server Object Properties (Continued)

Name	Value/Value Range	Description
Server Originator Identification	Free string (max length 64 characters). For numeric values hex code can be used (starting with "0x" e.g. 0xABB). Default: ABB	Specifies the default originator identification that is used for IEC 61850 control services.
System Event Level	Disabled Level 1 (main operation and errors) Level 2 (time synchronization errors) Level 3 (time synchronization done) Level 4 (reported local updates from devices) Level 5 (reported unconfigured updates from devices) Default: Disabled	Level of system event that are sent from the OPC Server. Amount of events sent is cumulative, higher level also contains lower level events. System event level configuration at OPC Server level overrides definitions at subnetwork and device levels.

Table 1. IEC 61850 OPC Server Object Properties (Continued)

IEC 61850 Subnetwork Object Properties

Table 2 lists the IEC 61850 Subnetwork object properties that can be configured and value ranges for them.



Each IEC 61850 node of the system must have a unique subnet / node address.

Property	Value / Value range	Description
Basic		
In Use	In Use Not In Use Default: In Use	Controls whether the device communication is initially in use or not.
Communication Po	rt	
IP Address	127.0.0.1	IP Address for communication channel. Dotted decimal to be used. It is updated from scd file during import.

Property	Value / Value range	Description
Communication Co	ntrol	
System Event Level	Disabled Level 1 (main operation and errors) Level 2 (time synchronization errors) Level 3 (time synchronization done) Level 4 (reported local updates from devices) Level 5 (reported unconfigured updates from devices) Default: Disabled	Level of system events (OPC AE events) can be viewed with an OPC AE client or with a CET Diagnostic AE client for OPC Server. Amount of events sent is cumulative: higher level also contains lower level events. System event level configuration at subnetwork overrides definitions at device level. Same or higher event level must be set for Subnetwork as for IED. System events can be used for debugging and event flow monitoring. Event level can be changed during the runtime by using the Diagnostic events level attribute, IEC 61850 line attributes.
TCP/IP Keepalive Time-out	(13600) Default: 15	TCP/IP Keepalive time-out in seconds.

IEC 61850 Device Object Properties

Table 3 lists the configurable properties for IEC 61850 Devices (used for ABB protection and control devices) and value ranges for these properties.



Each IEC 61850 node of the system must have a unique subnet / node address.

Name	Value / Value range	Description
Basic		
In Use	In use Not in use Default: In use	Controls if the device communication is initially in use or not.

Name	Value / Value range	Description
Simulation Mode	True False Default: False	Defines if the device is in simulation mode.
System Event Level	Level0=Disabled Level1=Level 1 (main operation, error replies, errors) Level2=Level 2 (information reports, OK replies, RCB initializing) Level3=Level 3 (sent requests (connect, read, write), transparent SPA messages) Level4=Level 4 (reported local updates) Level5=Level 5 (reported unconfigured updates)	Level of system events (OPC AE events) can be viewed with a CET Diagnostic AE client for OPC Server or with an OPC AE client. Amount of events sent is cumulative: higher level also contains lower level events. System event level configuration at subnetwork overrides definitions at device level. The same or higher event level must be set for Subnetwork as for IED. System events can be used for debugging and event flow monitoring. Event level can be changed during the run time by using the Diagnostic events level attribute, IEC 61850 device attributes.
Addresses		
IP Address	127.0.0.1	IEC 61850 Node Number of the device. It is updated from scd file during import.
OSI ACSE AE Qualifier	23	IEC 61850 Subnet Number of the device.
OSI ACSE AP Title Value	1,3,9999,23	OSI ACSE AP Title Value as defined in IEC 61850-8-1.

Table 3. IEC 61850) Device Object	Properties (<i>Continued</i>)
--------------------	-----------------	--------------	--------------------

Name	Value / Value range	Description
OSI Presentation Selector	0000001	OSI Presentation Selector as defined in IEC 61850-8-1.
OSI Session Selector	0001	OSI Session Selector as defined in IEC 61850- 8-1.
OSI Transport Selector	0001	OSI Transport Selector as defined in IEC 61850-8-1.
Communication Control	-	
Configuration Revision Check Enabled	True False Default: False	If enabled, checks configuration revisions from all logical devices (LDx.LLN0.NamPlt.configRev). If configuration revisions do not match between configuration and IED, communication to the IED is not established.
Dynamically Create Data Sets	True False Default: False	Specifies whether data sets and reporting are initialized dynamically. Using static data sets is recommended. The IED needs to support this feature. If enabled, all configured data sets in CET are created and report control blocks configured at runtime to the IED after connecting. The dynamic data sets must be configured with the Dataset Editor and designated to available report control blocks. The report control blocks must be configured and dedicated for the IEC 61850 OPC Server instance. Data sets used with buffered reporting are created once when the BRCB is first initialized. Data sets used with unbuffered reporting are created every time the URCB is initialized. Dynamic data sets are not removed.

Name	Value / Value range	Description
Enable EntryID Check	True False Default: False	Enable reporting EntryID check. Report EntryIDs are used as sequence numbers for buffered reporting. A gap in sequence numbers will cause a restart of reporting, starting from lost sequence number.
MMS Request Timeout	060000 0 = disabled Default: 5000	Specifies the timeout for the MMS request in milliseconds (msec). If 0 it is not in use.
Report Control Block Initialize	True False Default: True	Initialize to report control blocks and enable reporting.
Send Single Message MMS Writes	True False Default: False	Sends single message MMS writes.
Use 32 Bit Entry ID	True False Default: False	Enables or disables usage of 32 bit EntryIDs for information report sequence. The IEC 61850 standard defines 64 bit EntryID, but SPA-ZC 40x uses 32 bit EntryID.
Use Sequence Number Check	True False Default: False	Enables or disables sequence number checking information reports for the IEC 61850 OPC server.

Table 3. IEC 61850 Device Object Properties (Continued)

Name	Value / Value range	Description
Polling		
Polling Timeout	(03600) Default: 0 (disabled)	Polling Timeout in seconds. If the device does not support reporting, ST and MX attributes can be polled with this interval.
Control Authorization		
Disable Interlockcheck for All Controls	True False Default: False	Disables interlockcheck condition check for all select and operate controls.
Disable Synchrocheck for All Controls	True False Default: False	Disables synchrocheck condition check for all select and operate controls.
Interlock Override Supported	True False Default: False	Specifies whether Interlock Override is supported by this IED.
Station/Remote Switch OPC Path		OPC path of the station remote switch position to be used with this device. The format is #ProgID For OPC Server#Channel Name\\IED Name\\Logical Device Name\\Logical Node Name\\Data Object Name. For example, #ABB.IEC61850_OPC_DA_Server.Instance[1] 1#Channel1\\IED1\\LD1\\GGIO1\\loc
Synchrocheck Override Supported	True False Default: False	Specifies whether Synchrocheck Override is supported by this IED.
OPC Alarm and Event		
Area Name		Specifies which area this IED belongs to.

Table 3. IEC 61850	Device Ol	bject Properties	(Continued)
--------------------	-----------	------------------	-------------

Name	Value / Value range	Description
Area Description		Description of area.
Device Connection Status Class	Default: Device Connection Status	Device Connection Status Class definition used with current device.
Measurement Limit Supervision	IED Based limit supervision OPC Server based limit supervision	Specifies whether measurement limit supervision is performed by the IEC 61850 OPC Server.
Authentication		
Is Authentication Disabled	True False Default: True	Is Authentication Disabled?
Is Password used	True False Default: False	Is Password used?
Password	Default: None	Password used for authentication.
SPA Access		
SPA parameter for Close Password		SPA parameter for close Password.
PA value for Open Password		SPA parameter value for open Password.
SPA Store parameter name		SPA store parameter name.
SPA Store parameter value	065536	SPA store parameter value.
SPA Value for Close Password	065536	SPA value for close password.

Name	Value / Value range	Description
SPA value for Open Password	065536	SPA value for open password.
Disturbance Recording	-	
Disturbance Recorder Delete Recordings	Default: False	Specifies whether DRs are deleted from IED after upload.
Disturbance Recorder Enabled	Default: False	Specifies whether DR upload is enabled.
Disturbance Recorder Local Directory		Specifies the folder where all disturbance recordings will be stored in the running computer. If left empty "C:\COMTRADE\IEDName" will be used.
Disturbance Recorder Maximum Total File Size	0 - 2147483647 0: no limit Default: 0	Specifies maximum size for folder where uploaded DRs are locally stored for this IED.
Disturbance Recorder Polling Period	0 - 2147483647 0: disabled Default: 120	DR polling period in seconds
Disturbance Recorder Remote Directory		Specifies the folder where all disturbance recordings will be stored in this IED.
Disturbance Recording	via FTP	
Disturbance Recorder FTP Password		FTP password to be used with DR functionality
Disturbance Recorder FTP User Name		FTP username to be used with DR functionality
Disturbance Recorder Read Via FTP	False: MMS (IEC 61850) True: FTP Default: False	Specifies whether DRs will be read using FTP

Table 3. IEC 61850 Device Object Properties (Continued)

Name	Value / Value range	Description
Web Server Enabled	True False Default: False	Specifies whether IED Web Server is accessible from COM600 HMI.
Web Server IP Address		IP Address for Web Server. Dotted decimal or DNS name to be used. If omitted and Web Server is enabled, IED IP address is used.

Logical Device Object Properties

The logical devices are configured, whenever they are imported with IEC 61850 Devices. *Table 4* lists the configurable Logical Device object properties.

Name	Value / Value range	Description
Transparent SPA		
SPA Address	(0999) Default: 0	The SPA address of the device connected via TCP/IP. By setting value >0 enables the built in TCP/SPA client, which can be used through the Transparent SPA attribute, IEC 61850 logical device attributes.
SPA TCP Port	(165535) Default: 7001	SPA TCP Port.
SPA TCP Timeout	(165535) Default: 3	SPA TCP Timeout in seconds.
Control Authoriza	Control Authorization	

Name	Value / Value range	Description
Station/Remote Switch OPC Path		Station/Remote Switch OPC Path OPC path of the station remote switch position to be used with this device. The format is Node#ProgID For OPC Server#Channel Name\IED Name\Logical Device Name\Logical Node Name\Data Object Name. For example, GW#ABB.IEC61850_OPC_DA_Server.Instance[1]#Channe I1\IED1\LD1\GGIO1\loc.
SPA Access		
SPA parameter for Close Password		SPA parameter for close Password.
SPA value for Open Password		SPA parameter value for open Password.
SPA Store parameter name		SPA store parameter name.
SPA Store parameter value	065536	SPA store parameter value.
SPA Value for Close Password	065536	SPA value for close password.
SPA value for Open Password	065536	SPA value for open password.

Table 4. Logical	Device Objec	t Properties	(Continued)
------------------	--------------	--------------	-------------

Supported IEC 61850-Ed1 Data Objects

IEC 61850 OPC Server supports data objects for status, measurand, controllable status, and controllable analog information. The IEC 61850 OPC Server supports 28 data object types for an IEC 61850 Device. The data objects are configured whenever they are imported with IEC 61850 devices. The configurations can be monitored with Data Object and Attribute Viewer on Page 45.

Data classes for status information:

- Single point status (SPS)
- Double point status (DPS)
- Integer status (INS)
- Protection activation information (ACT)
- Directional protection activation information (ACD)
- Security violation counter (SEC)
- Binary counter reading (BCR)

Data classes for measurand information:

- Measured value (MV)
- Complex measured value (CMV)
- Sampled value (SAV)
- WYE
- Delta (DEL)
- Sequence (SEQ)

Data classes for controllable status information:

- Controllable single point (SPC)
- Controllable double point (DPC)
- Controllable integer status (INC)
- Binary controlled step position information (BSC)
- Integer controlled step position information (ISC)

Data classes for controllable analog information:

• Analog set point (APC)

Data objects classes for status settings:

- Single setting point (SPG)
- Integer status setting (ING)

Data classes for analogue settings:

- Analogue setting (ASG)
- Setting curve (CURVE)

Data classes for description information:

- Device name plate (DPL)
- Logical Node name plate (LPL)

Data classes for internal status information:

- Integer status (Internal INS)
- Single point status (Internal SPS)
- Controllable single point (Internal SPC)

The parameters are stored in object properties in CET. The actual configuration for data objects is not supported.

Data Object and Attribute Viewer

The configured data object types, data attribute types and enumerated attributes can be viewed with the provided viewers for IEC 61850 OPC Server.

To view data object type viewer:

- 1. Right-click the IEC 61850 OPC Server.
- 2. Select **DOType Viewer** from the context menu.

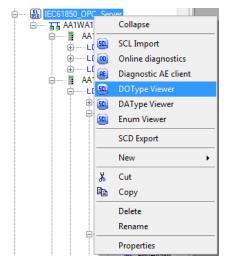


Figure 6. DOType Viewer

With DOType Viewer the attributes of the DOtypes can be viewed under the IEC 61850 OPC Server in the communication structure. From the DOType drop-down menu, select the data object types to view.

To view data attribute type viewer:

- 1. Right-click the IEC 61850 OPC Server.
- 2. Select **DAType Viewer** from the context menu.

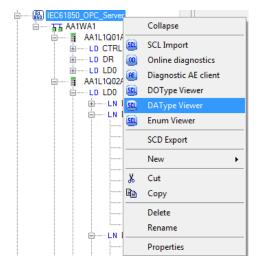


Figure 7. DAType Viewer

With DAType Viewer, the attributes of the DAtypes can be viewed under the IEC 61850 OPC Server in the communication structure. From the DAType drop-down menu, select the data attribute types to view.

To view enumerated basic type attributes:

- 1. Right-click the IEC 61850 OPC Server.
- 2. Select **Enum Viewer** from the context menu.

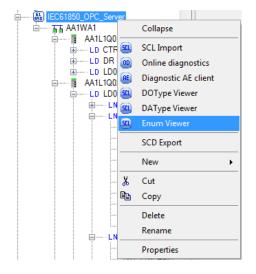


Figure 8. Enum Viewer

With Enum Viewer, the enumeration of EnumTypes can be viewed under the IEC 61850 OPC Server in the communication structure. From the EnumType drop-down menu, select the enumerated basic type attributes to view.

With DOI Editor, the data object's default values are overridden if necessary. Refer to IEC standards IEC 61850-6 and IEC 61850-7-3.

Measurement

Measurement Limit Supervision

Configuring OPC Server based measurement limit supervision and units:

Measurement limit value supervision is done by the IEC 61850 IED with the specified LNs. If the IED does not support limit value supervision or does not provide units for the measurements, it is possible to configure the OPC server instead to handle the limit value supervision and to publish units for the measurements to realize a common IEC 61850 substation supervision functionality for the 800xA operator workplaces. Supervision mode (IED or OPC) can be

configured with the Measurement Limit Supervision property of the IEC61850 device for each IED. If the IED based supervision mode is selected, the limit values can be configured with the properties described in the following sections.

The data objects MV, CMV, SEQ, DEL and WYE support measurement limit supervision. MV, CMV, SAV, SEQ, DEL and WYE measurement data objects support overriding unit and multiplier information. The configurable properties for the data objects are presented in the following sections.

Common Data Class Object Properties

MV, CMV, DEL Properties

Table 5 Configurable limit supervision properties for the MV, CMV DEL object.

Property	Туре	
[060] Limit Value Supervision		
Max	float	
High-High	float	
High	float	
Low	float	
Low-Low	float	
Min	float	
[050] Scale and Unit		
Multiplier	Enum	
Scale	Enum	
SI Unit	Enum	

Table 5. Configuring MV, CMV, DEL properties

SAV Properties

Table 6 Configurable limit supervision properties for the SAV object.

Table 6. Configuring SAV properties

Property	Туре	
[050] Scale and Unit		
SI Unit	Enum	
Multiplier	Enum	

SEQ Properties

Table 7 Configurable limit supervision properties for the SEQ object.

Table 7.	Configuring	SEQ properties
----------	-------------	----------------

Property	Туре	
[060] C1 Limit Value Supervision		
Max	float	
High-High	float	
High	float	
Low	float	
Low-Low	float	
Min	float	
[060] C2 Limit Valu	e Supervision	
Max	float	
High-High	float	
High	float	
Low	float	
Low-Low	float	

Property	Туре
Min	float
[060] C3 Limit Valu	e Supervision
Мах	float
High-High	float
High	float
Low	float
Low-Low	float
Min	float
[050] Scale and Un	it
C1 Multiplier	Enum
C1 SI Unit	Enum
C2 Multiplier	Enum
C2 SI Unit	Enum
C3 Multiplier	Enum
C3 SI Unit	Enum

Table 7.	Configuring SEQ properties
----------	----------------------------

WYE Properties

Table 8 Configurable limit supervision properties for the WYE object.

Table 8. Configuring SEQ properties

Property	Туре
[060] Phase Limit Value Supervision	
Max	float
High-High	float

Property	Туре	
High	float	
Low	float	
Low-Low	float	
Min	float	
[060] Net Limit Val	ue Supervision	
Max	float	
High-High	float	
High	float	
Low	float	
Low-Low	float	
Min	float	
[060] Neutral Limit	Value Supervision	
Max	float	
High-High	float	
High	float	
Low	float	
Low-Low	float	
Min	float	
[060] Res Limit Value Supervision		
Мах	float	
High-High	float	
High	float	
Low	float	

Table 8.	Configuring SEQ properties
----------	----------------------------

Property	Туре
Low-Low	float
Min	float
[050] Scale and Unit	
Net Multiplier	Enum
Net SI Unit	Enum
Neut Multiplier	Enum
Neut SI Unit	Enum
Phase Multiplier	Enum
Phase SI Unit	Enum
Res Multiplier	Enum
Res SI Unit	Enum

Table 8.	Configuring SEQ properties
----------	----------------------------

Other Common Data Class Object Properties

Common Data Class Specifications for Status Information

Single Point Status (SPS)

Table 9 defines the common data class of single point status.

Table 9. Single Point Status

Name	Туре	FC	Value/Value range	M/O/C	OPC Data Type
stVal	BOOLEAN	ST	TRUE FALSE	Μ	VT_BOOL
q	Quality	ST		М	VT_I4
t	TimeStamp	ST		М	VT_DATE

Name	Туре	FC	Value/Value range	M/O/C	OPC Data Type
subEna	BOOLEAN	SV		0	VT_BOOL
subVal	BOOLEAN	SV	TRUE FALSE	0	VT_BOOL
subQ	Quality	SV		0	VT_I4
subID	VISIBLE STRING64	SV		0	VT_BSTR
d	VISIBLE STRING64	DC	Text	0	VT_BSTR
dU	UNICODE STRING255	DC		0	VT_BSTR
cdcNs	UNICODE STRING255	EX		0	VT_BSTR
cdcName	UNICODE STRING255	EX		0	VT_BSTR
dataNs	UNICODE STRING255	EX		0	VT_BSTR

Table 9. Single Point Status (Continued)

Double Point Status (DPS)

Table 10 defines the common data class of double point status.

Name	Туре	FC	Value/Value range	M/O	OPC Data Type
stVal	CODED ENUM	ST	intermediatestate (0) off (1) on (2) bad-state (3)	М	VT_14
q	Quality	ST		М	VT_I4
t	TimeStamp	ST		М	VT_DATE
subEna	BOOLEAN	SV		0	VT_BOOL
subVal	CODED ENUM	SV	intermediatestate (0) off (1) on (2) bad-state (3)	0	VT_I4
subQ	Quality	SV		0	VT_I4
subID	VISIBLE STRING64	SV		0	VT_BSTR
d	VISIBLE STRING255	DC	Text	0	VT_BSTR
dU	UNICODE STRING255	DC		0	VT_BSTR
cdcNs	VISIBLE STRING255	EX		0	VT_BSTR
cdcName	VISIBLE STRING255	EX		0	VT_BSTR
dataNs	VISIBLE STRING255	EX		0	VT_BSTR

Table 10. Double Point Status

Integer Status (INS)

Table 11 defines the common data class of Integer status.

Table 11. Integer Status

Name	Туре	FC	Value/Value range	M/O	OPC Data Type
stVal	INT32	ST		М	VT_I4
q	Quality	ST		М	VT_I4
t	TimeStamp	ST		М	VT_DATE
subEna	BOOLEAN	SV		0	VT_BOOL
subVal	INT32	SV		0	VT_I4
subQ	Quality	SV		0	VT_I4
subID	VISIBLE STRING64	SV		0	VT_BSTR
d	VISIBLE STRING255	DC		0	VT_BSTR
dU	UNICODE STRING255	DC		0	VT_BSTR
cdcNs	VISIBLE STRING255	EX		0	VT_BSTR
cdcName	VISIBLE STRING255	EX		0	VT_BSTR
dataNs	VISIBLE STRING255	EX		0	VT_BSTR

Protection Activation information (ACT)

Table 12 defines the common data class of protection activation information.

Name	Туре	FC	Value/Value range	M/O	OPC Data Type
general	BOOLEAN	ST		М	VT_BOOL
phsA	BOOLEAN	ST		0	VT_BOOL
phsB	BOOLEAN	ST		0	VT_BOOL
phsC	BOOLEAN	ST		0	VT_BOOL
neut	BOOLEAN	ST		0	VT_BOOL
q	Quality	ST		М	VT_I4
t	TimeStamp	ST		М	VT_DATE
operTm	TimeStamp	CF		0	VT_DATE
d	VISIBLE STRING255	DC		0	VT_BSTR
dU	UNICODE STRING255	DC		0	VT_BSTR
cdcNs	VISIBLE STRING255	EX		0	VT_BSTR
cdcName	VISIBLE STRING255	EX		0	VT_BSTR
dataNs	VISIBLE STRING255	EX		0	VT_BSTR

Table 12. Protection Activation Information

Directional Protection Activation Information (ACD)

Table 13 defines the common data class of Directional protection activation information.

Name	Туре	FC	Value/Value range	M/O	OPC Data Type
general	BOOLEAN	ST		М	VT_BOOL
dirGeneral	ENUMERATED	ST	unknown (3) forward (1) backward (2)	М	
phsA	BOOLEAN	ST		0	VT_BOOL
dirPhsA	ENUMERATED	ST	unknown (3) forward (1) backward (2)	0	
phsB	BOOLEAN	ST		0	VT_BOOL
dirPhsB	ENUMERATED	ST	unknown (3) forward (1) backward (2)	0	
phsC	BOOLEAN	ST		0	VT_BOOL
dirPhsC	ENUMERATED	ST	unknown (3) forward (1) backward (2)		
neut	BOOLEAN	ST		0	VT_BOOL
dirNeut	ENUMERATED	ST	unknown (3) forward (1) backward (2)	0	
q	Quality	ST		М	VT_I4
t	TimeStamp	ST		М	VT_DATE

Table 13. Directional Protection Activation Information

Name	Туре	FC	Value/Value range	M/O	OPC Data Type
d	VISIBLE STRING255	DC		0	VT_BSTR
dU	UNICODE STRING255	DC		0	VT_BSTR
cdcNs	VISIBLE STRING255	EX		0	VT_BSTR
cdcName	VISIBLE STRING255	EX		0	VT_BSTR
dataNs	VISIBLE STRING255	EX		0	VT_BSTR

Table 13. Directional Protection Activation Information (Continued)

Security Violation Counter (SEC)

 Table 14 defines the common data class of Security violation counting information.

Name	Туре	FC	Value/Value range	M/O	OPC Data Type
cnt	INT32U	ST		М	VT_I4
sev	ENUMERATED	ST	unknown (0) critical (1) major (2) minor (3) warning (4)	Μ	VT_14
t	TimeStamp	ST		М	VT_DATE

Table 14. Security Violation Counting

Name	Туре	FC	Value/Value range	M/O	OPC Data Type
addr	OCTET STRING64	ST		0	VT_BSTR
d	VISIBLE STRING255	DC	Text	0	VT_BSTR
dU	UNICODE STRING255	DC		0	VT_BSTR
cdcNs	VISIBLE STRING255	EX		0	VT_BSTR
cdcName	VISIBLE STRING255	EX		0	VT_BSTR
dataNs	VISIBLE STRING255	EX		0	VT_BSTR

 Table 14. Security Violation Counting (Continued)

Binary Counter Reading (BCR)

Table 15 defines the common data class of binary counter reading information.

Та	ble 15.	Bina	ry Counte	r Readin	g

Name	Туре	FC	Value/Value range	M/O	OPC Data Types
actVal	INT128	ST		М	VT_I4
frVal	INT128	ST		O ⁽¹⁾	VT_I4
frTm	TimeStamp	ST		O ⁽¹⁾	VT_DATE
q	Quality	ST		М	VT_I4
t	TimeStamp	ST			VT_DATE
units	Unit	CF		0	VT_R4

Name	Туре	FC	Value/Value range	M/O	OPC Data Types
pulsQty	FLOAT32	CF		М	VT_BOOL
frEna	BOOLEAN	CF		O ⁽¹⁾	VT_DATE
strTm	TimeStamp	CF		O ⁽¹⁾	VT_DATE
frPd	INT32	CF		O ⁽¹⁾	VT_BOOL
frRds	BOOLEAN	CF		O ⁽¹⁾	VT_BSTR
d	VISIBLE STRING255	DC	Text	0	VT_BSTR
dU	UNICODE STRING255	DC		0	VT_BSTR
cdcNs	VISIBLE STRING255	EX		0	VT_BSTR
cdcName	VISIBLE STRING255	EX		0	VT_BSTR
dataNs	VISIBLE STRING255	EX		0	VT_BSTR

Table 15. Binary Counter Reading (Continued)

(1) All or none of these items must be present.

Common Data Class Specifications for Controllable Status Information Controllable Single Point (SPC)

Table 16 defines the common data class of controllable single point.

Name	Туре	FC	Value/Value range	M/O	OPC Data Type
lastApplError	ApplicationError Code	МХ	Refer to Application Error Codes on Page 297	O ^(a)	VT_14
ctlVal	BOOLEAN	CO	off (FALSE) on (TRUE)	М	VT_BOOL
operTm	TimeStamp	СО		0	VT_DATE
origin	Originator	CO, ST			
ctlNum	INT8U	CO, ST	0255	0	VT_I4
stVal	BOOLEAN	ST	FALSE TRUE	М	VT_BOOL
q	Quality	ST		М	VT_I4
t	TimeStamp	ST		М	VT_DATE
stSeld	BOOLEAN	ST	FALSE TRUE	0	VT_BOOL
subEna	BOOLEAN	SV		0	VT_BOOL
subVal	BOOLEAN	SV	FALSE TRUE	0	VT_BOOL
subQ	Quality	SV		0	VT_I4
subID	VISIBLE STRIN64	SV		0	VT_BSTR
pulseConfig	PulseConfig	CF		0	

Table 16. Controllable Single Point

Name	Туре	FC	Value/Value range	M/O	OPC Data Type
ctlModel	ENUMERATED	CF	Status-only (0) directwithnormalsec urity (1) sbowithnormalsecur ity (2) directwithenhanced security(3) sbowithenhancedse curity(4)	М	VT_14
sboTimeout	INT32U	CF		0	VT_14
sboClass	ENUMERATED	CF	operate-once (0) operatemany (1)	0	VT_14
d	VISIBLE STRING255	DC	Text	0	VT_BSTR
dU	UNICODE STRING255	DC		0	VT_BSTR
cdcNs	VISIBLE STRING255	EX		0	VT_BSTR
cdcName	VISIBLE STRING255	EX		0	VT_BSTR
dataNs	VISIBLE STRING255	EX		0	VT_BSTR

Table 16. Controllable Single Point

Mapping of controls

• Direct Control with Normal Security: ctlVal: MMS Write.request to Oper structure with value.

- SBO with Normal Security: ctlVal: MMS Write.request to ctlVal with value. IEC61850 OPC Server will do the select before operate.
- Direct Control with Enhanced Security: tlVal: MMS Write.request to Oper structure with value.
- SBO with Enhanced Security: ctlVal: MMS Write.request to ctlVal with value. IEC61850 OPC Server will do the select before operate.

Controllable Double Point (DPC)

Table 17 defines the common data class of controllable double point.

Name	Туре	FC	Value/Value range	M/O	OPC Data Type
ctlSelOn	AbbCommand Bitmask			М	VT_l4
ctlSelOff	AbbCommand Bitmask			М	VT_l4
ctlOperOn	AbbCommand Bitmask			М	VT_14
ctlOperOff	AbbCommand Bitmask			М	VT_l4
ctlCan	AbbCommand Bitmask			М	VT_l4
ctlOper	AbbCommand Bitmask			М	VT_l4
lastApplErr or	ApplicationErro rCode		Refer to Application Error Codes on Page 297	М	VT_l4
ctlVal	BOOLEAN	CO	off (FALSE) on (TRUE)	М	VT_BOOL

Table 17. Controllable Double Point

Name	Туре	FC	Value/Value range	M/O	OPC Data Type
operTm	TimeStamp	СО		0	VT_DATE
origin	Originator	CO, ST			
ctlNum	INT8U	CO, ST	0255	0	VT_I4
stVal	CODED ENUM	ST	intermediatestate(0) off (1) on (2) bad-state (3)	М	VT_I1
q	Quality	ST		М	VT_l4
t	TimeStamp	ST		М	VT_DATE
stSeld	BOOLEAN	ST	FALSE TRUE	0	VT_BOOL
subEna	BOOLEAN	SV		0	VT_BOOL
subVal	BOOLEAN	SV	intermediatestate(0) off (1) on (2) bad-state (3)	0	VT_I1
subQ	Quality	SV		0	VT_I4
subID	VISIBLE STRIN64	SV		0	VT_BSTR
pulseConfig	PulseConfig	CF		0	
ctlModel	ENUMERATED	CF	Status-only (0) directwithnormalsecurity (1) sbowithnormalsecurity (2) directwithenhancedsecurity(3) sbowithenhancedsecurity(4)	Μ	VT_14

Table 17. Controllable Double Point

Name	Туре	FC	Value/Value range	M/O	OPC Data Type
sboTimeout	INT32U	CF		0	VT_I4
sboClass	ENUMERATED	CF	operate-once (0) operatemany (1)	0	VT_14
d	VISIBLE STRING255	DC	Text	0	VT_BSTR
dU	UNICODE STRING255	DC		0	VT_BSTR
cdcNs	VISIBLE STRING255	EX		0	VT_BSTR
cdcName	VISIBLE STRING255	EX		0	VT_BSTR
dataNs	VISIBLE STRING255	EX		0	VT_BSTR

Table 17. Controllable Double Point

• **ctlOperOn**: This attribute determines the control activity operation in direction On/Close.

- **ctlOperOff**: This attribute determines the control activity operation in direction Off/Open.
- **ctlSelOn**: This attribute determines the selection with direction On/Close.
- **ctlSelOff**; This attribute determines the selection with direction Off/Open.
- ctlCan: This attribute determines the cancellation of the selection
- **ctlOper**: This attribute determines the selection with direction

Mapping of controls

- Direct Control with Normal Security:
 - ctlSelOn: (not used)

- ctlSelOff: (not used)
- ctlOperOn: MS Write.request to Oper structure with value ON.
- ctlOperOff: MMS Write.request to Oper structure with value OFF.
- ctlCan: (not used)
- ctlOper: (not used)

The ctlSelOn, ctlSelOff, ctlCan, selCause, cmdTermCause, stSeld and the bits in ControlValues are not applicable.

- SBO with Normal Security:
 - ctlSelOn: MMS Read.request to SBO structure (to perform select).
 - ctlSelOff: MMS Read.request to SBO structure (to perform select).
 - ctlOperOn: MMS Write.request to Oper structure with value ON (to operate).
 - ctlOperOff: MMS Write.request to Oper structure with value OFF (to operate).
 - ctlCan: MMS Write.request ro Cancel structure
 - ctlOper: MMS Write.request to Oper structure with value ON/OFF according to previous direction of select.
- Direct Control with Enhanced Security:
 - ctlSelOn: (not used)
 - ctlSelOff: (not used)
 - ctlOperOn: MMS Write.request to Oper structure with value ON.
 - ctlOperOff: MMS Write.request to Oper structure with value OFF.
 - ctlCan: MMS Write.request ro Cancel structure
 - ctlOper: (not used)
- SBO with Enhanced Security:
 - ctlSelOn: MMS Read.request to SBOw structure.
 - ctlSelOff: MMS Read.request to SBOw structure.

- ctlOperOn: MMS Write.request to Oper structure with value ON.
- ctlOperOff: MMS Write.request to Oper structure with value OFF.
- ctlCan: MMS Write.request to Cancel structure
- ctlOper: MMS Write.request to Oper structure with value ON/OFF according to previous direction of select.

Controllable Integer Status (INC)

Table 18 defines the common data class of controllable integer status.

Name	Туре	FC	Value/Value range	M/O	OPC Data Type
lastApplError	ApplicationErro rCode		Refer to Application Error Codes on Page 297		VT_l4
ctlVal	INT32	CO		М	VT_I4
operTm	TimeStamp	CO		0	VT_DAT
orCat	ENUMERATED			0	VT_I4
orldent	OCTET STRING64			0	VT_BSTR
ctlNum	INT8U	CO, ST	0255	0	VT_I4
stVal	INT32	ST		М	VT_I4
q	Quality	ST		М	VT_I4
t	TimeStamp	ST		М	VT_DATE
stSeld	BOOLEAN	ST	FALSE TRUE	0	VT_BOOL
subEna	BOOLEAN	SV		0	VT_BOOL
subVal	INT32	SV		0	VT_I4
subQ	Quality	SV		0	VT_I4

Table 18. controllable integer status

Name	Туре	FC	Value/Value range	M/O	OPC Data Type
subID	VISIBLE STRING64	SV	Text	0	VT_BSTR
ctlModel	ENUMERATED	CF	Status-only (0) directwithnormalsecurity (1) sbowithnormalsecurity (2) directwithenhancedsecurity(3) sbowithenhancedsecurity(4)	М	VT_14
sboTimeout	INT32U	CF		0	VT_l4
sboClass	ENUMERATED	CF	operate-once (0) operatemany (1)	0	VT_14
minVal	INT32	CF		0	VT_l4
maxVal	INT32	CF		0	VT_I4
stepSize	INT32U	CF	1 (maxVal - minVal)	0	VT_I4
d	VISIBLE STRING255	DC	Text	0	VT_BSTR
dU	UNICODE STRING255	DC		0	VT_BSTR
cdcNs	VISIBLE STRING255	EX		0	VT_BSTR
cdcName	VISIBLE STRING255	EX		0	VT_BSTR
dataNs	VISIBLE STRING255	EX		0	VT_BSTR

Table 18.	controllable	integer status
-----------	--------------	----------------

Mapping of controls

• Direct Control with Normal Security:

- ctlVal: MMS Write.request to Oper structure with value.
- SBO with Normal Security:
 - ctlVal: MMS Write.request to Oper structure with value. IEC61850 OPC Server will do the select before operate.
- Direct Control with Enhanced Security:
 - ctlVal: MMS Write.request to Oper structure with value.
- SBO with Enhanced Security:
 - ctlVal: MMS Write.request to Oper structure with value. IEC61850 OPC Server will do the select before operate.

Binary Controlled Step Position Information (BSC)

Table 19 defines the common data class of binary controlled step position information.

Name	Туре	FC	Value/Value range	M/O	OPC Data Type
lastApplErr or	ApplicationErro rCode		Refer to Application Error Codes on Page 297		VT_l4
ctlVal	ENUMERATED		stop (0) lower (1) higher (2) reserved (3)	М	VT_14
operTm	TimeStamp	СО		0	VT_DAT

Table 19. Binary Controlled Step Position Information

Name	Туре	FC	Value/Value range	M/O	OPC Data Type
orCat	ENUMERATED		not-supported	0	VT_l4
			bay-control		
			station-control		
			remote-control		
			automatic bay		
			automatic-station		
			automaticremote		
			maintenance		
			process		
orldent	OCTET			0	VT_BSTR
	STRING64				
ctlNum	INT8U	CO, ST	0255	0	VT_l4
valWTr.pos Val	INT8	ST		М	VT_l4
valWTr.tran sInd	BOOLEAN	ST		М	VT_BOOL
q	Quality	ST		М	VT_I4
t	TimeStamp	ST		М	VT_DATE
stSeld	BOOLEAN	ST	FALSE	0	VT_I4
			TRUE		
q	Quality	ST		М	VT_BOOL
t	TimeStamp	ST		М	VT_DATE
stSeld	BOOLEAN	ST	FALSE TRUE	0	VT_BOOL
subEna	BOOLEAN	sv		0	VT_BOOL

Name	Туре	FC	Value/Value range	M/O	OPC Data Type
subVal	INT32	SV		0	VT_I4
subQ	Quality	SV		0	VT_I4
subID	VISIBLE STRING64	SV	Text	0	VT_BSTR
ctlModel	ENUMERATED	CF	Status-only (0) directwithnormalsecurity (1) sbowithnormalsecurity (2) directwithenhancedsecurity(3) sbowithenhancedsecurity(4)	М	VT_14
sboTimeout	INT32U	CF		0	VT_I4
sboClass	ENUMERATED	CF	operate-once (0) operatemany (1)	0	VT_I4
minVal	INT8	CF		0	VT_I4
maxVal	INT8	CF		0	VT_I4
stepSize	INT8	CF	1 (maxVal - minVal)	0	VT_I4
d	VISIBLE STRING255	DC	Text	0	VT_BSTR
dU	UNICODE STRING255	DC		0	VT_BSTR
cdcNs	VISIBLE STRING255	EX		0	VT_BSTR
cdcName	VISIBLE STRING255	EX		0	VT_BSTR
dataNs	VISIBLE STRING255	EX		0	VT_BSTR

Table 19. Binary Controlled Step Position Information

Mapping of controls

- Direct Control with Normal Security:
 - ctlVal: MMS Write.request to Oper structure with value.
- SBO with Normal Security:
 - ctlVal: MMS Write.request to Oper structure with value.
 - IEC61850 OPC Server will do the select before operate.
- Direct Control with Enhanced Security:
 - ctlVal: MMS Write.request to Oper structure with value.
- SBO with Enhanced Security:
 - ctlVal: MMS Write.request to Oper structure with value.
 - IEC61850 OPC Server will do the select before operate.

Integer Controlled Step Position Information (ISC)

Table 20 defines the common data class of integer controlled step position information.

Name	Туре	FC	Value/Value range	M/O	OPC Data Type
lastApplError	ApplicationErro rCode		Refer to Application Error Codes on Page 297		VT_l4
ctlVal	INT8	СО	-64 63	М	VT_l4
operTm	TimeStamp	со		0	VT_DAT

Table 20. Integer Controlled Step Position Information

Name	Туре	FC	Value/Value range	M/O	OPC Data Type
orCat	ENUMERATED		not-supported	0	VT_l4
			bay-control		
			station-control		
			remote-control		
			automatic bay		
			automatic-station		
			automaticremote		
			maintenance		
			process		
orldent	OCTET STRING64			0	VT_BSTR
ctlNum	INT8U	CO, ST	0255	0	VT_I4
valWTr.posV al	INT8	ST		М	VT_l4
valWTr.transl nd	BOOLEAN	ST		М	VT_BOOL
q	Quality	ST		М	VT_I4
t	TimeStamp	ST		М	VT_DATE
stSeld	BOOLEAN	ST	FALSE TRUE	0	VT_l4
subEna	BOOLEAN	SV		0	VT_BOOL
subVal	INT32	SV		0	VT_I4
subQ	Quality	SV		0	VT_I4
subID	VISIBLE STRING	SV	Text	0	VT_BSTR

Table 20. Intege	r Controlled Ste	p Position Information
------------------	------------------	------------------------

Name	Туре	FC	Value/Value range	M/O	OPC Data Type
ctlModel	ENUMERATED	CF	Status-only (0) directwithnormalsecurity (1) sbowithnormalsecurity (2) directwithenhancedsecurity(3) sbowithenhancedsecurity(4)	М	VT_14
sboTimeout	INT32U	CF		0	VT_I4
sboClass	ENUMERATED	CF	operate-once (0) operatemany (1)	0	VT_14
minVal	INT8	CF		0	VT_l4
maxVal	INT8	CF		0	VT_l4
stepSize	INT8	CF	1 (maxVal - minVal)	0	VT_l4
d	VISIBLE STRING255	DC	Text	0	VT_BSTR
dU	UNICODE STRING255	DC		0	VT_BSTR
cdcNs	VISIBLE STRING255	EX		0	VT_BSTR
cdcName	VISIBLE STRING255	EX		0	VT_BSTR
dataNs	VISIBLE STRING255	EX		0	VT_BSTR

Table 20. In	nteger Contro	olled Step Positio	on Information
--------------	---------------	--------------------	----------------

Mapping of controls

- Direct Control with Normal Security:
 - ctlVal: MMS Write.request to Oper structure with value.

- SBO with Normal Security:
 - ctlVal: MMS Write.request to Oper structure with value.
 - IEC61850 OPC Server will do the select before operate.
- Direct Control with Enhanced Security:
 - ctlVal: MMS Write.request to Oper structure with value.
- SBO with Enhanced Security:
 - ctlVal: MMS Write.request to Oper structure with value.
 - IEC 61850 OPC Server will do the select before operate.

Common Data Class Specifications for Controllable Analogue Information Analogue Set Point (APC)

Table 21 defines the common data class of analogue set point.

Name	Туре	FC	Value/Value range	M/O	OPC Data Type
lastApplError	ApplicationErro rCode		Refer to Application Error Codes on Page 297		VT_l4
setMag	AnalogueValue	SP, MX		М	VT_R4
origin	Originator	SP, MX		0	
operTm	TimeStamp	SP		0	VT_DAT
q	Quality	ST		М	VT_I4
t	TimeStamp	ST		М	VT_DATE
ctlModel	ENUMERATED	CF	direct-with-normal-security (1)	М	VT_I4
units	Unit	CF		0	
sVC	ScaledValueCo nfig	CF		0	
minVal	AnalogueValue	CF		0	VT_R4

Table 21. Analogue Set Point

Name	Туре	FC	Value/Value range	M/O	OPC Data Type
maxVal	AnalogueValue	CF		0	VT_R4
stepSize	AnalogueValue	CF	1 (maxVal - minVal)	0	VT_R4
d	VISIBLE STRING255	DC	Text	0	VT_BSTR
dU	UNICODE STRING255	DC		0	VT_BSTR
cdcNs	VISIBLE STRING255	EX		0	VT_BSTR
cdcName	VISIBLE STRING255	EX		0	VT_BSTR
dataNs	VISIBLE STRING255	EX		0	VT_BSTR

Table 21. Analogue Set Pa	oint (Continued)
---------------------------	------------------

Mapping of controls

- Direct Control with Normal Security:
 - setMag: MMS Write.request to Oper structure with value.
- SBO with Normal Security:
 - setMag: MMS Write.request to Oper structure with value. IEC61850 OPC Server will do the select before operate.
- Direct Control with Enhanced Security:
 - setMag: MMS Write.request to Oper structure with value.
- SBO with Enhanced Security:
 - setMag: MMS Write.request to Oper structure with value. IEC61850 OPC Server will do the select before operate.

Common Data Class Specifications for Status Settings

Single Point Setting (SPG)

Table 22 defines the common data class of single point setting.

Name	Туре	FC	Value/Value range	M/O	OPC Data Type
setVal	BOOLEAN	SP	off (FALSE) on (TRUE)	М	VT_BOOL
d	VISIBLE STRING255	DC	Text	0	VT_BSTR
dU	UNICODE STRING255	DC		0	VT_BSTR
cdcNs	VISIBLE STRING255	EX		0	VT_BSTR
cdcName	VISIBLE STRING255	EX		0	VT_BSTR
dataNs	VISIBLE STRING255	EX		0	VT_BSTR

Table 22. Single Point Setting

Integer Status Setting (ING)

Table 23 defines the common data class of integer status setting.

Table 23. Integer Status Setting

Name	Туре	FC	Value/Value range	M/O	OPC Data Type
setVal	INT32	SP		М	VT_l4
minVal	INT32	CF		0	VT_I4
maxVal	INT32	CF		0	VT_I4

Name	Туре	FC	Value/Value range	M/O	OPC Data Type
stepSize	INT32	CF	1 (maxVal - minVal)	0	VT_l4
d	VISIBLE STRING255	DC	Text	0	VT_BSTR
dU	UNICODE STRING255	DC		0	VT_BSTR
cdcNs	VISIBLE STRING255	EX		0	VT_BSTR
cdcName	VISIBLE STRING255	EX		0	VT_BSTR
dataNs	VISIBLE STRING255	EX		0	VT_BSTR

Table 23. Intege	r Status Settin	g (Continued)
------------------	-----------------	---------------

Common Data Class Specifications for Analogue Settings

Analogue Setting (ASG)

Table 24 defines the common data class of analogue setting.

Table 24. Analogue Setting

Name	Туре	FC	Value/Value range	M/O	OPC Data Type
setMag	AnalogueValue	SP, MX		М	VT_I4
units	Unit	CF		0	
sVC	ScaledValueCo nfig	CF		0	
minVal	AnalogueValue	CF		0	VT_I4
maxVal	AnalogueValue	CF		0	VT_I4

Name	Туре	FC	Value/Value range	M/O	OPC Data Type
stepSize	AnalogueValue	CF	1 (maxVal - minVal)	0	VT_I4
d	VISIBLE STRING255	DC	Text	0	VT_BSTR
dU	UNICODE STRING255	DC		0	VT_BSTR
cdcNs	VISIBLE STRING255	EX		0	VT_BSTR
cdcName	VISIBLE STRING255	EX		0	VT_BSTR
dataNs	VISIBLE STRING255	EX		0	VT_BSTR

Table 24. Analogue Setting	(Continued)
----------------------------	-------------

Setting Curve (CURVE)

Table 25 defines the common data class of Setting curve.

Name	Туре	FC	Value/Value range	M/O	OPC Data Type
setCharact	ENUMERATED	SP		М	VT_I4
setParA	FLOAT32	SP		0	VT_R4
setParB	FLOAT32	SP		0	VT_R4
setParC	FLOAT32	SP		0	VT_I4
setParD	FLOAT32	SP		0	VT_I4
setParE	FLOAT32	SP		0	VT_I4
setParF	FLOAT32	SP		0	VT_I4

Name	Туре	FC	Value/Value range	M/O	OPC Data Type
d	VISIBLE STRING255	DC	Text	0	VT_BSTR
dU	UNICODE STRING255	DC		0	VT_BSTR
cdcNs	VISIBLE STRING255	EX		0	VT_BSTR
cdcName	VISIBLE STRING255	EX		0	VT_BSTR
dataNs	VISIBLE STRING255	EX		0	VT_BSTR

Table 25. Setting Curve (Continued)

Common Data Class Specifications for Description Information

Device Name Plate (DPL)

Table 26 defines the common data class of device name plate. Data of this common data class are used to identify entities like primary equipment or physical devices.

Name	Туре	FC	Value/Value range	M/O	OPC Data Type
vendor	VISIBLE STRING255	DC		М	VT_BSTR
hwRev	VISIBLE STRING255	DC		0	VT_BSTR
swRev	VISIBLE STRING255	DC		0	VT_BSTR

Table 2	26. D	evice	Name	Plate
---------	-------	-------	------	-------

Name	Туре	FC	Value/Value range	M/O	OPC Data Type
serNum	VISIBLE STRING255	DC		0	VT_BSTR
model	VISIBLE STRING255	DC		0	VT_BSTR
location	VISIBLE STRING255	DC		0	VT_BSTR
cdcNs	VISIBLE STRING255	EX		0	VT_BSTR
cdcName	VISIBLE STRING255	EX		0	VT_BSTR
dataNs	VISIBLE STRING255	EX		0	VT_BSTR

Table 26. Device Name Plate

Logical Node Name Plate (LPL)

Table 27 defines the common data class of logical node name plate. Data of this common data class are used to identify logical nodes.

Name	Туре	FC	Value/Value range	M/O	OPC Data Type
vendor	VISIBLE STRING255	DC		М	VT_BSTR
hwRev	VISIBLE STRING255	DC		М	VT_BSTR
d	VISIBLE STRING255	DC	Text	М	VT_BSTR

Name	Туре	FC	Value/Value range	M/O	OPC Data Type
dU	VISIBLE STRING255	DC		0	VT_BSTR
configRev	VISIBLE STRING255	DC		0	VT_BSTR
ldNs	VISIBLE STRING255	EX	will be included only in LLN0	0	VT_BSTR
InNs	VISIBLE STRING255	EX		0	VT_BSTR
cdcNs	VISIBLE STRING255	EX		0	VT_BSTR
cdcName	VISIBLE STRING255	EX		0	VT_BSTR
dataNs	VISIBLE STRING255	EX		0	VT_BSTR

Table 27. Logical Node Name Plate

Report Control Block Object Properties

Data Sets

A data set is an ordered group of data objects and data attributes organized as a single collection for the convenience of the client. Data sets are used to define the values of data to be transmitted in case a value of a data set member changes. A data set is used for data reporting and GOOSE messaging.

Data Reporting

Data changes are used as a trigger for reporting. This information is grouped using a data set. The data set is the content basis for reporting. Reporting uses information

reports to transmit data. The data configured in a data set is transmitted in information reports. Reporting is controlled by report control blocks.

Report Control Block

Report control describes the conditions for generating information reports based on parameters set by configuration or by a client. Report Control Blocks control the procedures that are required for reporting values of data from logical nodes to one client.

There are buffered and unbuffered report control blocks:

- In a Buffered Report Control Block (BRCB) internal events issue immediate sending of reports, or buffer the events for transmission. This way the values of a data object are not lost due to transport flow control constraints or loss of connection. BRCB provides sequence-of-events functionality.
- In an Unbuffered Report Control Block (URCB) internal events issue immediate sending of reports on a best efforts basis. If no association exists, or if the transport data flow is not fast enough to support it, events may be lost.

Property	Value / Value range	Description
Basic		
Buffer Time	Default: 0 milliseconds	With this value, RCB can be configured to wait for other events after the first change before sending the report. Value 0 means that a new change is immediately reported to the client. Configurable.
Buffered	True False Default: True	Controls if the RCB is buffered or unbuffered
Configuration Revision	02147483647	Configuration revision of the data set referenced by this RCB. Every modification in the data set increases the Configuration Revision property by one.

Table 28. Report Control Block object properties

Property	Value / Value range	Description
Data Set		The name of the data set to be sent by the report control block.
Indexed	True False Default: True	Indicates if this RCB is configured with indexed naming convention.
Integrity period	0214748647 Default: 0	Integrity period in milliseconds. If this attribute has a value > 0 ms, an integrity report with all data listed in the data set is sent periodically in this interval. By default, this feature is not enabled, because it generates an unnecessary load to the server and network. If this feature is used, the Trigger Option 'Period' in RCB needs to be enabled. Configurable
Report ID		Used as identification in information reports to specify that the report is from this RCB. By default report control block MMS path name is used. Configurable.
Option Fields		Defines what information is sent with the information report. Configurable.
Config Reference	True False Default: False	Config Reference
Data Ref	True False Default: False	Data Ref
Data Set	True False Default: False	Data Set

Table 28. Report Control Block object properties (Continued)

Property	Value / Value range	Description
Entry ID	True False Default: True	Entry ID
Reason Code	True False Default: True	Reason Code
Sequence Number	True False Default: True	Sequence Number
Time Stamp	True False Default: False	Time Stamp
Trigger Options		Defines the triggering conditions for creating reports.
Data change	True False Default: True	Specifies whether a report entry will be generated due to a change of the value of the data attribute.
Data Update	True False Default: False	Specifies whether a report entry will be generated due to freezing the value of an unfreezable attribute or updating the value of any other attribute. An updated value may have the same value as the old value.

Table 28. Report Control Block object properties (Continued)

Property	Value / Value range	Description
Period	True False Default: False	Specifies whether a report entry will be generated on the expiration of the integrity period.
Quality Change	True False Default: True	Specifies whether a report entry will be generated due to a change of the value of the quality attribute.

CET Project Configuration

A new CET project is created to configure the IEC 61850 OPC Server. Perform the following steps to create CET project and configure the IEC 61850 OPC Server:

- 1. Double-click the CET icon on the desktop or select Start > ABB > IEC61850 OPC Server > Communication Engineering Tool.
- 2. In File menu, select File > Open/Manage Project.

TCo	mmunica	ation Er	ngineerii	ng Tool for	IEC 61
File	Edit	View	Tools	Window	Help
2	Open/M	anage P	roject	Ctr	1+0
	Close Pr	oject			
	Save			Ct	rl+S
	Exit				
	1: Local	Server	test		

Figure 9. Open/Manage Project in CET

3. In the **Open/Manage Project** dialog box, click **New Project**.

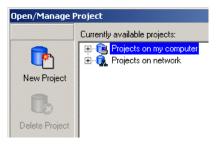


Figure 10. Open/Manage Project Dialog Box

4. In the **New Project** dialog box, enter the Project name and the Description.

New Project	×
Server name:	
IN-L-INXI006129\PCMSERVER	-
Project name:	
Description:	
	-
Create Cancel	

Figure 11. New Project Dialog Box



If the user want to open an existing project, in Step 3, locate the project in currently available projects list and click **Open Project**.

Adding Computer Node Object

5. Select the newly created project.

6. Right-click new project name and select **New > Communication > Computer Node.** Figure 12 shows the new Computer Node created in the Communication structure.

Communication	_				
🔋 New Projec	Collapse				
	New	•	New		
	Properties		Communication	•	Computer Node

Figure 12. Computer Node Selection

Adding OPC Server Object

 Right-click Computer Node object and select New > IEC61850 > IEC61850 OPC Server.

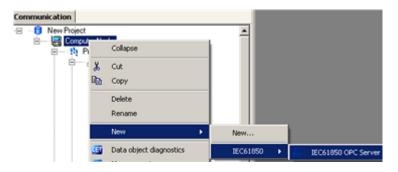


Figure 13. OPC Server Selection

Project Explorer		→ 9	×
Communication			
🗈 — 🤌 Common Ev 🗈 — 🗗 Scale Defini	ion Dia ent Sel ions	gnostic Event Definitions	<
iiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii		Collapse	
ē A		Cut	
	6	Сору	
		Delete	
		Rename	
		New	•
	ŒT	SCL Import	
	Œ	Online diagnostics	
	Œ	Diagnostic AE client	
	CET	DOType Viewer	
	E (ET	DAType Viewer	
		Enum Viewer	
	9	Properties	

8. Right-click OPC Server instance and select Properties.

Figure 14. Properties Selection

- 9. In the right-side pane, under **Basic**:
 - a. For AE ProgID,

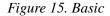
enter **ABB.IEC61850_OPC_AE_Server.Instance**[*n*], where **n** is OPC Server instance number and n=1,2,3,4,.....32.

b. For DA ProgID,

enter **ABB.IEC61850_OPC_DA_Server.Instance**[*n*], where **n** is OPC Server instance number and n=1,2,3,4,.....32.

c. For **Instance Number**, enter *n*, where *n* is same as mentioned in Step a and Step b.

🖂 [010] Basic	
AE Prog ID	ABB.IEC61850_OPC_AE_Server.Instance[1]
DA Prog ID	ABB.IEC61850_OPC_DA_Server.Instance[1]
Instance Number	1





Ensure that in Step a, Step b and Step c, n must be the same. For example, if n=1 for step a, then n=1 for steps b and c respectively.

!

Ensure that the OPC Server Instance number running on Connectivity Server is unique across the 800xA System. Exception to this is if redundancy pair exists.



AE ProgID, **DA ProgID** and **Instance Number** for the first connectivity server are created automatically on selecting **Update and Reload configuration**. However, note that the OPC Server instance number starts from one and in sequence for each Connectivity Server.

Table 29 illustrates the instance number for each Connectivity Servers. Automatic creation of instance number is recommended only for the first connectivity server and its redundant pair if exists.

800xA Connectivity Server	OPC Server	OPC Server - Redundant
1 - Redundant	1,2,3,4	1,2,3,4
2 - Non Redundant	5,6,7,8	-
3 - Non Redundant	9,10,11,12	-
4 - Redundant	13,14,15,16	13,14,15,16
5 - Redundant	17, 18,19,20	17, 18,19,20
6 - Non Redundant	21,22,23,24	-
7 - Redundant	25,26,27,28	25,26,27,28
8 - Non Redundant	29,30,31,32	-

Table 29. OPC Server Instance Numbering



Once the OPC Server instance is created, it is recommended not to change the **AE ProgID**, the **DA ProgID**, and the **Instance Number**.

SCL Import

After adding an IEC 61850 OPC Server object, perform the following steps to import the scd file:

- 1. Select an IEC 61850 OPC Server instance that needs to be configured.
- 2. Right-click IEC 61850 OPC Server object and select SCL Import.

	Process Event Definitions Communication Diagnostic Event Definitio Common Event Settings Scale Definitions		
IEC61	060.0	PC Course	
		Expand	
	*	Cut	
	8	⊆ору	
		Delete	
		Rename	
		New +	
	(E)	SCL Import	

Figure 16. SCL Import Selection

3. Click Choose File.

IEC61850 OPC Server - S		- ↓ ↓
OPC Server Objects		
File:		Select File
Selected OPC Server: Selected Accesspoint:	✓	Import

Figure 17. Choose File

4. Browse and select the required SCD File in the file browser dialog and click **Open**.

Choose SCL file					? ×
Look in:	C SCL		- 0 🕫	• 🔜 💙	
My Recent Documents Desktop	DEMO.scd				
) My Documents					
My Computer IN L-IN04006					
My Network	File name:	DEM0.scd			Open
Places	Files of type:	SCL Files ("ICD; ".CID; ".SCD	; ">04L)		Cancel

Figure 18. Choose SCL File Dialog Box

5. Select the OPC Server (Substation) that points to the subnetwork from the **Selected OPC Server** drop-down and click **Import**.

Project Explorer 🗸 🗸	X IEC61850_OPC_Server - SCL Import	- ↓
Project Explorer 4 Communication IntarioHydro_MainNorth1 Image: Computer Node Image: Communication Diagnostic Event Definitions Image: Communication Diagnostic Event Definitions Image: Communication Diagnostic Event Definitions Image: Communication Diagnostic Event Definitions Image: Communication Diagnostic Event Definitions Image: Communication Diagnostic Event Definitions Image: Communication Diagnostic Event Definitions Image: Communication Diagnostic Event Definitions Image: Communication Diagnostic Event Definitions Image: Communication Diagnostic Event Definitions Image: Communication Diagnostic Event Definitions Image: Communication Diagnostic Event Definitions Image: Communication Diagnostic Event Definitions Image: Communication Diagnostic Event Definitions Image: Communication Diagnostic Event Definitions Image: Communication Diagnostic Event Definitions Image: Communication Diagnostic Event Definitions Image: Communication Diagnostic Event Definitions Image: Communication Diagnostic Event Definitions Image: Communication Diagnostic Event Definitions Image: Communication Diagnostic Event Definitions Image: Communication Diagnostic Event Definitions Image: Communication Diagnostic Event Definitions Image: Communication Diagnostic Event Definitions Image: Communication Diagnostic Event Definitions Image: Communication Diagnostic Event Definitions Image: Communicatic Eve	X IEC61850_OPC_Server - SCL Import OPC Server Dbjects Messages File: C:\Substation.scd Selected OPC Server: AA1AA10PC1 Selected Accesspoint:]
	Do not import D0's without protocol configuration (sAddr) Check RCBs for Client Identity	
	Check Configuration Revisions	

Figure 19. Subnetwork Selection

Table 30 provides descriptions on the SCL Import screen:

Table 30. Subnetwork selection field details

Subnetwork Field Labels	Description
Filter DOs that don't belong to the DataSet:	Enhance the performance by selecting this option, as it limits the amount of data objects being imported. If a data object does not belong to any data set, it will not be imported. Some IEDs can provide large amounts of data that is not reported, that is, not updated in COM600 HMI.
Overwrite existing descriptions	All existing descriptions of objects affected by the import operation are overwritten. Select this option only if you know that the file to be imported contains better descriptions than your current configuration.
Import protocol configuration (sAddr)	Both the object tree and protocol configuration are created. If you do not select this option, only the object tree structure is created. While re-importing the SCD, the checkbox Import Protocol Configuration (sAddr) must be cleared to avoid overwriting of the existing event definition mappings of Data objects in the CET project.
Overwrite Alarm and Event settings	All configured alarm and event settings are overwritten and the default settings are assigned to them. Select this option only if customized Alarm and Event settings is available on the existing configuration.
Overwrite Limit settings	All configured unit and limit configurations are overwritten and the values from the SCL file are assigned to them.
Do not import DO's without protocol configuration (sAddr)	None of the data objects without communication information are created to the object tree.

Table 30.	Subnetwork s	selection f	field details	(Continued)
10000000	01101101110111	,		(00

Subnetwork Field Labels	Description
Check RCBs for Client Identity	IEDs are imported from the given file in which the client identity of the Report Control Blocks matches the selected OPC Server.
Check Configuration Revisions	Configuration revision attributes of the project are compared to the SCL file to be imported.

6. The SCD file contents is populated into CET as shown in Figure 20.

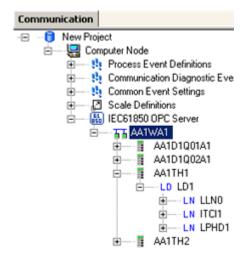


Figure 20. CET Project Explorer

SCD File Information	Description
Communication Section Subnetwork (Name, IP address)	The Name, IP address field of subnetwork used from SCD file by IEC 61850 OPC Server.
	For more information, refer to IEC 61850 Subnetwork Object Properties on Page 33.
IED Section (Name, Type, IP address, Manufacturer, configVersion, OSI- AP-Title, OSI-AE-Qualifier, OSI- TSEL, OSI-PSEL, OSI-SSEL)	The Name, Type, IP address, Manufacturer, configVersion, OSI-AP-Title, OSI-AE- Qualifier, OSI-TSEL, OSI-PSEL, OSI-SSEL field of IED used from SCD file by IEC61850 OPC server.
	For more information, refer to IEC 61850 Device Object Properties on Page 35.
Logical Device under IED>LD (Name)	The Name field of Logical Device used from SCD file by IEC61850 OPC server.
	For more information, refer to Logical Device Object Properties on Page 42.
Logical Node under IED>LD>LN. (Name, InClass, InInst, prefix, cdc, DOI name, DAI name)	The Name,Inclass,Ininst,prefix,cdc,DOIName,DAI Name field of Logical Node used from SCD file by IEC61850 OPC Server.
Report Control Block under IED>LD0.	The RCB field is used from SCD file by IEC61850 OPC server.
DataSet Section (IdInst, prefix, InInst, InClass, DO name, fc)	The Dataset editor field is used from SCD file by IEC61850 OPC server. For more information, refer to Sequence of Events on Page 204.

Table 31. SCD File Information for IEC 61850 OPC Server

Update and Reload Configuration

After the configurable objects in the object tree have been created, the configuration must be updated to the IEC61850 OPC Server(s). This is done by using the Management function.

To activate the update and activate the configuration:

1. Right-click **Computer Node** and select **Management**. Management Dialog window opens as shown in Figure 22.

Project Explorer	
Communication	
test Computer N ⊕	Collapse Cut Copy Delete Rename New Data object dia Management SCL Export Properties

Figure 21. Management Selection

CETLocal Server\MyTestProject - ABB IEC 61850	OPC Server
Eile Edit View Iools Window Help	**************************************
Project Explorer 🗸 🕈 🗙	Computer Node - Management
Communication	Configuration control
MyTestProject Gomputer Node Gomputer Node Gomputer Science Event Definitions	Update configuration
Communication Diagnostic Even	<u>R</u> eload configuration
	Update & reload configuration
EC61850_Subnetwork	
	License information
	Customer: 800xA Revision: 1.0
	Ready
	30. joulukuuta 2011 8:50:46 🛛 🕂 🖁 🖉

Figure 22. Computer Node - Management Function

2. Click **Update configuration** followed by **Reload configuration** or **Update & Reload configuration**.

After Update/Reload of CET is done, due to OPC server restart, alarms that were in RTN status prior to Update/Reload action disappears.

3. This completes the configuration of OPC Server instance and the OPC Server is ready to support OPC DA and AE for 800xA as configured in CET.



In some scenarios (for example. Computer crash while configuration of IEC 61850 OPC Server), the CET project database gets corrupted and cannot be opened again from IEC 61850 Server CET tool after restarting the computer.

To recover the CET project, perform the following steps:

- Restart the machine. Fresh instance of the OPC server instance is running in the task manager.
- 2. Copy the system.xml file from the relevant OPC server instance folder to any other folder as backup. Ensure the correct system.xml is copied as backup.

The *system.xml* file under the IEC 61850 installation folder contains the entire project configuration. The system.xml file for each OPC server is stored in the respective instance folder under the following path: *C:\Program files\ABB\61850 OPC server\OPC_61850\bin\ OPCS_IEC61850_x*, where x is the OPC server instance number.

- 3. Create a new project in CET Tool and click OK in the pop-up error message window.
- 4. Create a new computer node and a new IEC 61850 OPC Server.
- 5. Navigate to the scl import option and import the relevant system.xml file for that OPC Server instance.
- 6. For an additional OPC server, repeat Step 2 and Step 5.
- 7. Update and reload the configuration.

Redundant IEC 61850 OPC Server Configuration

Perform the following steps to handle the OPC Server redundancy:

- 1. Create CET project in Primary IEC connect machine and configure all required configuration such as Alarms and events.
- 2. Configure Report client identity properties for OPC instance as primary OPC name (PrimOPC).
- 3. Export the CET project as *.*pcmp*.
- 4. Import the *.*pcmp* CET project in secondary OPC machine.
- 5. Change the Report client identity properties for OPC instance as Secondary OPC name (SecOPC).

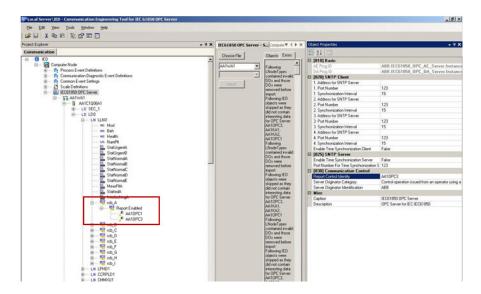


Figure 23. Redundant OPC Server

6. Select Computer Node object and open the Computer Management Tab.

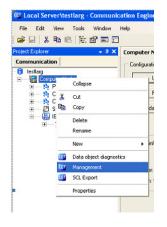


Figure 24. Computer Node - Management

7. Click **Update configuration** and followed by **Reload configuration**.

Figure 25. Computer Node - Update Configuration

8. This completes the configuration of the redundant OPC Server on the secondary connectivity server.

Affinity Configuration for IEC 61850 Projects with IEC 61850 Redundant Connectivity Server

In an 800xA System with Redundant IEC61850 Connectivity Server nodes, Affinity configuration is recommended. Affinity configuration have Aspect Server (containing Alarm Manager subscribing to Event Collectors in Connectivity Servers) and All Operator Workplaces (clients subscribing to Connectivity Server OPC DA) configured to prefer Primary Connectivity Server node.

Such configuration ensures that Alarm Manager and Operator Workplaces are subscribed to the same IEC 61850 DA and AE server instance running in Primary Connectivity Server node and thereby all OPC events arising from any Client DA activity being detected by Alarm manager without any loss of events in PPA Alarm and Event list.

In case of Primary Connectivity Server fails, the affinity preference for Alarm Manager and Operator Workplaces moves to Secondary Connectivity Server node.



PPA Automatic Load Balancing algorithm will be disabled when affinity configuration is deployed.

For details on configuring affinity, refer to *System 800xA Post Installation* (*3BUA000156**) Manual.

CET Feature Pack Update

Updated Event Categories

All alarms/ event belonging to the IED object type is either part of system alarms or events. In this feature pack update normal process alarms coming via LN-GGIO during some configuration also have possibility to define them as **System Alarm**. This is used for additional monitored equipment assigned to the IED as an interface to the system.

The intention behind this update is to differentiate System and Process alarms from the IEDs to improve the display on PPA with the different alarm page definition.

- Process Alarm monitors the running process.
- System Alarm monitors the installed equipment.

Alarms/ events belonging to primary equipment like CBR is defined as process alarms/ events, which also includes GGIOs configured for these object types. These process alarms/ events appear in the process alarm/ event lists.

Existing CET contains Event Categories

- For Events :
 - Simple Discrete Event
 - Simple level Event
- For Alarms:
 - Condition Discrete Event
 - Condition Level Event

In Feature Pack release, CET contains following additional Event categories to categorize as Process Alarms/Events and System Alarms/Events, as shown in Figure 26.

Gi Local Server\Testing - ABB IEC 61850 OPC Server	
File Edit View Tools Window Help	
Project Explorer	→ ₽ X
Communication	
Computer Node Computer Node Computer Node Societations Computer Node Societations Computer Node Societations Computer Node Societations Societations Computer Node Societations Computer Node Societations Societations Computer Node Societations Computer Node Societations Computer Node Societations Societations Computer Node Societations Societ	A H

Figure 26. Process and System Alarms or Events

- For Events :
 - Process Simple Discrete Event
 - Process Simple Level Event
 - System Simple Discrete Event
- For Alarms :
 - Process Condition Discrete Event
 - Process Condition Level Event
 - System Condition Discrete Event.

The above Event categories are further introduced in 800xA Alarm Collection Definition aspect to map to 800xA Category groups.

Further, a new event class *DeviceHealth* is introduced under Indication Events. The Condition Event category and Simple Event category of DeviceHealth is System Condition Discrete Event and System Simple Discrete Event by default.

The DeviceHealth Indication event can be configured for each IED in $IED \rightarrow LDO \rightarrow LPHD \rightarrow PhyHealth$ Data object to monitor the health of IED and generate System Alarm / Event in case of fault in IED.



For each OPC server instance, the Simple Event Categories and Condition Event Categories under Common Event Settings will be listed as *Category Name properly mapped with Category Group* in the *Alarm Collection Definition* aspect, only if those Categories are configured as OPC Alarm and Event to Data attributes of the Logical nodes with event class (Indication Events and Measurement limit Supervision Events).

Area Name and Area Description Configuration

This update is intended to bring in Alarm and Event page consistence with 800XA standard. A new item **Area** on 800XA Alarm and Event page filters alarms and events based on the substation area.

Two new attributes as shown in Table 32 are added to all CET generated events by default. CET users can create and configure Area Name and corresponding Area Description according to the project. The pre-configured Area Names is assigned to each IED. 800XA client will be able to filter the Alarms and Events based on the Area Name and Area Description attributes.

Ξ	[070] OPC Alarm and Event
	Area Description
	Area Name

Figure 27. Area Name and Area Description

Name	Value/ Default	Description
Area Name		Specifies which area this IED belongs to.
Area Description		Description of area.

Table 32. OPC Alarm Event

System Consistency Check during SCD file import

System Consistency Check is intended to be used with IEC 61850 protocol to check that the IED configurations are consistent with the compared IED configurations. According to the IEC61850 standard, IEDs can have two configuration revisions: one for data model and one for reporting. Configuration revision for data model is modeled on the LD0\LLN0\NamPlt\configRev object. It is the most important indicator of the configuration revision. Additionally, each Report Control block has a confRev attribute that defines the revision and the DataSet of RCB. System Consistency Check checks each LDs LLN0\NamPlt\configRev and confRev of each RCB.

The GUI tool is divided into two tabs: The **System Consistency Check** tab gives an overview of the project with the configuration consistency status of the IEDs as shown in Figure 28. The **Options** tab is used for setting the options for the update procedure as shown in Figure 28. Additionally, by clicking Details, a dialog on

consistency differences is shown.

) 📽 🖬 👗 🖬 🛍 🕅) 🗗 📼 🗖							
oject Explorer	- 9 X	Computer Node -	System Consistency Che	ck				w -
ommunication								
- 🟮 80/EDs_1030								
🖻 — 🚼 Computer Node		System Consistency Check Options						
Process		IED	Configuration File	Consistency	Browse For File	Details	Update Configuration	
E Communi	ication Diagnostic Event	MEDIUM882	80IED_RCB_GCB_Subne	Consistent	Browse	Details	Update	
€ Z Scale De		MEDIUMMOT13	SOIED_RCB_GCB_Subne	Consistent	Browse	Details	Update	
- A IEC6185		MEDIUMMOT16	80/ED_RC8_GC8_Subne	Consistent	Browse	Details	Update	
E- Th IEC		MEDIUMGEN5	80IED_RC8_GC8_Subne	Consistent	Browse	Details	Update	
	REC670_A11	MEDIUMTR3	80IED_RC8_GC8_Subne	Consistent	Browse	Details	Update	
	REC670_A12	MEDIUMMOT14	SOIED_RC8_GC8_Subne	Consistent	Browse	Details	Update	
	REC670_A13	MEDIUMGEN6	80IED_RC8_GC8_Subne	Consistent	Browse	Details	Update	
	RET670_A15 REM630_A14	MEDIUMMOT9	80IED_RC8_GC8_Subne	Consistent	Browse	Details	Update	
	REC670CIMMS1	MEDIUMMOT19	80/ED_RC8_GC8_Subne	Consistent	Browse	Details	Update	
		MEDIUMIC3	SOIED_RCB_GCB_Subne	Consistent	Browse	Details	Update	
		MEDIUMMOT12	SOIED_RCB_GCB_Subne	Consistent	Browse	Details	Update	
		MEDIUMMOT7	80IED RC8 GC8 Subne	Consistent	Browse	Details	Update	
		MEDIUMMOT20	80IED_RC8_GC8_Subne	Consistent	Browse	Details	Update	
	MEDIUMMOT17	SOIED RCB GCB Subne	Consistent	Browse	Details	Update		
		MEDIUMMOT18	80/ED_RC8_GC8_Subne	Consistent	Browse	Details	Update	
		MEDIUMIC2	80/ED_RC8_GC8_Subne		Browse	Details	Update	
		MEDIUMMOT4	SOIED RCB GCB Subne	Consistent	Browse	Details	Update	
		MEDIUMMOTS	SOIED_RCB_GCB_Subne	Consistent	Browse	Details	Update	
		MEDIUMMOTS	SOIED_RCB_GCB_Subne	Consistent	Browse	Detais	Update	
		MEDIUMMOT1	SOIED RCB GCB Subne	Consistent	Browse	Details	Update	
		MEDIUMMOT11	80/ED_RCB_GCB_Subne	Consistent	Browse	Details	Update	
		MEDIUMMOT15	SOLED_RC8_GC8_Subne	Consistent	Browse	Details	Update	
		MEDIUMMOT10	80/ED_RC8_GC8_Subre		Browse	Details	Update	
		MEDIUMMOT10	SOIED_RC8_GC8_Subre		0	Detais	Update	
		MEDIUMMOT2 MEDIUMMOT3	SOIED_HC8_GC8_Subne SOIED_RC8_GC8_Subne		Browse			
				Consistent	Browse	Details	Update	
		MEDIUMMOT5	SOIED_RCB_GCB_Subne	Consistent	Browse	Details	Update	
		MEDIUMTR2	80IED_RC8_GC8_Subne	Consistent	Browse	Details	Update	
		MEDIUMXX21	80/ED_RC8_GC8_Subne	Consistent	Browse	Details	Update	
		MEDIUMOO(51	SOIED_RCB_GCB_Subne		Browse	Details	Update	
		MEDIUMXX24	80/ED_RC8_GC8_Subne		Browse	Details	Update	
		MEDIUMXX30	80/ED_RC8_GC8_Subne	Consistent	Browse	Details	Update	
		MEDIUMXX25	80IED_RC8_GC8_Subne		Browse	Details	Update	
		MEDIUMXX26	SOIED_RC8_GC8_Subne	Consistent	Erowse	Details	Update	

Figure 28. System Consistency Check

Local Server\80IEDs_1030 - ABB IEC 61850 OPC Server			
File Edit View Tools Window Help			
0 🛩 🖬 🙏 🗞 🛍 🕅 🗃 🖬			
Project Explorer 🗸 🗘 🗙	Computer Node - System Consistency Check		* 4 ▷ ×
Communication			
● ● ● ● Computer Node ● ● ● Process Event Definitions ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●	System Consistency Check Options Aam and Event Template: Filter DOs that don't belong to DataSet Overwrite existing descriptions Do not import substation information Import substation information from a separate template Check LDO.LLNO.NamePlate.confRev	General Phase Tripping	• Stat Check Update All

Figure 29. System Consistency Check - Options tab

When the tool is started, it will automatically perform the offline check. In the offline mode, the IED configuration revisions used in the CET project are compared to the specified IED configuration files. When the IED configuration file is imported to CET, the file name and location are saved, and the information is later used by the System Consistency Check tool. To enable the correct result of the comparison, always store the changed configuration files with the same name to the same location as the originals. If the location or the file name has changed, you can browse the new file with the Browse button. If the configuration is inconsistent, click the Details button for more detailed information. Finally, an individual configuration can be updated using the Update button. The Update All button updates all inconsistent configurations.

The **Options** view allows you to select same importing options that are available in the **SCL Import** tool. It is recommended that same options are used with both functions.

The **Details** view shows added or deleted LDs and RCBs. Additionally, it shows the modifications to the content of LD or RCB.



System Consistency Check tool does not list the IEDs from earlier version of CET because the information about the original files is not known to the System Consistency Check tool, hence the file name is empty.

It is recommended to run System Consistency Check function for CET projects created with CET version containing System Consistency Check tool.

Event Template Tool

Event Template Tool at Computer Node Level

The Computer Node level Event Template tool allows export of configured Process Event Definitions in CET project into an Event Template file. The Event template can then be imported and reused into Process Event Definitions of same type in other CET projects. The Event Template Tool is launched from context menu at Computer Node level as shown in Figure 30 and Figure 31.

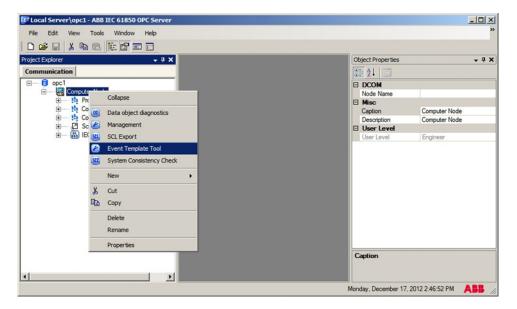


Figure 30. Event Template Tool - Context menu, Computer node level

ET Local Server\opc1 - ABB IEC 61850 0	PC Server		
File Edit View Tools Window	Help		**
🗅 🛩 🖬 👗 🛍 🛍 🔃 🗃 🚍			
Project Explorer 🗸 🕈 🗙	EventTemplateTool - Event Template Tool - + 4 > >	Object Properties	* † X
Communication	E- Computer Node	21 🖾	
E opc1	Process Event Definitions	DCOM	
Computer Node	Communication Diagnostic Event Definitions Common Event Settings	Node Name	
	Scale Definitions	B Misc	
		Caption	Computer Node
		Description	Computer Node
		User Level	Engineer
	Overwrite existing definitions in import. Import Template Template Template	Caption	
,		Monday, December 17,	2012 2:44:58 PM
		-	

Figure 31. Event Template Tool

Overwrite Existing definitions in import option must be selected in the Event Template Tool for overwriting the existing Process Event Definition property values in the system.

Event Template Tool at IED Level

The IED Event Template tool allows export of configured IED in CET project into an IED Template file. The IED template can then be imported and reused into IEDs of same type in other CET projects.

The Event Template tool is launched from context menu at IED level as shown in Figure 32 and Figure 33.

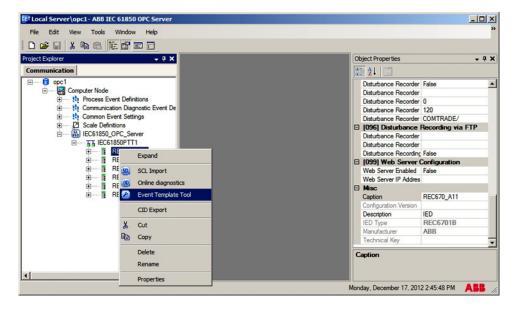


Figure 32. Event Template Tool - Context menu, IED level

File Edit View Tools Window Help Image: Strategy of the strategy		<u>×</u> »
Project Explorer 🗸 🗘 🗙	EventTemplateTool - Event Template Tool 🗧 🌗 🗙	Object Properties 🗸 🕈 🗙
Communication	E- REC670_A11	
Computer Node Computer Node Computer Node Communication Diagnostic Event De Common Event Settings Common Event Settings	⊕ Ø SEC_1 ⊕ Ø SEC_1 ⊕ Ø SEC_3 ⊕ Ø UV2_1 ⊕ Ø UV2_2	Disturbance Recorder False Disturbance Recorder 0 Disturbance Recorder 0 Disturbance Recorder 120 Web Server IP Addres 14 Masc Caption Caption REC670_A11 Configuration Version 16D IED Type REC6701B Manufacturer AB8 Technical Key *
۲	Overwrite existing definitions in import. Export Template Template	Caption
		Monday, December 17, 2012 2:46:22 PM

Figure 33. Event Template Tool

Following three possible scenarios applicable for IED Template import:

• CET Project does not contain Event Definition which is in IED Template file:

Event Definition is created, mappings are set, *Overwrite existing definitions in import* option is not used regardless of the selected value.

• CET Project contains Event Definition which is in IED Template file, *Overwrite existing definitions in import* option is Not set:

Existing event definition property values are not overwritten.

• CET Project already contains Event Definition which is in IED Template file, *Overwrite existing definitions in import* option is set:

Existing Event Definition property values are overwritten in CET Project, *Overwrite existing event definition* option is used.

Analog Alarm Limit Configuration

This update is intended to configure and display Operator Limits, Units and ranges of Analog values on Faceplates and Trends.

In case of limit violations, analog values is also displayed for the limit value and physical unit. New fields are added for High High, Low Low, High, Dim, Max Range and Min Range.

If SCD file:

- contains limit configuration and units of analog signals, the same limit/units is shown in CET and OPC server.
- does not contain limit configuration and units of analog signals, default / empty limits/ units is shown in CET and OPC server.

Disturbance Recording

Disturbance Recording is the function of an IED which records the disturbances occurring due to interruptions in the received signals.

OPC Server can be configured to automatically scan for and transfer disturbance recording files to a specified directory on the Connectivity Server using IEC 61850 OPC Server.

Disturbance Recorder items (included in the IED object type Control Connection Aspect) can be used to display the current disturbance recording settings of IEC61850 CET OPC server.

The following are the two methods to upload the disturbance recording file from the IED.

Disturbance Recording via MMS

- 1. Open CET.
- 2. In CET:
 - a. Expand **Computer Node > OPC Server > Subnetwork > IED**.

b. Right-click and select Properties

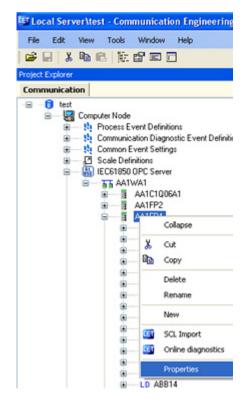


Figure 34. IED With Properties Selected

3. In the right-side Properties pane, update the fields mentioned in the Table 3 under **Disturbance Recording** column. Set the **Disturbance Recorder Enabled** option to **True**.

File Edit View Tools Window Help			,
D 📽 🔛 🐰 🛍 🛍 🔃 🖬 🖬 🖬	Object Properties		- # >
Communication	2 2 I		
Computer Node Compute	SPA Parameter for Open Password SPA atore parameter name. SPA atore parameter name. SPA atore parameter value. SPA Value for Open Password SPA Value for Open Password I 0950 Disturbance Recording Disturbance Recorder Delete Recording: Disturbance Recorder Local Directory Disturbance Recorder Local Directory Disturbance Recorder Remote Directory Disturbance Recorder Remote Directory Disturbance Recorder Remote Directory Disturbance Recorder Poling Period Disturbance Recorder Poling Period Disturbance Recorder Poling Period Disturbance Recorder FTP User Name Disturbance Recording Read Via FTP I 0991 Web Server Configuration Web Server IP Address Misc Caption IED Type Manufacturer Technical Key Caption	120	

Figure 35. Sample IED Object Properties of RE_670 Series via MMS

4. Set Disturbance Recorder Local Directory path of your choice. By default, it will be:

OPC Server Install Drive\COMTRADE

Disturbance Recording via FTP

- 1. Open CET.
- 2. In CET:
 - a. Expand Computer Node > OPC Server > Subnetwork > IED.

b. Right-click and select **Properties**.

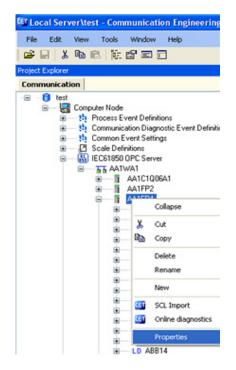


Figure 36. IED With Properties Selected

- 3. In the right-side Properties pane, update the fields mentioned in Table 3, IEC 61850 Device Object Properties on Page 35, under **Disturbance Recording** via FTP column.
 - Provide the Username and Password as Administrator.
 - Set the **Disturbance Recordings Read Via FTP** option to **True**.

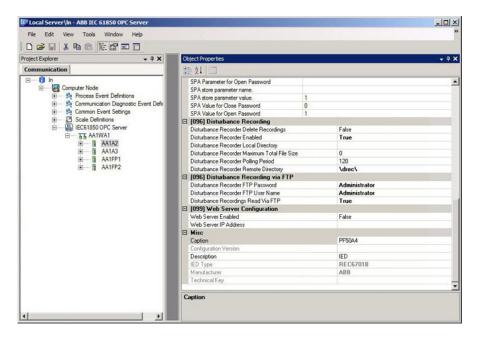


Figure 37. Sample IED Object Properties of RE_670 Series via FTP

Table 33 and Table 34 details the recommended disturbance recording settings for different IEDs.

	SPA-ZC40x	RE_615 Series	RE_615 Series 2.x	RE_630 Series	RE_670 Series
[096]Disturbance Record	ling				
Disturbance Recorder Delete Recording	False	False	False	False	False
Disturbance Recorder Enabled	True	True	True	True	True
Disturbance Recorder Local Directory	-	-	-	-	-
Disturbance Recorder Maximum Total File Size	0	0	0	0	0
Disturbance Recorder Polling Period	120	120	120	120	120
Disturbance Recorder Remote Directory	c:\comtrade\	\COMTRADE	\COMTRAD E\	\drec	\drec\
[096]Disturbance Record	ling via FTP				
Disturbance Recorder FTP Password	abb	remote0004	remote0004	Administra tor	Administrator
Disturbance Recorder FTP User Name	abb	ADMINISTR ATOR	ADMINISTR ATOR	Administra tor	Administrator
Disturbance Recordings Read Via FTP	True	True	True	True	True

Table 33. Disturbance Recording settings via FTP

	SPA-ZC40x	RE_615 Series	RE_615 Series 2.x	RE_630 Series	RE_670 Series
[096]Disturbance Record	ing				
Disturbance Recorder Delete Recording	False	False	False	False	False
Disturbance Recorder Enabled	True	True	True	True	True
Disturbance Recorder Local Directory	-	-	-	-	-
Disturbance Recorder Maximum Total File Size	0	0	0	0	0
Disturbance Recorder Polling Period	120	120	120	120	120
Disturbance Recorder Remote Directory	c:\comtrade\	-	\COMTRAD E\	-	-
[096]Disturbance Record	ing via FTP				
Disturbance Recorder FTP Password	-	-	-	-	-
Disturbance Recorder FTP User Name	-	-	-	-	-
Disturbance Recordings Read Via FTP	False	False	False	False	False

CET Project Maintenance

This section describes the guidelines to be followed while using the CET tool to Import and Export CET project.

Export CET Project

Before exporting, take a backup of the OPC configuration using the CET tool.

- 1. Open the CET tool.
- 2. Select File > Open/Manage project. Select the project the user want to export.
- 3. Click Export Project and click Open Project.

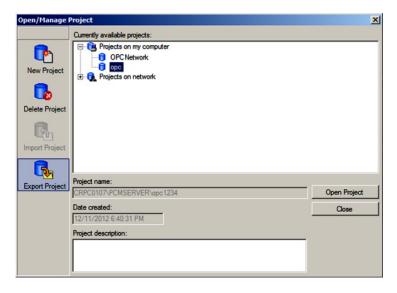


Figure 38. Open/Manage Project

4. Save the exported file.

Create target file for project export: opc				
Compute	r 🔹 Local Disk (C:) 👻	 Search Local Disk (C:) 		
Organize 🔻 New folder			8= - 🔞	
Favorites	Name -		Date modified	
E Desktop	Ji Windows		12/17/2012 1	
Lownloads	Users		11/15/2012 4	
🔛 Recent Places	🔒 User Manual		12/17/2012 2	
🔁 Libraries	Program Files (x86)		11/19/2012 5	
Documents	Program Files		11/15/2012 4	
J Music	PerfLogs		7/14/2009 8:	
Pictures	PCMDataBases		11/19/2012 1	
Videos	DperateITData1		12/17/2012 1	
	🔒 OperateITData		12/4/2012 2:-	
P Computer	🍌 inetpub		7/21/2011 12	
LOCALDISK (C:)	1 T		Ľ	
File name: Exp	orted Project opc		-	
	rted project (*.pcmp)			
Save as type: [Expo	rteu project (*.pcmp)			
Hide Folders		Save	Cancel	

Figure 39. Target File for Project Export

Import CET Project into Same CET Versions

Before importing, restore the OPC configuration using the CET tool.

- 1. Open the CET tool. Ensure that there are no open projects.
- 2. Select File > Open/Manage project.

3. Click **Import Project**.

Open/Manage	Project	×
	Currently available projects:	
P	Projects on my computer Projects on network	
New Project		
Delete Project		
Import Project		
Export Project	Project name:	
]	Open Project
	Date created:	Close
	Project description:	
	J	

Figure 40. Open/Manage Project Dialog Box

4. Browse for CET OPC Server Project backup *.pcmp* file to be imported. Import the project that was exported from the CET tool.

Import Project			×
🔾 🖉 - Comp	uter 🝷 Local Disk (C:) 👻	 Search Local Disk (C:) 	<u> 1</u>
Organize 👻 New folde	r	8=	• 🔳 🔞
Favorites	Name -		Date modified
E Desktop	Exported Project opc.pcmp		12/17/2012 2
Downloads	3 Windows		12/17/2012 1
🔛 Recent Places	🕌 Users		11/15/2012 4
📜 Libraries	🁪 User Manual		12/17/2012 2
Documents	Program Files (x86)		11/19/2012 5
J Music	🎉 Program Files		11/15/2012 4
Pictures	PerfLogs		7/14/2009 8:
Videos	PCMDataBases		12/17/2012 2
Computer	🎉 OperateITData 1		12/17/2012 1
Local Disk (C:)	🎉 OperateITData		12/4/2012 2:
	🁪 inetpub		7/21/2011 12
Network	All_junk		12/13/2012 1 🗸
			•
F	ile name: Exported Project opc.pcmp	 Exported project (*.pc 	mp) 💌
		Open	Cancel
12			11

Figure 41. Import BackupProject

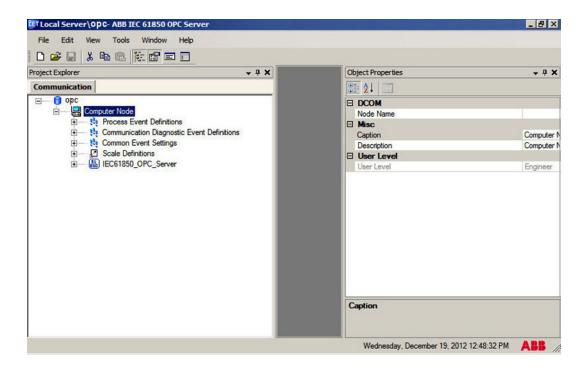


Figure 42. CET OPC Server Project

5. Perform CET Update / Reload to initialize OPC Server.

Import CET Project into Newer CET Versions

To migrate the Backup CET OPC Server Project to new version perform the steps as follows:

1. In **Open / Manage** Project dialog, Select the project under **Projects made with previous product versions** as shown in Figure 43. In this example **HTY (ABB IEC 61850 OPC Server 1.1.2)** is the project with older version.

Open/Manage	Project	×
	Currently available projects:	
New Project	Projects on my computer Projects made with previous product versions Projects made with previous product versions Projects made with previous product versions Projects on Projects on PC Server 1.1.2) 9.1 ied mAPPING_UNIQUE Naming ied mAPPING_UNIQUE Naming ied mAPPING_UNIQUE Naming redundancy Redundancy Projects on network	
Export Project	Project name:	
Esperit (ejeer	CRPC0104\PCMSERVER\HTY	Open Project
	Date created:	Close
	12/12/2012 1:37:53 PM	
	Project description:	

Figure 43. Open / Manage project

2. Click **Open Project**.

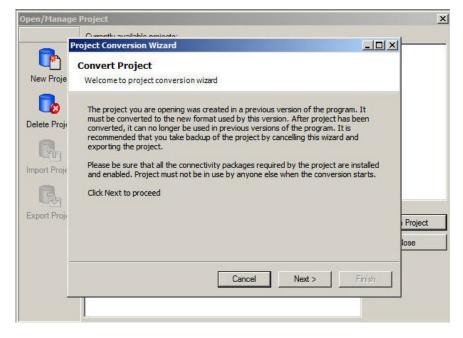


Figure 44. Project Conversion Wizard

3. Click Next to view Project Conversion Wizard summary window.

Open/Manage	e Project	×
	Currently available projecto	
New Proje	Convert Project Review the following summary information. Click Finish to convert your project	
	Summary:	
Delete Proje	If objects types have changed since the previous project version, error messages are shown when opening the project to indicate that object types don't match.	
Import Proje	Conversion type: In-place Project to be converted: HTY	
R		
Export Proje		Project
-		lose
	Cancel < Back Next > Finish	
-		

Figure 45. Project Conversion Wizard - Summary

Open/Manag	e Project	[
	Project Conversion Wizard	
New Proje	Convert Project Conversion Status	
	Total progress	
Delete Proje	0%	
Import Proje	Project data server	
R	0%	
Export Proji		Project lose
-	Cancel < Back Next > Finish	-

4. Click Next to view Project Conversion Wizard status window.

Figure 46. Project Conversion Wizard - Status

5. In Select version dialog, Select new version and Click **Ok**.

lect Version	
Current version: 1.2	
Select new version	
1.2	•
1.0	
1.1.1	
1.1.2	
Click cancel if you want to k	eep current CET
version.	
OK	(Cancel

Figure 47. Project Conversion Wizard

For revision releases, the **Select Version** window will display versions 3.x.

6. Click **Finish**.

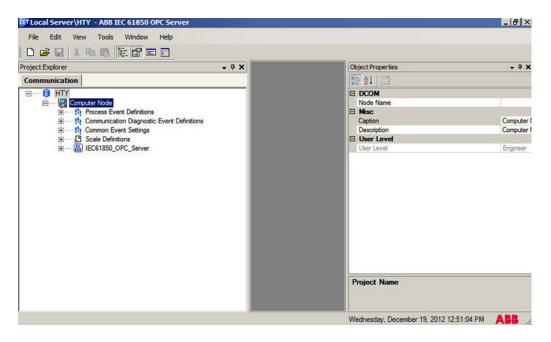
Open/Manage	e Project	x
	Currently susible emicrate Project Conversion Wizard	
New Proje	Convert Project Conversion Status	
	Total progress	
Delete Proje	100%	
Import Proje	CETProjectConverter	
	100%	
	Conversion completed!	
Export Proje		Project
		lose
	Cancel < Back Next > Finish	
_		

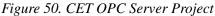
Figure 48. Project Conversion Complete

Open/Manage	e Project	×
Open/Manage	Project Finalizing project conversion Please wait Generating configuration for IEC61850_OPC_Server 9% Complete Total process 9% Complete	
EXport Proje		Project lose

Figure 49. Finalizing Project Conversion

7. CET OPC Server Project Conversion is completed.





•

Step 8 through Step 14 is applicable only for feature pack release.

The newly introduced CET *Event Categories* is not available in the migrated project in CET version 1.2.

To obtain the *Event Categories*, follow the below steps additionally:

- 8. Open Event Template Tool from Computer Node context Menu.
- 9. Click **Open Template** and browse *Program Files* (x86)\ABB\61850 OPC Server to import CETEventCategories.xml.
- 10. Ensure Overwrite existing Definitions in import option is selected.

This will update only default Event Classes with New Event Categories.

Condition Category and *Simple Event Category* of *User Defined Event Classes* must be updated accordingly by the user.

- 11. Click Import Template.
- 12. Update & reload the new CET project.
- 13. Restart the Connectivity Server Node.
- 14. Perform the following steps only after Primary and Secondary Connectivity servers are updated.
 - a. In Plant Explorer, Navigate to Service Structure > Event Collector, Service Perform an Upload for all IEC61850 Alarm and Event Service Groups.
 - In Plant Explorer, Navigate to Library Structure > Alarm & Event > Alarm Collection Definitions, Alarm Collection Definition and check all IEC61850 Alarm Collection Definition Objects.

If any Category Group is uncategorized, then manually categorize the group using respective Alarm Collection Definition Aspect.

For details on applying the categories, refer to Figure 51.

OPC AE Server:	IEC 6185	0 OPC AE Server Instance [1]		
Number of priority levels: 4 <u>Alarm Priority Mapping</u>				
Category Group	Event Type	Category Name	Enabled	Extension
Process Alarms	Condition	Level	TRUE	FALSE
System Events	Simple	System Message	TRUE	FALSE
System Events	Simple	Device Configuration Version Status Inactive	TRUE	FALSE
OperatorAction	Tracking	Operator Process Change	TRUE	FALSE
System Events	Simple	Mapped Address Update	TRUE	FALSE
Process Alarms	Condition	ProcessConditionLevelEvent	TRUE	FALSE
System Alarms	Condition	SystemConditionDiscreteEvent	TRUE	FALSE
Process Alarms	Condition	Discrete	TRUE	FALSE
System Events	Simple	SystemSimpleDiscreteEvent	TRUE	FALSE
System Events	Simple	Device Connection Status Inactive	TRUE	FALSE
System Alarms	Condition	Device Configuration Version Status	TRUE	FALSE
System Events	Simple	Unmapped Address Update	TRUE	FALSE
Process Alarms	Condition	Trip	TRUE	FALSE
System Alarms	Condition	Device Connection Status	TRUE	FALSE
Process Events	Simple	ProcessSimpleLevelEvent	TRUE	FALSE
Process Events	Simple	ProcessSimpleDiscreteEvent	TRUE	FALSE
Process Alarms	Condition	ProcessConditionDiscreteEvent	TRUE	FALSE

Figure 51. Alarm Collection Definition - Category Group

IEC 61850 OPC Server Performance Data

Substation with more than 80 IEDs can have two OPC server in a single SCD file. Each OPC server can have up to 16 subnetworks with a maximum number of 80 IEDs in mixed combinations.

For example, if one Subnetwork has more than 80 IEDs, split them across two OPC Server so that more than 80 IEDs are distributed across two OPC Servers.

For more details on IEC 61850 OPC Server Performance Data, refer to *System* 800xA System Guide Technical Data and Configuration (3BSE041434*) Manual.

CET Diagnostics

IEC 61850 OPC Server Diagnostics

After the IEC 61850 OPC Server has been installed and configured, you can, for example, monitor and control the condition of connections in an IEC 61850 network.

To access Online Diagnostics function in CET:

• Select Tools > Online Diagnostics as shown in Figure 52

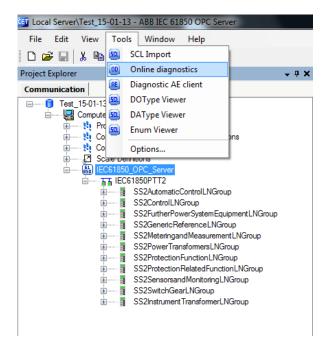


Figure 52. Online Diagnostics from Tools menu

• Select the object, right-click IEC 61850 Server object and select **Online Diagnostics** from the context menu as shown in Figure 53.

CET Local Server\Test_15-01-13 - ABB IEC 61850 OPC Server				
File Edit View Tool	s Window	Help		
0 🛩 🖬 👗 🖻 🛍	E 🕈 🗉			
Project Explorer			→ ₽ X	
Communication				
Test_15-01-13 Computer Node Computer Node	vent Definitions ation Diagnostic Event Settings initions _ <u>OPC_Septer</u> _			
	S1850PTT SS2Auto SS2Cont	SCL Import		
·······	SS2Furth 🔟	Online diagnostics		
±	SS2Gen SS2Mete	Diagnostic AE client		
	SS2Pow 🕮	DOType Viewer		
	SS2Prote SS2Prote	DAType Viewer		
■ ······ ■	SS2Sens	Enum Viewer		
	SS2Swite SS2Instri	SCD Export		
		New •		
	Ж	Cut		
	₿ <u>₽</u>	Сору		
		Delete		
		Rename		
		Properties		

Figure 53. Online Diagnostics from context menu

The server, a device, or data object is dragged and dropped from the Project Explorer's Communication structure under the Online Diagnostics function. Select Project Explorer from the **View** menu if it is not already open.

Following options are available to:

- reset counters (restart the OPC server)
- view the event log file
- clear the log file

- enable or disable the SNTP client
- reconnect the online diagnostics

Diagnostic AE Client

Diagnostic events can be monitored and controlled using the Diagnostic AE Client function.

To enable diagnostic events:

- 1. Right-click the device.
- 2. Select **Diagnostic AE client**.

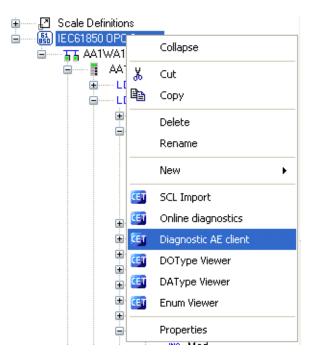


Figure 54. Diagnostic AE client Selected

3. Click **Refresh** to update the status information. To receive events from a certain device, the diagnostic events must be enabled for the selected device.

	pols <u>Wi</u> ndow <u>H</u> elp			
vent count: 50 Time	Туре	Source	Message	Addres
2004/06/23 11:05:57.6	7 System Message	IEC61850 SubnetworkiP2KA1	Connection open	
	7 Device Connection Status	IEC61850 Subnetwork/P2KA1/Device Connection Status	Connection OK	
2004/06/23 11:07:31.0	32 System Message	IEC61850 Subnetwork/P2KA1/C1/QC1CSWI1/Pos/t	Read request	
2004/06/23 11:07:31.0		IEC61850 Subnetwork/P2KA1/C1/QC1CSWI1/Pos/g	Read request	
2004/06/23 11:07:31.0		IEC61850 Subnetwork/P2KA1\C1\QC1CSWI1\PostctWal	Read request	
2004/06/23 11:07:31.0		IEC61850 Subnetwork/P2KA1\C1\QC1CSWI1\Pos\stYal	Read request	
2004/06/23 11:07:31.0		IEC61850 Subnetwork/P2KA1/C1/QC1CSWI1/Pos/stSeld	Read request	
2004/06/23 11:07:31.0		IEC61850 Subnetwork/P2KA11C11QC1CSWI11PostctModel	Read request	
2004/06/23 11:07:31.0		IEC61850 Subnetwork/P2KA1\CI\OC1CSWI1\Pos\SBOw\Test	Read request	
2004/06/23 11:07:31.0	2 System Message	IEC61850 Subnetwork/P2KA1\C1\QC1CSWI1\Pos\SBOw\ctlVal	Read request	
2004/06/23 11:07:31.0	52 System Message	IEC61850 Subnetwork\P2KA1\C1\QC1CSWI1\Pos\SBOw\ctlNum	Read request	
2004/06/23 11:07:31.0		IEC61850 Subnetwork/P2KA1(C1)QC1CSWI1(PostSBOw)T	Read request	
2004/06/23 11:07:31.0	2 System Message	IEC61850 Subnetwork/P2KA1/C1/QC1CSWI1/Pos/SBOw/origin/orIdent	Read request	
2004/06/23 11:07:31.0	52 System Message	IEC61850 Subnetwork/P2KA1/C1/QC1CSWI1/Pos/SBOw/origin/orCat	Read request	
2004/06/23 11:07:31.0	2 System Message	IEC61850 Subnetwork/P2KA11C11OC1CSWI11PostCancel/Test	Read request	
2004/06/23 11:07:31.0	2 System Message	IEC61850 Subnetwork/P2KA1\CI\QC1CSWI1\Pos\Cancel\ctlVal	Read request	
2004/06/23 11:07:31.01	72 System Message	IEC61850 Subnetwork/P2KA1/C1/QC1CSW11/Pos/Cancel/ctlNum	Read request	
2004/06/23 11:07:31.0	72 System Message	IEC61850 Subnetwork/P2KA1\C1\QC1CSWI1\Pos\Cancel\T	Read request	
2004/06/23 11:07:31.0	2 System Message	IEC61850 Subnetwork/P2KA1\C1\QC1CSWI1\Pos\Cancel\origin\orIdent	Read request	
2004/06/23 11:07:31.0		IEC61850 Subnetwork/P2KA1/C1/QC1CSWI1/Pos/Cancel/origin/orCat	Read request	
2004/06/23 11:07:31 01		IEC61850 Subnehund/D2K11/C11OC1CSWI11/DndOne/Tech	Dood remiert	

Figure 55. Diagnostic AE client Dialog Box

Monitoring and Controlling IEC 61850 Subnetwork Activity

The IEC 61850 subnetwork activity can be monitored with the Online Diagnostics function.

To monitor and control IEC 61850 subnetwork activity:

- 1. Select a subnetwork you want to monitor in the object tree of CET.
- 2. Right-click the channel.

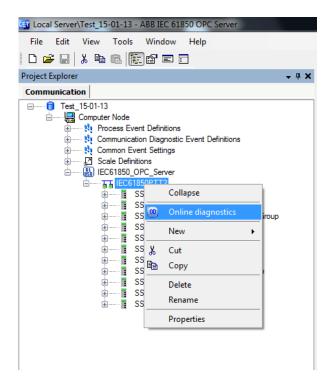


Figure 56. Online Diagnostics from context menu

3. Select **Online Diagnostics**.

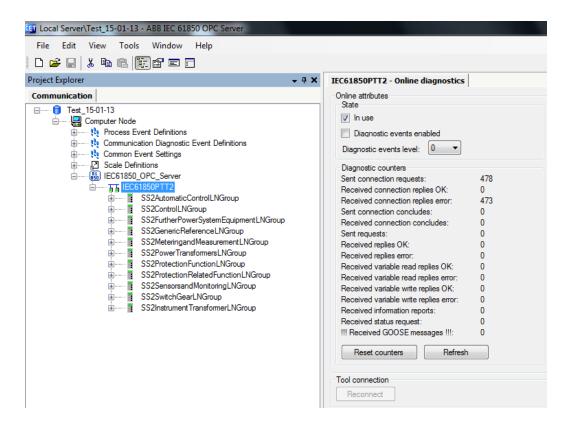


Figure 57. Online Diagnostics of Subnetwork

In the **Diagnostic counters** field, you can monitor the subnetwork activity and the available properties. To reset Diagnostic counters, click **Reset counters**.

Allow IEC 61850 subnetwork into use by selecting the In use check box. On clearing the check box takes the subnetwork out of use. To update the diagnostic counters click **Refresh**.

Monitoring and Controlling IEC 61850 Device Communication

The IEC 61850 device communication can be monitored with the Online Diagnostics function.

To monitor and control IEC 61850 device communication:

- 1. Select a device you want to monitor in the object tree of CET.
- 2. Right-click the device.

CE Local Server\Test_15-01-13 - ABB IEC 61850 OPC Server					
File Edit View Tools	s Window	Hel	р		
D 🗳 🖬 👗 🛍 🛍 🗱 🖀 🗉 🗖					
Project Explorer			→ ∓ X		
Communication					
Test_15-01-13 Computer Node کاری کاری Computer Node کاری کاری Communic کاری کاری Communic کاری	ation Diagnostic Event Settings initions _OPC_Server	: Even	t Definitions		
.	SS2Automatic		Expand		
÷	SS2ControlLN SS2FurtherPov	_			
	SS2GenericRe	SEL .	SCL Import		
	SS2Meteringar		Online diagnostics		
	SS2PowerTrar SS2Protection	2	Event Template Tool		
	SS2Protection		CID Export		
<u>+</u> ■ : : :	SS2Sensorsan SS2SwitchGea	Ж	Cut		
÷	SS2Instrument		Сору		
			Delete		
			Rename		
		_	Properties		

Figure 58. Online Diagnostics from context menu.

3. Select **Online Diagnostics**.

CET Local Server\Test_15-01-13 - ABB IEC 61850 OPC Server					
File Edit View Tools Window Help					
D 🛩 🔒 🐰 🖻 🛍 🕅 🖬 🕋 🗖					
Project Explorer - 🗸 🛪 🗙	SS2AutomaticControlLNGroup - Onli	ine diagnostics			
Communication	Online attributes				
	State				
🚊 🛄 Computer Node	📝 In use				
Process Event Definitions	Diagnostic events enabled				
Communication Diagnostic Event Definitions	Diagnostic events level: 0 💌				
	Status information				
EC61850_OPC_Server	Connection status:	Suspended			
	Detailed status:	Not connected			
SS2AutomaticControlLNGroup	IP address:	172.16.201.2			
SS2ControlENciroup	Configuration version:	4.0			
SS2GenericReferenceLNGroup	Diagnostic counters				
SS2MeteringandMeasurementLNGroup	Sent connection requests:	44			
SS2PowerTransformersLNGroup	Received connection replies OK:	0			
SS2ProtectionFunctionLNGroup	Received connection replies error:	44			
SS2ProtectionRelatedFunctionLNGroup	Sent connection concludes:	0			
SS2SensorsandMonitoringLNGroup	Received connection concludes:	0			
SS2SwitchGearLNGroup	Sent requests:	0			
🗄 SS2Instrument Transformer LNGroup	Received replies OK:	0			
	Received replies error:	0			
	Sent variable read requests:	0			
	Received variable read replies OK:	0			
	Received variable read replies error:	0			
	Sent variable write requests:	0			
	Received variable write replies OK:	0			
	Received variable write replies error:	0			
	Received information reports:	0			
	Received status request:	0			
	III Received GOOSE messages III:	0			
	Reset counters Refresh				
	Transparent XSAT				
		Send			
	Reply:				
	Tool connection				
	Reconnect				

Figure 59. Online Diagnostics of Device

In the **Status information** field, you can monitor the device status. The **Diagnostic counters** field provides information on device activity. To reset diagnostic counters, click **Reset** counters. To update the diagnostic counters click **Refresh**.

Allow an IEC 61850 device into use by selecting the **In Use** check box. On clearing check box, the device is taken out of use.

Monitoring and Controlling IEC 61850 Data Object Communication

The IEC 61850 data object diagnostics can be monitored with the Online Diagnostics function.

To monitor and control IEC 61850 data object communication:

1. Select a data object you want to monitor in the object tree.

2. Right-click the device.

G Local Server\Test_15-01-13 - ABB IEC 61850 OPC Server	
File Edit View Tools Window Help	
D 🚅 🔲 👗 🖻 🛍 🔃 🗃 🗖	
Project Explorer	→ ₽ ×
Communication	
Image: State of the second	es

Figure 60. Online Diagnostics from context menu

3. Select **Online Diagnostics**.

- 4 X	SS2AutomaticCor	ntrolLNGroup - Online diagnostics	Health - Online di	agnostics	→ 4 1
Sol-13 Sol-13 Somputer Node Process Event Definitions Communication Diagnostic Event Definitions Common Event Settings Common Event Settings Costed Definitions ICES1550_0PC_Server T ECES1550_PTZ	Name t q stVal	Value 12/30/1899 12:00:00 1 0	Quality BAD (0x0) BAD (0x0) BAD (0x0)	Timestamp 1990/01/01 17:30:00:000 1990/01/01 17:30:00:000 1990/01/01 17:30:00:000	Write value Refresh
Ecology S224/condicControlLVGroup S224/condicControlLVGroup U L0 L0 U L0					

Figure 61. Online Diagnostics of Data Object

In the **Status information** field, you can monitor and set attribute values and use control services. The Diagnostic counters field provides information on device activity.

Alarm and Event Configuration

Perform the following steps to configure alarms and events in CET:

1. Expand **Computer Node > Process Event Definitions > Indication Events.** In this example select **AlarmState** as shown in Figure 62.

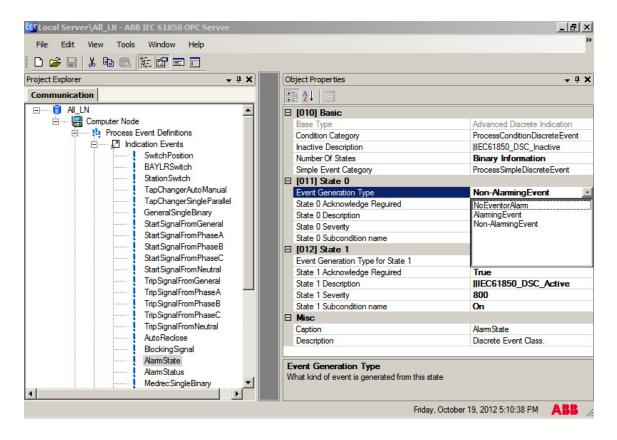


Figure 62. Tree Structure with AlarmState Selected

2. Expand the tree structure and select the attribute under the Logical Node. In **Object Properties**, under [040] **OPC Alarm and Event**, select **AlarmState** for **Indication Event** Type as shown in Figure 63.

Repeat the Alarm and Event configuration for all Data Objects in all IEDs that generates Alarm and Event from OPC Server.

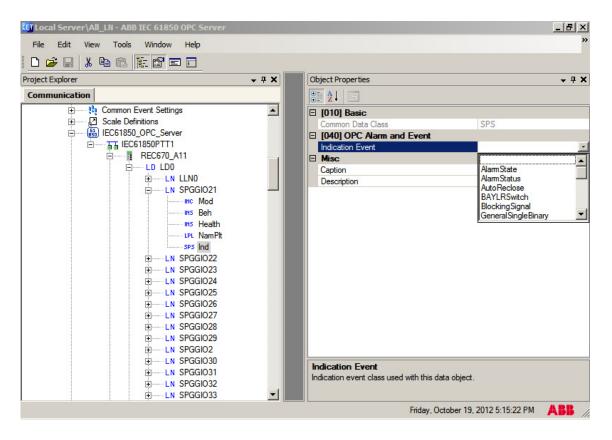


Figure 63. SCD File Populated in CET

Section 3 800xA IEC 61850 Uploader

This section describes how to work with IEC 61850 Uploader aspect user interface in 800x A Plant Explorer.

IEC 61850 Uploader aspect creates the communication and substation section of SCD file in *Control Structure* and *Functional Structure* of Plant Explorer respectively.

The Uploader creates the following:

- Objects in the 800xA *Control Structure* using information retrieved by the SCL Model component parsing the communication section of the SCD file. The control structure represents the communication of IED and connect OPC server in 800xA. For example, IED, Logical device, Logical Node are added to the *Control Structure*.
- Objects in the 800xA *Functional Structure* using information retrieved by the SCL Model component parsing the substation section of the SCD file. The Functional Structure represents the physical layout of the substation with power generation and distribution equipment. For example, Substation, Voltage Level, Bay and Conducting Equipment objects are added to the *Functional Structure*. The object types in the Functional Structure contain Faceplates and Graphic Elements, using which operators can monitor and control a substation.

IEC 61850 Uploader has three main components.

1. Uploader User Interface

The Uploader user interface contains Standard and Advanced tab that allow user to set Upload options, select Object Type Library, select SCD file, and start upload operation and also view the status of the Upload progress.



During upload, all the log messages are written in to AppLog server. These log files can be viewed and analyzed using AfwAppLogViewer.

2. Retrieve

Retrieve component uses the SCL component and parses communication and substation section of SCD file selected by the user. This SCD file is also used to configure the IEC 61850 OPC Server using CET Tool. The details of SCD file are parsed to OCS files, which is understandable by the Append Component of Uploader.

3. Append

Append component reads the OCS files created by Retrieve component of an Uploader. The Append Component creates the IEC 61850 communication structure in *Control Structure* using the OCS file data.

Creating IEC 61850 OPC Server Node in Control Structure

Perform the following steps to upload an SCD file and create IEC 61850 OPC Server Node:

- 1. Select Control Structure in 800xA Plant Explorer.
- 2. Right-click **Root Domain** and select **New Object** from the context menu.
- 3. In the New Object dialog box, select IEC61850 Object Types > IEC61850 OPC Server and enter a name.

bject description
Additional Arguments

Figure 64. New Object Dialog Box



Always refresh the uploader aspect, whenever performing upload operation multiple times on a single OPC Server (to refresh the current uploader aspect, select another aspect and re-select the uploader aspect).

4. Click Next.

5. In the **Additional Arguments** dialog box, click **Add to** create an OPC Server service group in *Service Structure* to connect to the OPC Server.

Additional Arguments	×
Selected Connectivity Server(s):	
	Add
	Remove
	Termete
Selected OPC Server, ProgID:	
×	
Information:	
Only an object with an unconfigured Data Source Definition Aspect will be created.	
A Service Group and Service Provider(s) need to be manually created.	
The Data Source Definition Aspect needs to be	
manually configured.	
Create	Cancel

Figure 65. Additional Arguments Dialog Box

6. Select the Connectivity Server on which the OPC Server is configured and click **OK**.

Select Connectivity	Server	(s)		X
CRPC094 CRPC093 CRPC099				
	0	к	Cancel	

Figure 66. Select Connectivity Server(s) Dialog Box



For redundant configuration, select both Connectivity Server nodes that form the Primary and Secondary Connectivity Server nodes.

7. In the Additional Arguments dialog box, select an OPC Server from the OPC Server, Prog ID drop-down list.

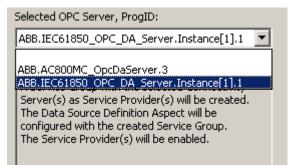


Figure 67. OPC Server ProgID Selection

- 8. Click Create to create a new IEC 61850 OPC Server.
- 9. This completes the creation and configuration of the OPC Server object in the Control Structure.

10. To confirm, go to the OPC Server object instance in Control Structure and check the **OPC Data Source Definition** Aspect. The aspect contains the details of the ProgID of the OPC Server to which the object is connected.



Figure 68. OPC Data Source Definition Selection

IEC 61850 Uploader Options

The **Uploader** aspect consists of *Standard* and *Advanced* tabs. The User performs upload either using the *Standard* tab or the *Advanced* tab. The following are the workflow details of using these two tabs:

Upload Using Standard Tab

1. In Control Structure, OPC Server Object, click IEC61850Uploader aspect.

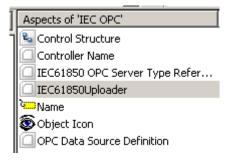


Figure 69. IEC61850Uploader

2. Select the **Standard** tab of the Uploader.

) 💮 🖬 🗸 IED :IEC61850Uploader	•	💀 🌡 🙊 🛃	- 0 -	
andard Advanced				
Import IEC61850 Objects				
SCD Filename:				
Sub Network:				•
Start Stop				
				*
J				-
		Cancel	Apply	Help

Figure 70. Standard Tab

3. Browse the SCD file which needs to be imported under the OPC Server object.

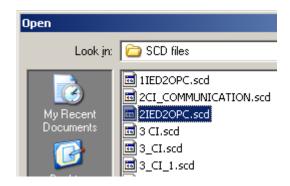


Figure 71. Browsing SCD File

Once the SCD file is selected, the Uploader parses the SCD file and lists the sub network in the SCD file in the **Sub Networks** drop-down list.



In the Selected SCD file, the Conducting Equipments should not contain LNs from different OPC servers, however Bay can contain LNs from different OPC servers.



Logical Nodes assigned to PTW object are not supported by the Uploader.

In case the uploaded SCD file is configured with PTW object, Uploader displays a warning message and completes the upload process without uploading PTW related LNs.



To upload from Standard Tab, user must select the required IEC 61850 Object Type Library in Advanced Tab.

4. Select the correct sub network from the drop-down list.

Ensure that the same sub network that is imported in the OPC Server (to which the OPC data source definition Aspect of OPC Server object is pointing) is chosen here as well.

ndard Advanced		
Import IEC61850 O	bjects	
SCD Filename:	C:\Small SCD.scd	
Sub Network:		
OCS Filename:	IECBus1 Sn1 Sn2	
Library Selection:	IEC61850_ObjectTypes 1.0-4	
Substation Path in Functional Structure	Root]
Retrieve Objects	Unique Naming of the Objects 🔽 IED Signal Mapping 🔽 Upload if IEC OPC server configuration is same as scd file content: 🗌	
Append Objects	Functional Structure Upload: 🔽 Stop	1

Figure 72. Sub Network Selection

5. Select the library in the Advanced tab.

i: IEC61850Uploade		
	350Uploader 🔄 🕏 🖉 😓 🖅 👻 🗖 👻	
tandard Advanced		
Import IEC61850 Ob	jects	
SCD Filename:	C:\Small SCD.scd	
Sub Network:	IECBus1	
OCS Filename:	C:\OperateITData\Temp\Uploader\{55EFD382-E954-4868-A029-D1CCE012	
Library Selection:	IEC61850_ObjectTypes 1.0-4	
Substation Path in Functional Structure	Root	
Retrieve Objects	Unique Naming of the Objects 🔽 IED Signal Mapping 🔽 Upload if IEC OPC server configuration is same as scd file content:	
Append Objects	Functional Structure Upload: 🔽 Stop	

Figure 73. Library Selection in Advanced Tab

6. Click **Start** to start the Uploader operation.



This performs both Functional Structure and Control Structure upload.



Only One Upload operation must be performed at a time in a single 800xA System. Simultaneous upload must not be done from multiple nodes of 800xA System.

The objects displayed in the *Control Structure* are extracted from the Communication section of the SCD file and the objects displayed in *Functional Structure* are extracted from substation section. Hence it may be possible that the objects that are present in the *Control Structure* are not present in *Functional Structure* or objects that are present in the *Functional Structure* are not present in the *Control Structure*.

Upload Using Advanced Tab

1. Click **IEC61850Uploader** aspect.

_				
ĺ	Aspects of 'IEC OPC'			
1	💁 Control Structure			
I	Controller Name			
I	IEC61850 OPC Server Type Refer			
I	IEC61850Uploader			
I	Name			
I	😨 Object Icon			
I	OPC Data Source Definition			
	1			

Figure 74. IEC61850 Uploader Aspect

2. Select the **Advanced** tab of the Uploader.

🕘 👪 🗸 i:IEC61	350Uploader	- 30	🕹 📼 👻 🔲	•	
ndard Advanced					
Import IEC61850 Ob	jects				
SCD Filename:	1				
Sub Network:					
OCS Filename:					
Library Selection:					-
Substation Path in Functional Structure					
	Unique Naming of the Obje	ects 🔽 IE	O Signal Mapping	7	
Retrieve Objects	Upload if IEC OPC server	configuration	is same as sord file.	content:	
		1000	na adrie da acu nie		
Append Objects	Functional Structure Uploa	d: 🔽		Sto	P
				1	
			Cancel	Apply	Help

Figure 75. Uploader Advanced Tab

3. Browse the SCD file which needs to be imported under the OPC Server object.

Open	
Look jn:	CD files
My Recent Documents	IIED2OPC.scd 2CI_COMMUNICATION.scd 2IED2OPC.scd 3 CI.scd 3_CI.scd 3_CI.scd 3_CI_1.scd

Figure 76. Browsing SCD File

4. Once the SCD file is selected the Uploader parses the SCD file and lists the sub network in the SCD file in the **Sub Network** drop-down list.

SCD file having multiple OPC server instances with the same sub network can be uploaded.

For example: Substation with more than 160 IEDs in a sub network can have two OPC server instances, hence an SCD file having 80 IEDs are distributed among the OPC Servers.



Ensure that a correct SCD file is uploaded. A caution, *Invalid SCD File! Uploader will Abort* message appears if the uploaded SCD file contains special character (& or Space) in the description of any Conducting Equipment or Bay.

ndard Advanced		
Import IEC61850 Ob	jects	
SCD Filename:	C:\Small SCD.scd	
Sub Network:	IECBus1	_
OCS Filename:	C:\OperateITData\Temp\Uploader\{55EFD382-E954-4868-A029-D1CCE01z	
Library Selection:	IEC61850_ObjectTypes 1.0-4	
Substation Path in Functional Structure	Root	
	Unique Naming of the Objects 🔽 IED Signal Mapping 🔽	
Retrieve Objects	Upload if IEC OPC server configuration is same as scd file content: $\hfill \square$	

Figure 77. Uploader Advanced Tab

5. Select the correct sub network from the drop-down list. Ensure that the same sub network that is imported in the OPC Server (to which the OPC data source definition Aspect of OPC Server object is pointing) is chosen.

🙀 i : IEC61850Upload	er	
🛛 🔾 🎒 🗕 🔛 🗸 i:IEC61	850Uploader 🔄 🕏 🕫 😓 🐼 👻 🗐 🗸	
Standard Advanced		
Import IEC61850 Ob	jects	
SCD Filename:	C:\Small SCD.scd	
Sub Network:	•	
OCS Filename:	IECBus1 Sn1 Sn2	
Library Selection:	IEC61850_ObjectTypes 1.0-4	
Substation Path in Functional Structure	Root	
Retrieve Objects	Unique Naming of the Objects 🔽 IED Signal Mapping 🔽 Upload if IEC OPC server configuration is same as scd file content: 🗖	
Append Objects	Functional Structure Upload: 🔽 Stop	
	Cencel Apply	Help

Figure 78. Sub Network Selection

OCS Filename: The Uploader assigns a unique OCS Filename in the Uploader Aspect of each OPC Server in Control Structure. The OCS Filename can also be modified by manually editing the filename.



It is recommended to take a backup of the existing OCS files, to prevent the Uploader from overwriting the files.

For SCD file with multiple subnetwork, the name of the subnetwork is suffixed with the OCS file name. For each subnetwork a new OCS file is created, hence for multiple subnetwork, multiple OCS files are created.



While uploading, retain the default ocs file name. If user specific ocs filename is provided as a default ocs file name, ensure that for multiple upload on different OPC server instances, the ocs filenames are unique.

During retrieve operation, Uploader creates an intermediate 800xA OCS file format. During Append operation, Uploader reads the selected OCS file and uploads the configuration details.

Multiple Retrieve operations can be performed sequentially for multiple OPC Server objects. In that case it is recommended that Filename specified in OCS Filename field is different for each OPC server while performing Retrieve operation. Otherwise the OCS file is overwritten with contents from the last retrieved SCD file

Library Selection: Select the object type library which contains the object types that has to be uploaded. If the user has created his own version of the OT library, then that library must be selected here.

Functional Structure Upload: The substation section of the SCD file needs to be represented in the *Functional Structure*. The Uploader provides an option for automatic creation of the substation section in the *Functional Structure*.

Select this option to create a substation tree structure in the *Functional Structure* of the plant explorer. For *Functional Structure* upload to work, the Substation section of the SCD file should be present.



In case the substation is not included in the configured SCD file, the *Functional Structure Upload* checkbox is disabled and unchecked to indicate that the SCD file does not contain Functional Structure objects (Substation) for upload. A message '*No objects found for Functional Structure retrieve*' is displayed while uploading the SCD file.

Upload if IEC OPC server configuration is same as SCD file content:

- If this option is selected, the upload action fails if any non matching object are found.
- If this option is not selected, Upload action proceeds, if any non matching objects are found. Upload continues with the matching objects.



Upload if IEC OPC server configuration is same as SCD file content is performed during retrieve operation.

Retrieve Objects: This starts the retrieve operation of the Uploader. During retrieve, the Uploader parses the SCD file and creates the OCS files.

i : IEC61850Upload	er de la constant de	
i:IEC61	850Uploader 💽 🕏 🕫 🐖 🗋 🔹	•
andard Advanced		
Import IEC61850 Ob	jects	
SCD Filename:	C:\Small SCD.scd	
Sub Network:	IECBus1	•
OCS Filename:	C:\OperateITData\Temp\Uploader\{55EFD382-E954-486	58-A029-D1CCE012
Library Selection:	IEC61850_ObjectTypes 1.0-4	
Substation Path in Functional Structure	Root	
Retrieve Objects	Unique Naming of the Objects 🔽 IED Signal Mapping 🔽 Upload if IEC OPC server configuration is same as scd file c	
Append Objects	Functional Structure Upload: 🔽	Stop
Append Succeeded!		^
4		•
		×

Append Objects: Once retrieve operation is complete, click Append Objects.

Figure 79. Advanced Tab - Retrieve and Append



Unique Naming, IED Signal Mapping, and *Functional Structure Upload* is performed during Append.

6. Now the *Control Structure* and *Function Structure* upload (if selected) is now complete.



In the *Functional Structure* there can be multiple objects with the same name in a single tree. These are not duplicates. For information on the location of such logical nodes in the IED, refer to **Controller Name** aspect.

IEC 61850 Uploader Options - Feature Pack Update

Substation Path in Functional Structure

The substation path shows the selected node in the functional structure under which the substation is appended. Browse and select the path for the substation in functional structure, the substation path text box displays the selected object path. After upload substation node is added under the path present in the substation path.

i : IEC61850Upload	er	_0>
🕒 🕘 👪 🗸 i:IEC61	850Uploader 🔄 🧐 🤣 🥵 🐼 👻 🗋 👻	
Standard Advanced		
Import IEC61850 Ol	jects	
SCD Filename:	C:\Small SCD.scd	
Sub Network:	IECBus1	1
OCS Filename:	C:\OperateITData\Temp\Uploader\{55EFD382-E954-4868-A029-D1CCE01z	
Library Selection:	IEC61850_ObjectTypes 1.0-4	
Substation Path in Functional Structure	Root	
Retrieve Objects	Unique Naming of the Objects 🔽 IED Signal Mapping 🔽 Upload if IEC OPC server configuration is same as scd file content: 🗖	
Append Objects	Functional Structure Upload: 🔽 Stop	
	Cancel Apply	Help

Figure 80. IEC 61850 Uploader Advanced tab

Unique Naming of the Objects

Unique Naming of the Objects option is available in the advanced tab of Uploader aspect and is used for unique naming of objects in the Control and Functional structure of Plant Explorer.

During Upload operation with the **Unique Naming of the Objects** option selected, the uploader modifies the LN names with the unique naming format as mentioned in Table 35 and the following message as shown in Figure 81 is displayed.



By default the Unique Naming option is unchecked.

Unique Naming Option	×
For Re-Upload in existing projects : Uploading with Modified Unique Naming option (Selected to Unselected or vice-versa), shall Rename any existing Logical Nodes and thereby reorder them in Control Structure and Functional Structure. Please ensure any links to Logical Nodes with old names in General Properties Aspect are updated for correct operation of Bay Faceplates.	
For Fresh Upload in New Projects : It is recommended to Select Unique naming option.	
Note : If uploading with Modified Unique Naming option (Selected to Unselected or vice-versa), please restart respective PPA Event Collector Service to refresh AE configuration with changed names.	
Continue with Upload?	
Yes No	1

Figure 81. Unique Naming Pop up message during upload

Figure 82 shows screen shot of control structure after Unique Naming option is selected during Upload. For example, IED, Logical device, Logical Node and Conducting Equipment objects.

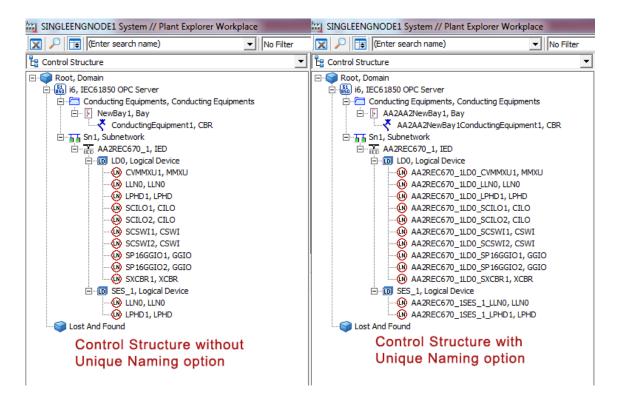


Figure 82. Unique naming of Primary Conducting Equipment in control structure

Figure 83 shows screen shot of functional structure, when Unique Naming option is selected during Upload. For example, Voltage Level, Bay and Conducting Equipment objects.

Enter search name)	No Filter
E Functional Structure	E Functional Structure
🖃 🌍 Root, Domain	🖃 🈭 Root, Domain
AA2, Substation	AA2, Substation
🖃 🚽 AA2, Voltage Level	🗄 🖞 🖌 🖓 AA2AA2, Voltage Level
🗄 🕞 NewBay1, Bay	🗄 🕞 🖟 🗛 🗛 AA2 AA2 New Bay 1, Bay
🗄 😽 ConductingEquipment 1, CBR	🗄 🔻 AA2AA2NewBay1ConductingEquipment1, CBR
(R) CVMMXU1, MMXU	AA2REC670_1LD0_CVMMXU1, MMXU
BP 16GGIO 1, GGIO	AA2REC670_1LD0_SP16GGIO1, GGIO
🕪 LLNO, LLNO	AA2REC670_1LD0_LLN0, LLN0
(R) LPHD 1, LPHD	AA2REC670_1LD0_LPHD1, LPHD
	AA2REC670_1LD0_SCILO1, CILO
	AA2REC670_1LD0_SCILO2, CILO
	AA2REC670_1LD0_SCSWI1, CSWI
	AA2REC670_1LD0_SCSWI2, CSWI
	AA2REC670_1LD0_SP16GGIO2, GGIO
SXCBR1, XCBR	AA2REC670_1LD0_SXCBR1, XCBR
···· 🛞 LLNO, LLNO	AA2REC670_1SES_1_LLN0, LLN0
(I) LPHD 1, LPHD	AA2REC670_1SES_1_LPHD1, LPHD
(R) CVMMXU1, MMXU	AA2REC670_2LD0_CVMMXU1, MMXU
🕕 LLNO, LLNO	AA2REC670_2LD0_LLN0, LLN0
(I) LPHD 1, LPHD	AA2REC670_2LD0_LPHD1, LPHD
🕀 SCILO1, CILO	AA2REC670_2LD0_SCILO1, CILO
🕪 SCILO2, CILO	AA2REC670_2LD0_SCILO2, CILO
	AA2REC670_2LD0_SCSWI1, CSWI
	AA2REC670_2LD0_SCSWI2, CSWI
BP 16GGIO 1, GGIO	AA2REC670_2LD0_SP16GGIO1, GGIO
	AA2REC670_2LD0_SP16GGIO2, GGIO
🛞 SXCBR1, XCBR	AA2REC670_2LD0_SXCBR1, XCBR
	AA2REC670_2SES_1_LLN0, LLN0
IPHD 1, LPHD	AA2REC670_2SES_1_LPHD1, LPHD
Functional Structure without Unique Naming option	Functional Structure with Unique Naming option

Figure 83. Unique naming of Secondary Equipment object in functional structure

Table 35 details the format for changing object name after applying the unique naming.

Object Type	Unique Naming Format	Example
Вау	Substation Name + Voltage Level Name + Bay	AA1AA1Q01, Bay
CBR	Substation Name + Voltage Level Name + Bay + CBR	AA1AA1Q01QA1, CBR
CE(Generic)	Substation Name + Voltage Level Name + Bay + CE	AA1AA1Q01BI1, Conducting Equipment
DIS	Substation Name + Voltage Level Name + Bay + DIS	AA1AA1Q01QB1, DIS
GEN	Substation Name + Voltage Level Name + Bay + GEN	AA1AA1Q01QC1, GEN
PTR	Substation Name + Voltage Level Name + Bay + PTR	AA1AA1Q01QD1, PTR
CTR	Substation Name + Voltage Level Name + Bay + CTR	AA1AA1Q01QE1, CTR
VTR	Substation Name + Voltage Level Name + Bay + VTR	AA1AA1Q01QF1, VTR
Voltage Level	Substation Name+ Voltage Level Name	AA1AA1, Voltage Level
LN	IED+LD+"_"+LN	AA1A1LD0_CVMMXU1, MMXU
Substation	Not part of unique naming.	Not Applicable
Subnetwork	Not part of unique naming.	Not Applicable
IED	Not part of unique naming.	Not Applicable
LD	Not part of unique naming.	Not Applicable

Table 35. Unique Naming Format for Conducting Equipment Objects

IED Signal Mapping

IED Signal Mapping aspect is available for each Conducting Equipment, Substation and Voltage Level, and, Bay in the Object Type Library.

Extended Object Type Library containing the IED Signal Mapping aspect can be used to deliver the projects with customized faceplates as per industry standards with variety of IEDs.

The **IED Signal Mapping aspect** is used for defining the properties and corresponding rules for the specified IED type (for example. REF615, REM615, REF630, REB670, REG670, and REL670). These properties are by default available in Control Connection aspect of the Conducting Equipment and are used for faceplate configuration.

On selecting **IED Signal Mapping** option during upload, uploader checks the properties of the IEDs available in the SCD file and appends the respective properties from IED Mapping Aspect to display Item IDs in the Control Connection Aspect for the Conducting Equipment and Bay.

Uploader ensures that all the properties in IED Signal Mapping aspect are available and matching with the properties of the Control Connection aspect, otherwise the uploader stops with an error message.

After upload, the properties are updated in the Control Connection aspect in the *Control Structure* and *Functional Structure* of the 800x A Plant Explorer. Figure 84 shows the IED Signal Mapping Aspect of Bay Conducting Equipment object in Object Type Structure.

) 🔎 📑 (Enter search name) 👱	No Filter	Replace -	4 🖗 0 i 🤻 🖆 🔁	🛥 🖄 🖄 崎 💕 🔛 📗	
Object Type Structure	Aspects of 'Bay'		Modified	Description	
ABS System, Object Type Group Control System, Object Type Group IEC61850 Object Types, Object Type Group IEC61850 Object Types 1.0-11, Library Version Conducting Equipments, Object Type Functional Objects, Object Type Group Ierup Type	Image Configure Image Confector_ANSI Image Confector_IEC Image Confector_	nalMapping	10/9/2012 +:55:16 PM 11/8/2012 2:56:46 PM 11/8/2012 2:56:25 PM 10/9/2012 4:56:47 PM 10/9/2012 4:56:47 PM 10/9/2012 1:55:57 PM 11/27/2012 1:152:43 10/19/2012 2:25:46 PM 5/14/2010 2:52:46 PM	Graphic Elements are object Graphic Elements are object Graphic Elements are object Graphic Elements are object Graphic Elements are object This aspect category was ad Graphic Elements are object	aware building blo aware building blo aware building blo aware building blo ded by the Aspect
PTR, Object Type				Browse	
Voltage Level, Object Type		REF615	Delete Row Add C	Column Delete Column	
Substation, Object Type Voltage Level, Object Type W TR, Object Type G onen: Logical Node, Object Type	Property Name	REF615	REM615	RET615	CSWI 1.Pos
Substation, Object Type Vitage Level, Object Type VIR, Object Type Generic Logical Node, Object Type IEC61850 OPC Server, Object Type	Property Name CBRPositionSelectionOff	REF615 CSWI_1.Pos.cttSelOff	REM615 CSWI_1.Pos.ct/SelOff	RET615 CSWI_1.Pos.ctlSelOff	CSWI_1.Pos.
Substation, Object Type Voltage Level, Object Type OF Control of the second seco	Property Name CBRPositionSelectionOff CBRPositionSelectionOn	REF615 CSWI_1.Pos.ctlSelOff CSWI_1.Pos.ctlSelOn	REM615 CSWI_1.Pos.ctiSelOff CSWI_1.Pos.ctiSelOn	RET615 CSWI_1.Pos.ct/SelOff CSWI_1.Pos.ct/SelOn	CSWI_1.Pos.
Substation, Object Type Vitage Level, Object Type Of UTR, Object Type Generic Logical Node, Object Type EGS 1850 OPC Server, Object Type ED, Object Type Glogical Device, Object Type	Property Name CBRPositionSelectionOff CBRPositionSelectionOn CBRControlOperationOff	REF615 CSWI_1.Pos.ctiSelOff CSWI_1.Pos.ctiSelOn CSWI_1.Pos.ctiOperOff	REM615 CSWI_1.Pos.ct/SelOff CSWI_1.Pos.ct/SelOn CSWI_1.Pos.ct/OperOff	RET615 CSWI_1.Pos.ctSelOff CSWI_1.Pos.ctSelOn CSWI_1.Pos.ctSelOn	CSWI_1.Pos. CSWI_1.Pos.
Substation, Object Type Voltage Level, Object Type Of VTR, Object Type Generic Logical Node, Object Type EC51850 OPC Server, Object Type ED, Object Type ED, Object Type ED_clical Nodes, Object Type Logical Device, Object Type Logical Nodes, Object Type	Property Name CBRPositionSelectionOff CBRPositionSelectionOn	REF615 CSWI_1.Pos.ctlSelOff CSWI_1.Pos.ctlSelOn CSWI_1.Pos.ctlOperOff CSWI_1.Pos.ctlOperOn	REM615 CSWI_1.Pos.ct/SelOff CSWI_1.Pos.ct/SelOn CSWI_1.Pos.ct/OperOff CSWI_1.Pos.ct/OperOff	RET615 CSWI_1.Pos.ctlSelOff CSWI_1.Pos.ctlSelOn CSWI_1.Pos.ctlOperOff CSWI_1.Pos.ctlOperOn	CSWI_1.Pos. CSWI_1.Pos. CSWI_1.Pos.
Substation, Object Type Vitage Level, Object Type Ottage Level, Object Type Generic Logical Node, Object Type Logical Device, Object Type Logical Device, Object Type Logical Device, Object Type Logical Nodes, Object Ty	Property Name CBRPositionSelectionOff CBRPositionSelectionOn CBRControlOperationOff CBRControlOperationOn	REF615 CSWI_1.Pos.ctiSelOff CSWI_1.Pos.ctiSelOn CSWI_1.Pos.ctiOperOff	REM615 CSWI_1.Pos.ct/SelOff CSWI_1.Pos.ct/SelOn CSWI_1.Pos.ct/OperOff	RET615 CSWI_1.Pos.ctSelOff CSWI_1.Pos.ctSelOn CSWI_1.Pos.ctOperOff	CSWI_1.Pos. CSWI_1.Pos.
Substation, Object Type Witage Level, Object Type Witage Level, Object Type Generic Logical Node, Object Type Elip, Object Type Logical Nodes, Object Type Logical Nodes, Object Type Logical Nodes, Object Type Logical Nodes, Object Type Elip Logical Nodes, Object Type	Property Name CBRPositionSelectionOff CBRPositionSelectionOn CBRControlOperationOff CBRControlOperationOn CBRSelectionStatus	REF615 CSWI_1.Pos.ctiSelOff CSWI_1.Pos.ctiSelOff CSWI_1.Pos.ctiOperOff CSWI_1.Pos.ctiOperOff CSWI_1.Pos.stSeld	REM615 CSWI_1.Pos.ctlSelOff CSWI_1.Pos.ctlSelOn CSWI_1.Pos.ctlOperOff CSWI_1.Pos.ctlOperOn CSWI_1.Pos.stSeld	RET615 CSWI_1.Pos.ctlSelOff CSWI_1.Pos.ctlSelOn CSWI_1.Pos.ctlOperOff CSWI_1.Pos.ctlOperOn	CSWI_1.Pos. CSWI_1.Pos. CSWI_1.Pos.
Substation, Object Type Village Level, Object Type Generic Logical Node, Object Type Generic Logical Node, Object Type Generic Logical Node, Object Type Generic Logical Nodes, Object Type Logical Nodes, Object Type Logical Nodes, Object Type Comparison object Type Comparison Compari	Property Name CBRPositionSelectionOff CBRPositionSelectionOff CBRControlOperationOff CBRControlOperationOff CBRSelectionStatus CBRLocalRemoteStatus	REF615 CSWI_1.Pos.ctSelOff CSWI_1.Pos.ctSelOn CSWI_1.Pos.ctOperOff CSWI_1.Pos.ctOperOn CSWI_1.Pos.ctOperOn CSWI_1.Pos.ctSeld XCBR_1.Loc.stVal	REM615 CSWI_1.Pos.ct/SelOff CSWI_1.Pos.ct/SelOff CSWI_1.Pos.ct/OperOff CSWI_1.Pos.ct/OperOn CSWI_1.Pos.stSeld XCBR_1.Loc.stVal	RET615 CSWI_1.Pos.cttSelOff CSWI_1.Pos.cttSelOn CSWI_1.Pos.cttSelOn CSWI_1.Pos.cttOperOn CSWI_1.Pos.stSeld	CSWI_1.Pos. CSWI_1.Pos. CSWI_1.Pos.
Substation, Object Type Vitage Level, Object Type Generic Logical Node, Object Type EC61850 OPC Server, Object Type ED, Object Type Comparison object Type Industrial, Products Industrial, Products Pice Logical Nodex, Object Type Pice Logical Nodes, Object Type Pice Logical Nodes Distribution, Object Type Group Pice Piant & Mil, Object Type Group Pice Logical Nodes Distribution Distribu	Property Name CBRPositionSelectionOff CBRPositionSelectionOff CBRControlOperationOff CBRControlOperationOff CBRSelectionStatus CBRLocalRemoteStatus CBRPositionStatus	REF615 CSWI_LPos.ctBeOff CSWI_Pos.ctBeOff CSWI_Pos.ctBeOr CSWI_Pos.ctOperOff CSWI_Pos.ctOperOf CSWI_LPos.stBed XCBR_LLoc.stVal CSWI_LPos.stVal	REM615 CSWL_1.Pos.cttSelOff CSWL_1.Pos.cttSelOn CSWL_1.Pos.cttOperOff CSWL_1.Pos.cttOperOff CSWL_1.Pos.stSeld XCBR_1.Loc.stVal CSWL_1.Pos.stVal	RET615 CSWI_1-Pos.cttSelOff CSWI_1-Pos.cttSelOff CSWI_1-Pos.cttOperOff CSWI_1-Pos.ctOperOff CSWI_1-Pos.stSeld CSWI_1-Pos.stSeld	CSWI_1.Pos. CSWI_1.Pos. CSWI_1.Pos.
Substation, Object Type Witage Level, Object Type Witage Level, Object Type Witage Level, Object Type Generic Logical Node, Object Type Elso, Object Type Logical Device, Object Type Logical Nodes, Object Type Industrial, Products Location, Object Type Group Plant & Mill, Object Type Group Plant CRPC0107 System Specific, Object Type Group	Property Name CBRPositionSelectionOff CBRPositionSelectionOff CBRControlOperationOff CBRControlOperationOn CBRSelectionStatus CBRLocalRemoteStatus CBRPositionStatus CBRPositionStatus CBRPositionStatus	REF615 CSWI_1.Pos.ctiSelOff CSWI_1.Pos.ctiSelOff CSWI_1.Pos.ctiOperOff CSWI_1.Pos.ctiOperOff CSWI_1.Pos.stSeld XCBR_1.Loc.stVal CSWI_1.Pos.stVal CSWI_1.Pos.stVal	REM615 CSWI_1.Pos.ctlSelOff CSWI_1.Pos.ctlSelOn CSWI_1.Pos.ctlOperOff CSWI_1.Pos.ctlOperOff CSWI_1.Pos.stSeld XCBR_1.Loc.stVal CSWI_1.Pos.stSeld CSWI_1.Pos.stVal	RET615 CSWI_1.Pos.ctlSelOff CSWI_1.Pos.ctlSelOn CSWI_1.Pos.ctlOperOff CSWI_1.Pos.ctlOperOfn CSWI_1.Pos.stSeld CSWI_1.Pos.stVal CSWI_1.Pos.stVal	CSWI_1.Pos. CSWI_1.Pos. CSWI_1.Pos.
Substation, Object Type Vitage Level, Object Type Generic Logical Node, Object Type ED, Object Type Logical Device, Object Type Logical Nodes, Object Type Logical Nodes, Object Type Industrial, Products Logical Nodest Phant & Mil, Object Type Group Phant & Mil, Object Type Group Phant & Mil, Object Type Group Comparison Compar	Property Name CBRPositionSelectionOff CBRControlOperationOff CBRControlOperationOff CBRControlOperationOff CBRScontrolOperationOff CBRLocalRemoteStatus CBRLocalRemoteStatus CBREnableClose CBREnableClose CBREnableClose	REF615 CSWI_1.Pos.ctSelOff CSWI_1.Pos.ctSelOff CSWI_1.Pos.ctOperOff CSWI_1.Pos.ctOperOn CSWI_1.Pos.ctOperOn CSWI_1.Pos.stSeld XCBR_1.Loc.stVal CSWI_1.Pos.stVal CILO_1.EnaOpn.stVal CILO_1.EnaOpn.stVal	REM615 CSWI_1.Pos.ct/SelOff CSWI_1.Pos.ct/SelOff CSWI_1.Pos.ct/OperOff CSWI_1.Pos.ct/OperOff CSWI_1.Pos.ct/OperOn CSWI_1.Pos.stSeld XGBR_1.Loc.stVal CILO_1.EnaOs.stVal CILO_1.EnaOs.stVal	RET615 CSWI_1.Pos.cttSelOff CSWI_1.Pos.cttSelOn CSWI_1.Pos.cttSelOn CSWI_1.Pos.cttOperOn CSWI_1.Pos.stSeld CSWI_1.Pos.stSeld CSWI_1.Pos.stVal CILO_1.EnaOs.stVal CILO_1.EnaOs.stVal	CSWI_1.Pos. CSWI_1.Pos. CSWI_1.Pos.
Substation, Object Type Vitage Level, Object Type Witage Level, Object Type Witage Level, Object Type Generic Logical Node, Object Type Elso, Object Type Logical Device, Object Type Logical Nodes, Object Type Industrial, Products Location, Object Type Group Plant & Mill, Object Type Group Plant CRPC0107 System Specific, Object Type Group	Property Name CBRPositionSelectionOff CBRPositionSelectionOff CBRControlOperationOff CBRControlOperationOff CBRSelectionStatus CBRLocalRemoteStatus CBRPositionStatus CBREnableClose CBREnableClose CBREnableCopen EarthingSwitchPosition	REF615 CSWL_1.Pos.ctWselOff CSWL_1.Pos.ctWselOff CSWL_1.Pos.ctWselOff CSWL_1.Pos.ctOperOff CSWL_1.Pos.stWsl CSWL_1.Pos.stVal CSWL_1.Pos.stVal CLLO_1.EnaOs.stVal CLLO_1.EnaOp.stVal XSWL_2.Pos.stVal	REM615 CSWL_1-Pos.cttSelOff CSWL_1-Pos.cttSelOff CSWL_1-Pos.cttOperOff CSWL_1-Pos.cttOperOff CSWL_1-Pos.cttOperOff CSWL_1-Pos.stVal CSWL_1-Pos.stVal CSWL_1-Pos.stVal CILO_1-EnaQbs.stVal CILO_1-EnaQbs.stVal XSWL_2-Pos.stVal	RET615 CSWI_1.Pos.cttSelOff CSWI_1.Pos.cttSelOff CSWI_1.Pos.cttOperOff CSWI_1.Pos.ctOperOff CSWI_1.Pos.stSeld CSWI_1.Pos.stVal CSWI_1.Pos.stVal CILO_1.EnaOps.stVal XSWI_2.Pos.stVal	CSWI_1.Pos. CSWI_1.Pos. CSWI_1.Pos.
Substation, Object Type Witage Level, Object Type Witage Level, Object Type Witage Level, Object Type Generic Logical Node, Object Type Elso, Object Type Logical Device, Object Type Logical Nodes, Object Type Industrial, Products Location, Object Type Group Plant & Mil, Object Type Group Plant CRPC0107 System Specific, Object Type Group	Property Name CBRPositionSelectionOff CBRPositionSelectionOn CBRControlOperationOff CBRControlOperationOn CBRSelectionStatus CBRLocalRemoteStatus CBRLocalRemoteStatus CBREnableClose CBREnableClose CBREnableClose CBREnableClose CBREnableClose CBREnableClose CBREnableClose CBREnableClose CBREnableClose CBREnableClose CBREnableClose CBREnableClose CBREnableClose CBREnableClose CBREnableClose CBREnableClose CBREnableClose	REF615 CSWI_LPos.ctlSelOff CSWI_LPos.ctlSelOff CSWI_LPos.ctlOperOff CSWI_LPos.ctlOperOff CSWI_LPos.stlOperOn CSWI_LPos.stloal CSWI_LPos.stVal CILO_LEnaOps.stVal CILO_LEnaOps.stVal XSWI_LPos.stVal XSWI_LPos.stVal	REM615 CSWI_1.Pos.ctlSelOff CSWI_1.Pos.ctlSelOff CSWI_1.Pos.ctlOperOff CSWI_1.Pos.ctlOperOff CSWI_1.Pos.stlOperOn CSWI_1.Pos.stVal CILO_1.EnaOs.stVal CILO_1.EnaOs.stVal CILO_1.EnaOs.stVal XSWI_1.Pos.stVal XSWI_1.Pos.stVal	RET615 CSWI_1.Pos.ctlSelOff CSWI_1.Pos.ctlSelOff CSWI_1.Pos.ctlOperOff CSWI_1.Pos.ctlOperOff CSWI_1.Pos.stVal CSWI_1.Pos.stVal CILO_1.EnaCpn.stVal CILO_1.EnaCpn.stVal XSWI_2.Pos.stVal	CSWI_1.Pos. CSWI_1.Pos. CSWI_1.Pos. CSWI_1.Pos.
Substation, Object Type Vitage Level, Object Type Witage Level, Object Type Witage Level, Object Type Generic Logical Node, Object Type Elip, Object Type Logical Device, Object Type Logical Nodes, Object Type Industrial, Products Location, Object Type Group Plant & Mill, Object Type Group Plant CRPC0107 System Specific, Object Type Group	Property Name CBRPositionSelectionOff CBRPositionSelectionOff CBRControlOperationOff CBRControlOperationOff CBRLoatrolOperationOff CBRLoatrolOperationStatus CBRPositionStatus CBREnableCose CBRENABLECOSE CBRENABLE	REF615 CSWI_1.Pos.ctSelOff CSWI_1.Pos.ctSelOff CSWI_1.Pos.ctSoperOff CSWI_1.Pos.ctOperOn CSWI_1.Pos.ctOperOn CSWI_1.Pos.stSeld XCBR_1.Loc.stVal CILO_1.EnaOpn.stVal CILO_1.EnaOpn.stVal XSWI_2.Pos.stVal MMCU_1.A.phsA.cVal.mag	REM615 CSWI_1.Pos.ct/SelOff CSWI_1.Pos.ct/SelOff CSWI_1.Pos.ct/OperOff CSWI_1.Pos.ct/OperOff CSWI_1.Pos.ct/OperOn CSWI_1.Pos.st/Seld XCBR_1.Loc.st/val CILO_1.EnaOpn.st/val CILO_1.EnaOpn.st/val CILO_1.EnaOpn.st/val XSWI_2.Pos.st/val MMCU_1.A.ph/sA.c/val.mag	RET615 CSWI_1.Pos.cttSelOff CSWI_1.Pos.cttSelOfn CSWI_1.Pos.cttOperOff CSWI_1.Pos.cttOperOff CSWI_1.Pos.stVal CSWI_1.Pos.stVal CILO_1.EnaOpn.stVal CILO_1.EnaOpn.stVal XSWI_2.Pos.stVal XSWI_2.Pos.stVal	CSWI_1.Pos. CSWI_1.Pos. CSWI_1.Pos. CSWI_1.Pos. CSWI_1.Pos. MMXU_1.A.p
Substation, Object Type Vitage Level, Object Type Witage Level, Object Type Witage Level, Object Type Generic Logical Node, Object Type Elip, Object Type Logical Device, Object Type Logical Nodes, Object Type Industrial, Products Location, Object Type Group Plant & Mill, Object Type Group Plant CRPC0107 System Specific, Object Type Group	Property Name CBRPositionSelectionOff CBRControlOperationOff CBRControlOperationOff CBRControlOperationOff CBRSelectionStatus CBRPositionStatus CBRPositionStatus CBREnableOpen EarthingSwitchPosition RackedInRackedOut HighSidePhaseCurrentL1 HighSidePhaseCurrentL2	REF615 CSWI_1.Pos.ctSelOff CSWI_1.Pos.ctSelOff CSWI_1.Pos.ctSoperOff CSWI_1.Pos.ctOperOn CSWI_1.Pos.ctOperOn CSWI_1.Pos.stSeld XCBR_1.Loc.stVal CILO_1.EnaOpn.stVal CILO_1.EnaOpn.stVal XSWI_2.Pos.stVal MMCU_1.A.phsA.cVal.mag	REM615 CSWI_1.Pos.ct/SelOff CSWI_1.Pos.ct/SelOff CSWI_1.Pos.ct/OperOff CSWI_1.Pos.ct/OperOff CSWI_1.Pos.ct/OperOn CSWI_1.Pos.st/Seld XCBR_1.Loc.st/val CILO_1.EnaOpn.st/val CILO_1.EnaOpn.st/val CILO_1.EnaOpn.st/val XSWI_2.Pos.st/val MMCU_1.A.ph/sA.c/val.mag	RET615 CSWI_1.Pos.cttSelOff CSWI_1.Pos.cttSelOfn CSWI_1.Pos.cttOperOff CSWI_1.Pos.cttOperOff CSWI_1.Pos.stVal CSWI_1.Pos.stVal CILO_1.EnaOpn.stVal CILO_1.EnaOpn.stVal XSWI_2.Pos.stVal XSWI_2.Pos.stVal	CSWI_1.Pos- CSWI_1.Pos- CSWI_1.Pos- CSWI_1.Pos- CSWI_1.Pos- CSWI_1.Pos- MMXU_1.A.p

Figure 84. IED Signal Mapping Aspect



IED Signal Mapping aspect supports configuration of only one type of IED under a Bay and Conducting Equipment.

This is because only one set of properties can be accommodated for signals from an IED to display in Control Connection aspect.

The IED Signal Mapping Aspect contains:

• *Property Name* to define a signal name,

• *IED* column containing the mapping of each signal to the respective IEC 61850 data attribute of a given IED type.



The *Property Name* and *IED* name of the IED Signal Mapping Aspect must be unique and the *Property Name field* must not be left blank.

CBRPositionSelectionOn CSW CBRControlOperationOff CSW CBRControlOperationOn CSW CBRSelectionStatus CSW CBRLocalRemoteStatus XCBR	Add Row REF615 //_1.Pos.ctlSelOff /_1.Pos.ctOperOff /_1.Pos.ctOperOff /_1.Pos.ctOperOff	Delete Row Add Colu REM615 CSWI_LPos.ct/SelOff CSWI_I.Pos.ct/SelOn CSWI_I.pos.ct/OperOff	RET615 CSWI_1.Pos.ct/SelOff	REF630 CSWI 1.Pos.ctiselOff	Browse	
Property Name BRPositionSelectionOff CSW 2BRPositionSelectionOff CSW BRControlOperationOff CSW 2BRControlOperationOn CSW 2BRSelectionStatus CSW BRLocalRemoteStatus XCSR	REF615 /I_1.Pos.ct/SelOff /I_1.Pos.ct/SelOn /I_1.Pos.ct/OperOff /I_1.Pos.ct/OperOn	REM615 CSWI_1.Pos.ct/SelOff CSWI_1.Pos.ct/SelOn	RET615 CSWI_1.Pos.ct/SelOff			
Property Name BRPositionSelectionOff CSW BRPositionSelectionOff CSW BRControlOperationOff CSW BRControlOperationOn CSW BRSelectionStatus CSW BRIcoaRemoteStatus XCBR	REF615 /I_1.Pos.ct/SelOff /I_1.Pos.ct/SelOn /I_1.Pos.ct/OperOff /I_1.Pos.ct/OperOn	REM615 CSWI_1.Pos.ct/SelOff CSWI_1.Pos.ct/SelOn	RET615 CSWI_1.Pos.ct/SelOff			
Property Name BRPositionSelectionOff CSW BRPositionSelectionOff CSW BRControlOperationOff CSW BRControlOperationOn CSW BRSelectionStatus CSW BRLocaRemoteStatus XCBR	REF615 /I_1.Pos.ct/SelOff /I_1.Pos.ct/SelOn /I_1.Pos.ct/OperOff /I_1.Pos.ct/OperOn	REM615 CSWI_1.Pos.ct/SelOff CSWI_1.Pos.ct/SelOn	RET615 CSWI_1.Pos.ct/SelOff		REG650	-
Property Name BRPositionSelectionOff CSW BRPositionSelectionOff CSW BRControlOperationOff CSW BRControlOperationOn CSW BRSelectionStatus CSW BRLocaRemoteStatus XCBR	REF615 /I_1.Pos.ct/SelOff /I_1.Pos.ct/SelOn /I_1.Pos.ct/OperOff /I_1.Pos.ct/OperOn	REM615 CSWI_1.Pos.ct/SelOff CSWI_1.Pos.ct/SelOn	RET615 CSWI_1.Pos.ct/SelOff		REG650	
2BRPositionSelectionOff CSW 2BRPositionSelectionOn CSW 2BRControlOperationOff CSW 2BRControlOperationOn CSW 2BRSelectionStatus CSW 2BRLocalRemoteStatus XCBR	/I_1.Pos.ctlSelOff /I_1.Pos.ctlSelOn /I_1.Pos.ctlOperOff /I_1.Pos.ctlOperOn	CSWI_1.Pos.ctlSelOff CSWI_1.Pos.ctlSelOn	CSWI_1.Pos.ctlSelOff		REG650	-
2BRPositionSelectionOff CSW 2BRPositionSelectionOn CSW 2BRControlOperationOff CSW 2BRSelectionStatus CSW 2BRSelectionStatus XCBR	/I_1.Pos.ctlSelOff /I_1.Pos.ctlSelOn /I_1.Pos.ctlOperOff /I_1.Pos.ctlOperOn	CSWI_1.Pos.ctlSelOff CSWI_1.Pos.ctlSelOn	CSWI_1.Pos.ctlSelOff		REG650	
2BRPositionSelectionOn CSW 2BRControlOperationOff CSW 2BRControlOperationOn CSW 2BRSelectionStatus CSW 2BRLocalRemoteStatus XCBR	/I_1.Pos.ctlSelOn /I_1.Pos.ctlOperOff /I_1.Pos.ctlOperOn	CSWI_1.Pos.ctlSelOn		CSWI 1 Pos ctiSelOff		-
2BRControlOperationOff CSW 2BRControlOperationOn CSW 2BRSelectionStatus CSW 2BRLocalRemoteStatus XCBF	/I_1.Pos.ctlOperOff /I_1.Pos.ctlOperOn			COTTA_AIT OBICODCION		
DBRControlOperationOn CSW DBRSelectionStatus CSW DBRLocalRemoteStatus XCBR	/I_1.Pos.ctlOperOn	CSWI 1 Doc cHOpperOff	CSWI_1.Pos.ctlSelOn	CSWI_1.Pos.ctlSelOn		
BRSelectionStatus CSW BRLocalRemoteStatus XCBR		Com_1.Pos.cuoperoit	CSWI_1.Pos.ctlOperOff	CSWI_1.Pos.ctlOperOff		
OBRLocalRemoteStatus XCBR		CSWI_1.Pos.ctlOperOn	CSWI_1.Pos.ctlOperOn	CSWI_1.Pos.ctlOperOn		1
Contract to the second s	/I_1.Pos.stSeld	CSWI_1.Pos.stSeld	CSWI_1.Pos.stSeld	CSWI_1.Pos.stSeld		
CBRPositionStatus CSW	R_1.Loc.stVal	XCBR_1.Loc.stVal				
	/I_1.Pos.stVal	CSWI_1.Pos.stVal	CSWI_1.Pos.stVal			
	D_1.EnaCls.stVal	CILO_1.EnaCls.stVal	CILO_1.EnaCls.stVal			
	D_1.EnaOpn.stVal	CILO_1.EnaOpn.stVal	CILO_1.EnaOpn.stVal			
	/I_2.Pos.stVal	XSWI_2.Pos.stVal	XSWI_2.Pos.stVal			
	/I_1.Pos.stVal	XSWI_1.Pos.stVal	XSWI_1.Pos.stVal			
	U_1.A.phsA.cVal.mag	MMXU_1.A.phsA.cVal.mag	MMXU_1.A.phsA.cVal.mag	MMXU_1.A.phsA.cVal.mag	MMXU_1.A.phsA.cVal.mag	MMXU_
	(U_1.A.phsB.cVal.mag	MMXU_1.A.phs8.cVal.mag	MMXU_1.A.phsB.cVal.mag	MMXU_1.B.phsA.cVal.mag	MMXU_1.B.phsA.cVal.mag	MMXU_
	(U_1.A.phsC.cVal.mag	MMXU_1.A.phsC.cVal.mag	MMXU_1.A.phsC.cVal.mag	MMXU_1.C.phsA.cVal.mag	MMXU_1.C.phsA.cVal.mag	MMXU_
	(U_1.A.res.cVal.mag	MMXU_1.A.res.cVal.mag	MMXU_1.A.res.cVal.mag	MMXU_1.A.res.cVal.mag		
.owSidePhaseCurrentL1			MMXU_2.A.phsA.cVal.mag.f		MMXU_2.A.phsA.cVal.mag.f	
.owSidePhaseCurrentL2			MMXU_2.A.phsB.cVal.mag.f		MMXU_2.A.phsB.cVal.mag.f	
owSidePhaseCurrentL3			MMXU_2.A.phsC.cVal.mag.f		MMXU_2.A.phsC.cVal.mag.f	_
owSidePhaseCurrentN			MMXU_2.A.res.cVal.mag		2	-
	(U_1.PPV.phsAB.CVal.mag		MMXU_1.PPV.phsAB.CVal.mag	MMXU_1.PhV.phsA.cVal.mag		MMXU_
	U_1.PPV.phsBC.CVal.mag		MMXU_1.PPV.phsBC.CVal.mag	MMXU_1.PhV.phsB.cVal.mag		MMXU_:
	(U_1.PPV.phsCA.CVal.mag		MMXU_1.PPV.phsCA.CVal.mag	MMXU_1.PhV.phsC.cVal.mag	MMXU_1.PhV.phsC.cVal.mag	MMXU_
	(U_1.Phv.res.cVal.mag	MMXU_1.Phv.res.cVal.mag	MMXU_1.Phv.res.cVal.mag			-
	(U_1.TotW.mag	MMXU_1.TotW.mag	MMXU_1.TotW.mag	MMXU_1.TotW.mag	MMXN_1.Watt.mag	MMXN_
	(U_1.TotVAr.mag	MMXU_1.TotVAr.mag	MMXU_1.TotVAr.mag	MMXU_1.TotVAr.mag	MMXN_1.VolAmpr.mag	MMXN_
	U_1.TotPF.mag	MMXU_1.TotPF.mag	MMXU_1.TotPF.mag	MMXU_1.TotPF.mag	MMXN_1.PwrFact.mag	MMXN_
	(U_1.Hz.mag	MMXU_1.Hz.mag	MMXU_1.Hz.mag	MMXU_1.Hz.mag	MMXN_1.Hz.mag	MMXN_:
CBRNumberofOperations CSW	/I_1.OpCntRs.Oper.ctlVal	CSWI_1.OpCntRs.Oper.ctlVal	CSWI_1.OpCntRs.Oper.ctlVal	I	1	

Figure 85. IEC61850 IED Mapping Signal Aspects

The properties defined under IED Type Column in the IED Signal Mapping Aspect is defined using:

• Instance Number

where the first part of the property is *LNType_InstanceNumber* and format as shown:

MMXU_1.A.res.cVal.mag

XSWI_1.Pos.stVal

Table 36 describes the fields used in IED Signal mapping Aspect.

Item Label	Description
Browse	Used for browsing the .csv file to either Import or Export the .csv file containing the properties. It is recommended to create a .csv file in the local folder, before exporting the properties.
IMPORT	Used for importing the properties from the .csv file and overwrite the data in the existing table of the IED Signal Mapping Aspect. Browse to the particular .csv file and then import the properties to override the existing properties of the IED Signal Mapping aspect.
EXPORT	Used for exporting the properties from the IED Signal Mapping Aspect to the .csv file. Browse and select a particular .csv file and then export the IED Signal Mapping Aspect properties.
Add Row	An empty row is added to the table of the IED Signal Mapping Aspect.
Delete Row	Selected row is deleted from the table of the IED Signal Mapping Aspect.

Table 36. IED Mapping Signal Aspect

Item Label	Description
Add Column	An empty column is added to the table of the IED Signal Mapping Aspect.
Delete Column	The selected IED type column is deleted from the table of the IED Signal Mapping Aspect. The <i>Property Name</i> cannot be removed from the IED Signal Mapping Aspect.

Figure 87 shows *Control Connection Aspect* in the *Control Structure* IED Signal Mapping option is selected during upload.

🙀 CRPC0102 System // Plant Explorer Workplace								_ 8 ×
🗙 🔎 📑 (Enter search name)	No Filter	💌 阿 Re	place 💌	🌺 🥹 🛈 🦓 🖻	ի 🎦 🔛 😰	🖄 🗞 💕 🕻		
🗄 Control Structure	Aspects of 'Bay1'	Modified		Desc Inherited	Category	name		-
⊡	Alarm and Event List		3 12:00:5		Alarm and			_
Lost And Found	AlarmControl	4/26/20	10 4:12:3		Graphic El	emen		
E B SLD, IEC61850 OPC Server	Bay Type Reference	-1-1	3 12:06:3		Bay			
Conducting Equipments, Conducting Equipments	Control Connection	1/9/201	3 12:06:3	Holds False	OPC Cont	rol Co		
🖃 🗜 Bay1, Bay	Sontrol Structure	1/9/201	3 12:07:0	[Con False	Control St	ructure		
- 🗘 CTR1, CTR	Controller Name	1/9/201	3 12:06:3	Obje False	Controller	Name		
	E Faceplate- Motor Feeder	1/9/201	3 12:00:5	True	Faceplate	PG2		-
GEN1, GEN	🕒 🕤 🔋 🗕 Bay1:Control C	oppection		- 🛃 🖉 😓 🖅 –				
- 👘 PTR1, PTR								
QA1, CBR	Property View Property Info	Additional Info	OPC Iten	n Properties System				
QA3, CBR	Name	Data Type	Access	Update Rate	Value	Quality	Timestamp	A
	ActivePower	VT_R4	R	3000	AddItem Error			
QA5, CBR	CBRControlOperationOff	VT_I4	R/₩	3000	AddItem Error			
VTR1, VTR	CBRControlOperationOn	VT_I4	R/W	3000	AddItem Error			
😟 - 📔 Bay2, Bay	CBREnableClose	VT_BOOL	R/W	3000	AddItem Error			
EC61850PTT1, Subnetwork	CBREnableOpen CBRLocalRemoteStatus	VT_BOOL VT_BOOL	R/W R	3000 3000	AddItem Error AddItem Error			
E REC670CIMMS1, IED	CBRNumberofOperations	VT_14	R	3000	Additem Error			
由 _ 祛 REC670_A11, IED	CBRPositionSelectionOff	VT_14	R/W	3000	AddItem Error			
REC670_A12, IED	CBRPositionSelectionOn	VT_I4	R/W	3000	AddItem Error			
REC670_A13, IED	CBRPositionStatus	VT_I4	R	3000	AddItem Error			
电 🚠 REC670_A16, IED	CBRPositionStatusQuality	VT_BSTR	R	3000	AddItem Error			
电 🚠 REC670_A17, IED	CBRPositionStatusTime	VT_DATE	R	3000	AddItem Error			
① 11 REM630_A14, IED	CBRSelectionStatus	VT_BOOL	R	3000	AddItem Error			
	EarthingSwitchPosition Frequency	VT_I4 VT R4	R R	3000 3000	AddItem Error AddItem Error			
	HighSidePhaseCurrentL0	VT_R4	R	3000	AddItem Error			
	HighSidePhaseCurrentL1	VT_R4	R	3000	AddItem Error			
	HighSidePhaseCurrentL2	VT_R4	R	3000	AddItem Error			
	HighSidePhaseCurrentL3	VT_R4	R	3000	AddItem Error			
	LoadShedTripCmdStatus1	VT_BOOL	R	3000	AddItem Error			
	LoadShedTripCmdStatus2	VT_BOOL	R	3000	AddItem Error			
	LowSidePhaseCurrentL0 LowSidePhaseCurrentL1	VT_R4	R R	3000	AddItem Error AddItem Error			
	LowSidePhaseCurrentL1	VT_R4 VT_R4	R	3000	Additem Error AddItem Error			-
	<	1111			HUMANITETTO			
	Subscribe for live data							
						ancel	tooks 1	Help
<[]						-CT 16.01	Apply	ыр

Figure 86. Control Structure - Control Connection Aspect

Figure 87 shows *Control Connection Aspect* in the *Functional Structure* IED Signal Mapping option is selected during upload.

CRPC0102 System // Plant Explorer Workplace	_						_ 8 ×
🔀 🔎 🛐 (Enter search name)	No Filter	💌 🖻 Rep	olace 💌	🧏 🥝 🕕 🦄 🖆	🎦 🗯 🏦 🏦 🖬	r 🔛 🛛	
皆 Functional Structure	Aspects of 'Bay1'	Modified		Desc Inherited	Category name		-
Bay1, Bay	Alarm and Event List	1/9/201	3 12:00:5	This True	Alarm and Even		_
BBGAPC1, GAPC	MarmControl	4/26/20	10 4:12:3		Graphic Elemen		
I d CTR1, CTR	Bay Type Reference	1/9/201	3 12:06:3	False	Bay		
🗉 式 DIS1, DIS	Control Connection	1/9/201	3 12:06:3	Holds False	OPC Control Co		
EF4_1PHAR1, PHAR	Sontrol Structure	1/9/201	3 12:07:0	[Con False	Control Structure		
EF4_1PTOC1, PTOC	Controller Name	1/9/201	3 12:06:3	Obje False	Controller Name		
EF4_1PTOC2, PTOC	Faceplate- Motor Feeder	1/9/201	3 12:00:5	True	Faceplate PG2		-
	🕒 🕤 🕞 🖌 Bay1:Control	Connection		🛃 🖉 😓 🖂 👻	a _ [
EF4_1PTOC4, PTOC	Bay1:Control	connection	<u>.</u>				
EF4_1PTRC1, PTRC	Property View Property Info	Additional Info	OPC Í Item	Properties System			
	in the property had		an a Taton	I not a second as a second			
🕀 🜀 GEN1, GEN	Name	Data Type	Access	Update Rate V	/alue Quality	Timestamp	
- 🚯 GFGGIO1, GGIO	ActivePower	VT_R4	R	3000	quanty	,	
🕕 ITCI1, ITCI	CBRControlOperationOff	VT I4	R/W	3000			
	CBRControlOperationOn	VT_I4	R/W	3000			
	CBREnableClose	VT_BOOL	R/W	3000			
🚯 LLNO, LLNO	CBREnableOpen	VT_BOOL	R/W	3000			
😡 LLNO, LLNO	CBRLocalRemoteStatus CBRNumberofOperations	VT_BOOL VT_I4	R R	3000 3000			
😥 LLNO, LLNO	CBRPositionSelectionOff	VT_14 VT_14	ĸ R/W	3000			
😡 LPHD1, LPHD	CBRPositionSelectionOn	VT_14	R/W	3000			
	CBRPositionStatus	VT_I4	R	3000			
🚯 LPHD1, LPHD	CBRPositionStatusQuality	VT_BSTR	R	3000			
	CBRPositionStatusTime	VT_DATE	R	3000			
🕕 LPHD1, LPHD	CBRSelectionStatus	VT_BOOL	R	3000			
	EarthingSwitchPosition Frequency	VT_I4 VT_R4	R R	3000 3000			
	HighSidePhaseCurrentL0	VT_R4	R	3000			
	HighSidePhaseCurrentL1	VT_R4	R	3000			
	HighSidePhaseCurrentL2	VT_R4	R	3000			
🚯 OC4_1PTOC2, PTOC	HighSidePhaseCurrentL3	VT_R4	R	3000			
- 😡 OC4_1PTOC3, PTOC	LoadShedTripCmdStatus1	VT_BOOL	R	3000			
OC4_1PTOC4, PTOC	LoadShedTripCmdStatus2	VT_BOOL	R	3000			
	LowSidePhaseCurrentL0 LowSidePhaseCurrentL1	VT_R4 VT_R4	R R	3000 3000			
	LowSidePhaseCurrentL2	VT_R4	R	3000			-1
🕀 🌚 PTR1, PTR	1	11 151	IN .				· •
🖲 💑 QA1, CBR	E						_
🗉 🔨 QA2, CBR	Subscribe for live data						
🗄 💑 QA3, CBR							
🗉 🔨 QA4, CBR 📃 💌					Cancel	Apply	Help
•					1010110001		Thomp

Figure 87. Functional Structure - Control Connection Aspect

Section 4 800xA IEC 61850 Alarm and Event Configuration

This section describes how to configure Alarms and Events in 800xA Plant Explorer using IEC 61850 OPC Server.

The IEC 61850 OPC Server forwards alarms and events from the IEC 61850 network to the 800xA system. The IEC 61850 OPC Server runs on Connectivity Server and is connected to 800xA using standard 800xA functionality for third party OPC A&E Servers.

To increase the level of integration, a specific Alarm Collection Definition object is included in IEC 61850 Connect. The Alarm Collection Definition object maps the following:

- The alarm severity attribute of IEC 61850 OPC Server to AE priority in 800xA.
- The IEC 61850 OPC Server event categories to 800xA category groups.

Alarm and Event List Configurations can be created for each business unit to adapt to the existing alarm and event concepts of the BU. One example feature used in other connectivities is to add the object description column to the alarm/event list. By adding one/more operator-friendly description of an object to the Description field of the **Name** aspect of an object, this information can be used in alarm/event lists instead of the "low-level" object name.

Configuring Alarms and Events in Plant Explorer

Once the AE server gets configured in CET and SCD file is imported in PPA, the following steps are to be performed to configure alarm and events for IEC 61850 Connect.

Perform the following steps to configure alarm and events:

- 1. Select Service Structure in Plant Explorer.
- 2. Right-click **Event Collector, Service** and select **New Object** from the context menu to create a service group.

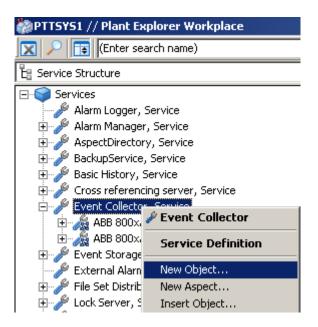


Figure 88. New Object Selection

3. In the **New Object** dialog box, enter the **Service Group** name and click **Create**.

New Object	×
Common Product Type Structure	Object description
Service Group	This object type is used to create service group objects.
	Additional Arguments
	Object Icon
	TEC61850 AE
Show all 🔽 List presentation	
Advanced	Create Cancel Help

Figure 89. New Object Dialog Box

4. Right-click the previously created Service Group (IEC) and select **New Object** from the context menu to create a service provider object.

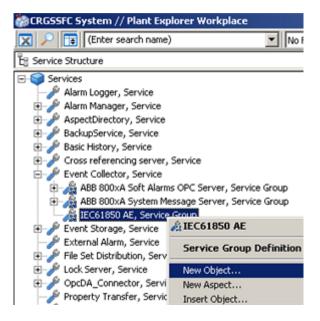


Figure 90. Service Provider Object

5. In the **New Object** dialog box, enter the service provider name and click **Create.**

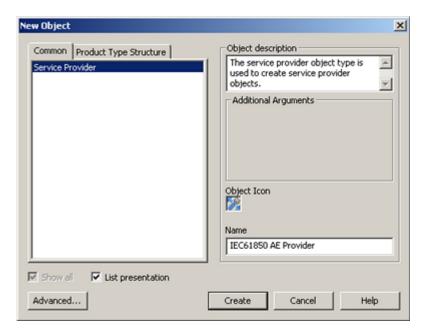


Figure 91. New Object Dialog Box With Service Provider



If there is a redundant AE server, then create a second provider object.

6. Select the created Service Provider object.

7. Select Service Provider Definition from the Aspects List.

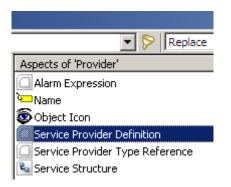


Figure 92. Service Provider Definition Aspect

- 8. Select the **Configuration** tab in Aspect Preview pane.
- 9. From the **Node** drop-down list, select a connectivity server on which the AE server resides and click **Apply**.

Configuration	Special Configuration State	us
Service:	Event Collector	View
Group:	IEC61850 AE Group	View
I Enable		
Current	Undefined	
Noc		View
Target Stal	CRPC093 CRPC094 CRPC099	
Comman		Run

Figure 93. Connectivity Server Selection

- 10. Click Special Configuration tab.
- 11. Click Override located beside Description of AE Server drop-down list.

12. Select the description of AE Server from the **Description of AE Server** dropdown list.

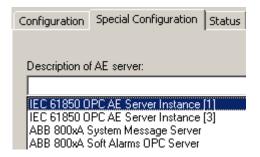


Figure 94. Special Configuration Tab



Ensure that the correct description of AE Server is selected. This must be the same as the ProgID of the AE Server to connect.

- 13. Select the service group created in Step 3.
- 14. Select Service Group Definition from the Aspects List.
- 15. Select the **Special Configuration** tab from the Aspect Preview pane.
- 16. Under **OPC A&E Server**, select alarm server from the **Alarm Server** dropdown list.

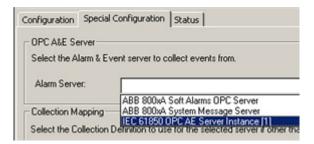


Figure 95. Alarm Server Selection



Ensure that the correct Alarm Server is selected. This must be the same as the ProgID of the AE Server to connect.



On selecting the alarm server, the collection definition appears automatically. If not, click the **New** button located beside the **Collection Definition** drop-down list as shown in Figure 96.

- Collection Mapping	
Select the Collection D	efinition to use for the selected server if other than the default.
Collection Definition:	IEC 61850 OPC AE Server Instance [1]

Figure 96. Collection Mapping

17. Under Source Object Handling, select **Tracking Source Object Interceptor** from the **Object Handler** drop-down list.

- Source Object Handling]
Object Handler:	Tracking Source Object Interceptor
Source Configuration:	Default Source Object Interceptor Tracking Source Object Interceptor
Source Translator:	IEC 61850 Connect Source Name Interpreter

Figure 97. Source Object Interceptor Selection

18. Select IEC 61850 Connect Source Name Interpreter from the Source Translator drop-down list.

- Source Object Handling]
Object Handler:	Tracking Source Object Interceptor
Source Configuration:	
Source Translator:	IEC 61850 Connect Source Name Interpreter

Figure 98. Source Object Handling

- 19. Click **Apply** to configure the above settings.
- 20. When the user clicks on Apply, the Upload button is enabled.
- 21. Click **Upload.** A new alarm collection aspect is created as shown in Figure 99. The alarm collection definition needs to be configured with reference to the alarm collection aspect provided by 61850 Connect.

The upload is now complete, and the 800xA system is now configured to receive alarm from the IEC 61850 AE Server. Optionally, the upload step can be skipped and the reference/default collection definition object provided with Connect can be used directly. This is possible only when the default event categories of the OPC Server are used (no changes have been made to the OPC Server event categories).



A new alarm definition object is created if more than one OPC Servers are used in the system. New alarm definition object is created in the below mentioned path:

Library Structure > Alarm & Event > Alarm Collection Definitions, Alarm Collection Definition > IEC 61850 OPC AE Server, Alarm Collection Definition.

Configuration Special C	Configuration Status			
OPC A&E Server Select the Alarm & Eve	ent server to collect events from.		Locales	
Alarm Server:	IEC 61850 OPC AE Server Instance [1]	•		•
Collection Mapping Select the Collection D	efinition to use for the selected server if other than the default.			
Collection Definition:	IEC 61850 OPC AE Server	•	Edit	New
- Source Object Handlin	9			
Object Handler:	Default Source Object Interceptor	•		
Source Configuration		-	Edit	New
Source Translator:	IEC 61850 Connect Source Name Interpreter	-		
	Reset configuration			Upload
Upload status messages	8			^
Starting upload	:			_
Retrieving Attributes				
Creating category as	pects			×

Figure 99. Special Configuration Tab

22. The *Category Group* of the newly created alarm collection definition must be categorized if required, as per the default alarm collection definition provided

by IEC 61850 Connect as shown in Figure 100.	
--	--

🕻 🔎 📷 (Enter search name) 💌	No Filter	-	🟱 Replace 👻	🎦 🕜 🕕 🤇	🗞 🖆 🔁 🔛 🖞	a Ba 🔓 🖬 🔛
Library Structure	Aspects of 'IEC 61	850 OPC AE Server'	Modified	Desc Inh	erited Catego	ory name
Alarm & Event	Alarm and Even	t Category transla	1/25/2013 1:53:5	Alar Fal	se Alarm	and Even
Alarm & Event Category Groups	Alarm Collection	Definition	11/22/2012 4:55:	This Fal	se Alarm	Collection
Harm & Event Color Definitions, Alarm & Event Color	Alarm Collection	Definition Type R	9/7/2007 4:10:52	Fal	se Alarm	Collection
Harm & Event Color Dennidons, Alarm & Event Color Alarm & Event List Configurations, Alarm & Event List	一一 .		9/7/2007 4:10:51	1000		Priority M
Harm & Event List Configurations, Alarm & Event List Here & Event Logger Configurations, Alarm & Event			1/14/2011 11:29:			Responsi
						and Even
Alarm Collection Definitions, Alarm Collection Definition ABB 800xA Soft Alarms OPC Server, Alarm Collection			1/25/2013 1:53:5			
		ation Version Stat		Fal		Attribute
ABB 800xA System Message Server, Alarm Collection Definition Definition Collection Definition Defin		ation Version Stat		Fal		Attribute
		ion Status Categor		Fal		Attribute
Alarm Grouping Configuration	Device Connect	ion Status Inactive	1/25/2013 1:53:5	Fal		Attribute
Alarm Hiding Configuration	Discrete Catego	ry Definition	1/25/2013 1:53:5	Fal	se Event	Attribute
- Alarm Shelving Configuration	Level Category	Definition	1/25/2013 1:53:5	Fal	se Event	Attribute
- Audible Alarm Configuration, Alarm & Event Audible	Library Structur	e	9/7/2007 4:10:52	Libr Fal	se Library	Structure
External Alarm Globals	Mapped Addres	s Update Category	. 1/25/2013 1:53:5	Fal	se Event	Attribute
Translations	Message transla		1/22/2013 6:00:3			and Even
Configuration Center, Task Center	Name	100113	9/11/2007 6:40:3			
Default View Class, Default View Class		on Channes Calenary		Fal		Attribute
History Log Templates, History Log Template Library			. 1/25/2013 1:53:5			
Libraries, Library Collection		nDiscreteEvent Ca		Fal		Attribute
Preferences & Customizations		nLevelEvent Cate		Fal		Attribute
ResourceLibraries	ProcessSimpleD	screteEvent Categ	. 1/25/2013 1:53:5	Fal	se Event	Attribute
Solution Libraries	ProcessSimpleLe	evelEvent Categor	1/25/2013 1:53:5	Fal	se Event	Attribute
System Messages	System Messag	e Category Definition	1/25/2013 1:53:5	Fal	se Event	Attribute
System Status	SystemConditio	nDiscreteEvent Ca	1/25/2013 1:53:5	Fal	se Event	Attribute
X Tools	SystemSimpleDi	screteEvent Cateo	1/25/2013 1:53:5	Fal	se Event	Attribute
Trend Templates, Trend Template Library	Trip Category D	-	1/25/2013 1:53:5	Fal		Attribute
B. Workplace Frames						Attributern
Workplace Panels] 🔇 😳 🧊 🗕 1	EC 61850 OPC AE S	erver:Alarm Collection 🔻	· 🗟 🕫 🎍	F# - 🗋 -	
	OPC AE Server: Number of priority		DPC AE Server Instance	10.000		
	Category Group	Event Type	Category Name		Enabled	Extension
	Process Alarms	Condition	Level		TRUE	FALSE
	System Events	Simple	System Message		TRUE	FALSE
	System Events	Simple	Device Configuration V	ersion Status In		FALSE
	OperatorAction	Tracking	Operator Process Char		TRUE	FALSE
	System Events	Simple	Mapped Address Upda		TRUE	FALSE
	Process Alarms	Condition	ProcessConditionLevel		TRUE	FALSE
	System Alarms	Condition	SystemConditionDiscre		TRUE	FALSE
	Process Alarms	Condition	Discrete		TRUE	FALSE
	System Events	Simple	SystemSimpleDiscreteE		TRUE	FALSE
	System Events	Simple	Device Connection Sta		TRUE	FALSE
	System Alarms	Condition	Device Configuration V		TRUE	FALSE
	System Events	Simple	Unmapped Address Up	idate	TRUE	FALSE
	Process Alarms	Condition	Trip		TRUE	FALSE
	System Alarms	Condition	Device Connection Sta		TRUE	FALSE
	Process Events	Simple	ProcessSimpleLevelEv		TRUE	FALSE
	Process Events Process Alarms	Simple Condition	ProcessSimpleDiscrete ProcessConditionDiscrete		TRUE	FALSE

Figure 100. Default Alarm Collection Definition

23. In Service Structure, select Services > Alarm Manager, Service > Basic, Service Group.

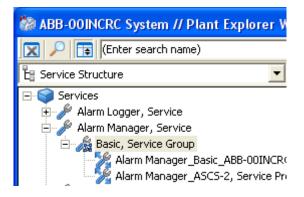


Figure 101. Service Group

24. In Aspects List pane, select Service Group Definition.



Figure 102. Service Group Definition

25. In Aspects pane, select the Special Configuration tab.

26. In the Special Configuration tab, check Log Non state-related changes.

Config	uration	Special Configuration	St	atus
Ala	rm Hand	ling		
	Make r	new alarm entry each tim	ie a	condition gets active
	Auto-ad	cknowledge alarm after		5 . [\$]
	Keep a	larms with condition inac	stive	e and acknowledged
Г	Auto-re	move alarms in inactive	and	d acknowledged state after
Ev	ent Logg	ing		
Г	Log Acl	knowledge	Г	Log Local Acknowledge
▼	Log Act	ive -> Inactive change		
Г	Log En	able/Disable		
Г	Log Hid	lden -> Not Hidden char	nge	
Г	Log Re	move Alarm		
Г	Log Cor	mment updates for Alam	1\$	

Figure 103. Log Non state-related changes in Special Configuration Tab

27. Click Apply.



The alarms list shows an alarm in a new row if there is a change in condition. If there is only a change in subcondition, then the new subcondition is displayed in the same row.

Alarm Priority Configuration

In 800xA, there are four default priority levels configured for alarms in the Alarm Collection Definition aspect of IEC 61850 OPC AE Server. The user can manually configure the alarm priority levels in the Plant Explorer and the severity levels in the IEC CET.

Alarm Priority Configuration in Plant Explorer

To configure the alarm priority levels, follow the steps below:

1. Open Plant Explorer.

- 2. Navigate to Library Structure.
- 3. Navigate to Alarm & Event > Alarm Collection Definitions > IEC 61850 OPC AE Server.
- 4. Select the Alarm Collection Definition aspect.

🛛 🔾 🥥 🤿 🗸 IEC 618	50 OPC AE Server:Alarm Coll 💌 🏂 🔗 🛃 🗸
OPC AE Server:	IEC 61850 OPC AE Server Instance [1]
Number of priority levels:	4 Alarm Priority Mapping

Figure 104. Alarm Priority Mapping Selection

- 5. In the aspect preview window, select **Alarm Priority Mapping**. The **Alarm Priority Mapping** dialog box appears.
- 6. In the **Alarm Priority Mapping** dialog box, the four default alarm priority levels will be displayed. The user can configure Priority Levels up to 32 levels.

The user can set the OPC Severity values for each Priority Level under **OPC Severity Range**.

Severity mapping			PTTSYS1 // Production // IEC 61850 OPC
Severity Range:			
Priority Level	From	To	Instructions
1	151	1000	There are 32 Severity levels by default in 800xA. Map this connectivity's
2	101	150	severity value ranges to the
3	50	100	corresponding 800xA Severity Level.
4	1	49	Leave the Severity Level row that you
5			don't want to use blank.
6			
7			
8			
9			
10			
11			
12			Set Default Priority Levels: 4
13			
14			*

Figure 105. Alarm Priority Mapping Dialog Box

Alarm Shelving

To enable the Alarm Shelving feature create a new property in Aspect System Settings named Alarm Management and set the value to true as shown in

Figure 106.

🗙 🔎 🗊 (Enter search name)	▼ No	Filter	🛨 🏱 R	teplace •	- 🛍 🛛 🛈 🔻	N 🗗 🔁 🛙	å 🖄 🖄 🎼 📫	
Admin Structure	-	Aspects of 'SEVST-W-000)3679 System' N	Modified	Desc 1	Inherited	Category name	
		Security Report	1	10/14/2009 1	11:5 This F	False	Security Report	
		System Extensions	1	10/30/2009 1	14:5 This F	False	System Extensi.	
Root, Domain		System Settings	1	10/22/2009 0)9:0 F	alse	System Settings	
SEVST-W-0003679 System, Domain	ļ							
SEVST-W-0003679 System, Domain		🕝 🕘 😭 🖌 SEVST-'	W-0003679 Syste	em:System S	🗕 🛃 🕱 🛃 🗗	- 0 -		
		G O 🜍 ▾ SEVST-	W-0003679 Syste	em:System S	- 🕹 🕫 🎍 🗗	• 🛛 •		
Environments	-	SEVST-	W-0003679 Syste	em:System S Type	- 🖏 🔊 婱 🖅 Description	✓ □ ✓ Readable?	R/Permission	Writable
Environments Solution Inventory Object	_			-		Readable?	R/Permission	Writable Yes
So Environments So Inventory Object So Labels		Name	Value False	Туре	Description	Readable? er Yes	R/Permission	Writable Yes Yes
Soft Environments Soft Environments		Name Signatures Required	Value False	Type Boolean	Description This system prope	Readable? er Yes er Yes	R/Permission	Yes
Governments Governmen		Name Signatures Required Advanced Access Con	Value False False	Type Boolean Boolean	Description This system prope This system prope	Readable? er Yes er Yes er Yes	R/Permission	Yes Yes

Figure 106. Alarm Shelving

Once the feature is enabled, Shelve is visible. Note that a license check will be performed when opening the alarm list. If the license is not available for Alarm Management, disturbance will be generated. This disturbance will not interrupt the Alarm Shelving.

800xA IEC 61850 Alarm and Event for Conducting Equipment

Alarms and events are related to the primary equipment objects that the operator works with. The alarms and events message includes the tag name of the related primary equipment object.

Currently, the Logical Node object in the IEC 61850 environment, which is the source of the alarm, transmits the alarms. From a usability point of view the Logical Node has no functional value on the alarm page for the operator as it represents only a logical function that can also be executed in a different equipment.

The Conducting Equipment (physical SA Component that is automated with one of several functions such as breaker, switch, motor, or pump) sends the alarm. So the Object Name column in the alarm list displays the conducting equipment name if

the alarm is generated from a Logical Node which is child of Conducting Equipment, else displays the Logical Node name.



Use the event list for generating High Warning and Low Warning messages on the PPA, as the Simple events are available only in the event list.

Figure 106 shows the Alarm and Event List Aspect for Bay Conducting Equipment.

🔀 🔎 📑 (Enter search name)	▼ No Filter	🔹 👂 Replace 🔹	42 🕑 🤅) 🔻 🖬	ì 🐴 🖾 🎪 🎪 🧏 📫 🕻
E Functional Structure	 Aspects of 'Bay4' 	Modified	Desc	Inherited	Category name
- 🖡 Bay4, Bay	Alarm List	1/25/2013 4:41:3	This	True	Alarm and Even
E CBR, CBR	AlarmControl	4/26/2010 4:12:3	Grap	True	Graphic Elemen
CMMXU2, MMXU	Bay Type Reference	1/25/2013 5:14:4		False	Bay
CVMMXU1, MMXU	Control Connection	1/25/2013 5:15:3	Holds	False	OPC Control Co
SCILO1, CILO	💁 Control Structure	1/25/2013 5:14:4	[Con	False	Control Structure
SCILO2, CILO	Controller Name	1/25/2013 5:14:4	Obie	False	Controller Name
🕡 SCSWI1, CSWI	Event List	1/25/2013 4:41:3	This	True	Alarm and Even
	III fpeMainviewBay	1/25/2013 4:41:3	Obje	True	Faceplate Elem
	Interpretation Interpretatio Interpretation Interpretation Interpretation Int	1/25/2013 4:41:3	Obje	True	Faceplate Elem
W SXCBR 1, XCBR	□ ≡ fpeStatusBay	1/25/2013 4:41:3	Obje	True	Faceplate Elem
	Functional Designation	1/25/2013 5:14:4	A na	False	Functional Desi
	Se Functional Structure	1/25/2013 5:14:5	[Fun	False	Functional Stru
WMMXU11, MMXU	X geBayStatus	1/25/2013 4:41:3	Grap	True	Graphic Elemen
CMSQI2, MSQI	2 geBayStatus_ANSI	1/25/2013 4:41:3	Grap	True	Graphic Elemen
	geBayStatus IEC	1/25/2013 4:41:3	Grap	True	Graphic Elemen
CVMMXU2, MMXU	a geEarth ANSI	1/25/2013 4:41:3	Grap	True	Graphic Elemen
CVMMXU2, MMXU	XI geEarth_IEC	1/25/2013 4:41:3	Grap	True	Graphic Elemen
CVMMXU4, MMXU	a geInfeeder ANSI	1/25/2013 4:41:3		True	Graphic Elemen
CVMMXU6, MMXU	geInfeeder IEC	1/25/2013 4:41:3	Grap	True	Graphic Elemen
CVMMXU6, MMXU	aeMotor ANSI	1/25/2013 4:41:3		True	Graphic Elemen
	X geMotor IEC	1/25/2013 4:41:3		True	Graphic Elemen
CMMXU6, MMXU	a geOutfeeder ANSI	1/25/2013 4:41:3		True	Graphic Elemen
CVMMXU3, MMXU	aeOutfeeder IEC	1/25/2013 4:41:3		True	Graphic Elemen
SCILO2, CILO	X LockControl	5/14/2010 2:52:4		True	Graphic Elemen
SCILO5, CILO	Main Faceplate	1/25/2013 4:41:3		True	Faceplate PG2
	Name	1/25/2013 5:14:4		False	Name
🕅 SCSWI4, CSWI	Object Icon	1/25/2013 4:41:5		True	Object Icon
	Operation Display Sele			True	General Propert
	Operator Note	1/25/2013 5:14:4			Operator Note
	Coperator Note	1/25/2015 5:14:4	oper	raise	operator Note

Figure 107. Alarm and Event List Aspect

Figure 106 shows High Alarm for Bay Conducting Equipment.

😋 📀 📱 👻 Bay 1: Alarm List	- 🛃 🖉 🍃	. 🖅 👻 📖 💌			
🥥 🖋 🛃 📳 🗐 🕍 📲	🕈 🕹 💋 🔛	🖹 🖹 🗰 📕 🔞			
Ack Prio State ActiveTime	ObjectName	ObjectDescription	Condition	SubCondition	
ACT 28 13:03:32:844	Bay1	Bay1	GeneralLevel	High Alarm	General Hig

Figure 108. High Alarm

Redundant OPC AE Configuration



Before configuring Redundant OPC AE, pre-configuration steps has to be performed. For step-by-step procedure refer Alarm and Event Configuration on page 148.

Perform the following steps to configure OPC AE for redundancy:

- 1. Select Service Structure in Plant Explorer.
- 2. Right-click **Event Collector, Service** and select **New Object** from the context menu to create a service group.

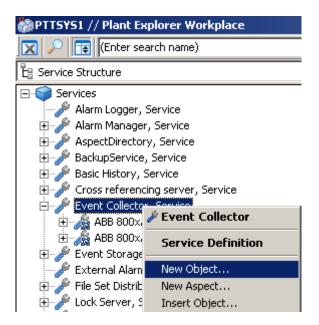


Figure 109. New Object Selection

3. In the New Object dialog box, enter a name and click Create.

New Object	×
Common Product Type Structure	Object description This object type is used to create service group objects.
	Object Icon
	Name IEC
Final Show all	
Advanced	Create Cancel Help

Figure 110. New Object Dialog Box

- 4. Click Next.
- 5. Right-click the previously created service group (IEC) and select **New Object** from the context menu to create a Service Provider object.



Figure 111. Service Provider Object

I

If there is a redundant AE server, then create a second Service Provider object.

- 6. Select the previously created Service Provider object.
- 7. Select Service Provider Definition from the Aspects list.
- 8. Click **Configuration** tab.
- 9. Select a connectivity server on which the AE server resides.

Service:	Event Collector	View
Group:	IEC61850 AE Group	View
Enabled		
Current	Undefined	
Noc	e:	 View
Noc Target Stat	CRPC093	View

Figure 112. Connectivity Server Selection

- 10. Click **Service Group** and select the **Service Group Definition** from the Aspects list.
- 11. Click Special Configuration tab.

12. Under **OPC A&E Server**, select the alarm server from the **Alarm Server** drop-down list.

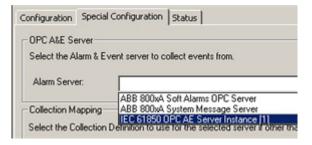


Figure 113. Alarm Server Selection



Once the alarm server is selected, the collection definition appears automatically. If not, select **IEC 61850 OPC AE Server Instance [1]** from the drop-down list.

- 13. Right-click the previously created service group (IEC) and select **New Object** (Redundant) from the context menu to create a service provider object.
- 14. Repeat the Step 6 to Step 12.
- 15. Click **Apply** to configure the above settings.
- 16. Click Upload.
- 17. In Library Structure expand Alarm & Event > Alarm Collection Definitions.

18. Select IEC 61850 OPC Server related Collection Definition.

🐼 ABB-00INCRC System // Plant Explorer Workplace
🔀 🔎 📑 (Enter search name) 💽 No Filter
Eg Library Structure
🖃 🌍 Alarm & Event
Alarm & Event Category Groups
🕢 🌍 Alarm & Event Color Definitions, Alarm & Event Color Definitions
Alarm & Event List Configurations, Alarm & Event List Configurations
🕢 🌍 Alarm & Event Logger Configurations, Alarm & Event Logger Configurat
😑 🌍 Alarm Collection Definitions, Alarm Collection Definitions
- ABB 800xA Soft Alarms OPC Server, Alarm Collection Definition
- ABB 800xA System Message Server, Alarm Collection Definition
— IEC 61850 OPC AE Server Instance [3], Alarm Collection Definition
IEC 61850 OPC AE Server, Alarm Collection Definition

Figure 114. OPC AE Server

19. In the Aspects List, select Alarm Collection Definition.

💌 🖻 Replace 📑
Aspects of 'IEC 61850 OPC AE Server'
Alarm and Event Category transla
Alarm Collection Definition
Alarm Collection Definition Type R
🔲 Alarm Priority Mapping

Figure 115. Alarm Collection Definition Aspect

- 20. In Aspect preview pane, change the view to Configuration View.
- 21. In the Configuration tab, select **Supports Refresh** and **Require Dual** Acknowledge check box. This check box is selected by default for the system created IEC 61850 OPC AE Server Instance, Alarm Collection Definition aspect.



For user created IEC 61850 OPC AE Server Instance, Alarm Collection Definition aspect, the Supports Refresh check box must be manually selected.

For redundant IEC 61850 OPC AE Server, Require Dual Acknowledge check box must be manually selected.

Configuration	
OPC Alarm Server:	IEC 61850 OPC AE Server Instance [1]
OPC Sever Settings	
	ettings specifies the functionality that the connected OPC Alarm Server d be set accordingly.
Supports Refre	sh
E Supports Disab	âng
🔲 Supports D	isabling on condition
Require Dual A	cknowledge (both server in a redundant server pair gets acknowledge requests)

Figure 116. Configuration Tab

22. Click Apply.



The alarm limits or levels can only be set from IEDs. They cannot be read in Plant Explorer or written to IED.

Redundant OPC DA Configuration

Perform the following steps to achieve redundant configuration in a redundant OPC DA setup.

- 1. Create the OPC Server object under Root Domain in the *Control Structure*.
- 2. Create an OPC Server service group in service structure to connect to the OPC Server. To achieve this, in the Additional Arguments dialog box, click Add.

3. This action lists the PCs connected. Select the two Connectivity Servers (Both Primary and Redundant) and click **OK**.

Select Connectivi	ity Server(s)	
CRPC094 CRPC093		
CRPC099		
1	ОК	Cancel
	ОК	Cancel

Figure 117. Connectivity Server Selection

4. In the Additional Arguments dialog box, select the OPC Server ProgID.

Selected OPC Server, ProgID:	
ABB.AC800MC_OpcDaServer.3 ABB.IEC61850_OPC_DA_Server.Instance[1].1	
Server(s) as Service Provider(s) will be created.	1

Figure 118. OPC Server ProgID Selection For Redundant Server

5. Check for the two OPC DA service providers that are created under the same OPC DA service Group.

6. The Configuration of Redundant OPC Servers in the Plant Explorer is now complete.



While creating **Redundant OPC Server** in **Control Structure**, the newly created **OPC Server Service Provider** in **Service Structure** does not change to **Service** state automatically.

In such cases, select **Special Configuration** tab of the erroneous Service Provider and click **Refresh**. Select the correct OPC DA Server instance and disable or enable service to bring the current status to **Service**.

7. Repeat all the steps mentioned in the subsections Upload Using Standard Tab on page 156 and Upload Using Advanced Tab on page 160.



After upload, there may be some objects which are present in *Control Structure* only and not in *Functional Structure* and some objects which are present in *Functional Structure* only and not in the *Control Structure*. In such cases, for the objects present only in *Control Structure* "**Control Structure**" aspect is present and for the objects present only in *Functional Structure* "**Functional Structure**" aspect is present.

Sequence of Events

The internal events (process values, corresponding trigger values that caused the event, time stamps and quality information) are used as a trigger foundation for reporting and logging. This information is grouped using a data set. The data set is the content basis for reporting and logging. The data set contain references to the data and the data attribute values.

The data set specifies which data is to be monitored and reported. The next task is to define when and how to report or log the information. The reporting model provides two kinds of s:

- 1) Unbuffered
- 2) Buffered

The buffered and unbuffered reporting starts with the configuration of the s.

The specific characteristic of the buffered is that it continues buffering the event data as they occur according to the enabled trigger options if there is, for example, a

communication loss. The reporting process continues as soon as the communication is available again. The buffered guarantees the Sequence-of-Events (SoE).

If there is loss of communication, the Unbuffered does not support the SoE. So, to support the SoE, correct data set and s must be configured while designing and generating the SCD file.

Section 5 Addition and Modification of Graphic Elements



This function is only supported and applicable for 800xA IEC 61850 releases before Feature Pack. This section must be ignored for Feature Pack release.

This section describes how to create and modify user defined faceplates and graphic elements containing only IEC 61850 data along with other connectivity data.

Faceplates and Graphic Elements Containing IEC 61850 Data

While creating faceplates or graphic elements for an object of existing default set of object types. Perform the following steps to create the faceplate/faceplate element/graphic element in the chosen object type:



Only the users with application engineer rights can create faceplates and graphic elements.

Graphic elements and faceplates must be created only for *Functional Structure* object types.

While creating a faceplate for an object type that is not part of the default set of object types, create a new object type under the 'Functional Objects' folder. The new object type name and type name in SCD file must be the same.

Perform the following steps, to create/edit a faceplate for an object type:

- 1. Open the Plant Explorer.
- Navigate to Library Structure > Libraries, Library Collection > IEC61850_ObjectTypes_GraphicsExtLib, Extension Library >

IEC61850_ObjectTypes_GraphicsExtLib 1.0.0, Extension Library Version.

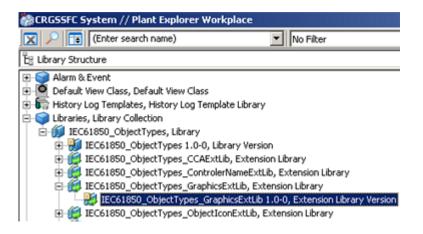


Figure 119. Plant Explorer With Extension Library Selected

3. Select the **Extension Library Version Definition** aspect from the Aspects List.

💌 🖻 Replace 💌 🔐 🥝	1 🔻 💼
Aspects of 'IEC61850_ObjectTypes	Modified
Extension Library Version Definition	12/19/2007 4
Extension Library Version Type Re	7/5/2006 12:
🕒 Library Structure	7/5/2006 12:
🛍 Library Structure	7/5/2006 12:
Name	7/5/2006 12:
🐼 Object Icon	6/24/2003 3:

Figure 120. Aspects List With Extension Library Version Definition Selected

4. Click New Version in Aspect Preview.

General History Aspec	ts Dependencies Cons	istency
Extension Library Versio	on	
Name: 61850_Obje	ctTypes_GraphicsExtLib	Ver
State: Released		Bas
Owner		
Company:	Departm	ent:
State	Activation	Aspect
C Open	Active	
C Closed	C Inactive	
Released		
Export Library	New Version	

Figure 121. Aspect Preview With New Version Selected

5. In the **New Version** dialog box, select the number in Major version and click **Create**.



Ensure that the number for major version is greater than 1.

New Version	×
Extension library: IEC61	850_ObjectT 🔽
Major version Minor vers	- 0 -
Base library IEC61850_C	bjectTypes 1
Create	Cancel

Figure 122. New Version Dialog Box

- 6. IEC61850_ObjectTypes_GraphicsExtLib 2.0-0, Extension Library Version is created under Library Structure > Libraries, Library Collection > IEC61850_ObjectTypes_GraphicsExtLib, Extension Library.
- 7. Navigate to the object type in the *Object Type Structure*.
- 8. Select the object on which you want to create/edit the faceplate (For example, the DIS, Object Type).

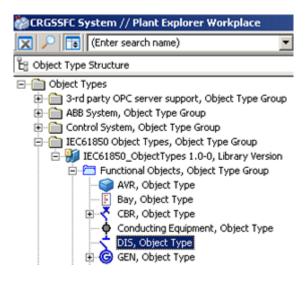


Figure 123. Object Type Group With Object Selected

9. Add/edit faceplate elements, faceplates, and graphic elements in the Aspect List.

For more information, refer to *System 800xA Engineering Process Graphics* (*3BSE049230**).

Faceplates and Graphic Elements Containing Data from Other Connectivity

The faceplates and graphic elements have to be created on the instances in *Functional Structure* using standard 800xA functionalities.

All graphic elements and faceplates created are customizable using standard 800xA functionalities.



For more information on addition and modification of graphic elements, refer to *System 800xA Engineering Process Graphics (3BSE049230*)*.

Configuring the Control Connection Aspect of Functional Objects

The **Control Connection** aspect of the functional objects can have predefined attributes for use in the faceplates/graphic elements. These predefined attributes can be made to obtain data from a particular type of logical node, which are associated with a functional object. For example, a functional object CBR can be associated with LNs XCBR and CILO. The predefined attribute in the CBR object can be configured to get data from XCBR logical node. This can be achieved by providing a name syntax for the predefined attribute of the functional object (CBR in the above example). The following is the syntax:

<LN name>_<instance number>.<attribute of the LN>.

Example

A predefined attribute in the **Control Connection** aspect of CBR Object Type can contain an attribute like 'XCBR_1.BlkOpn.stVal'.

This means that the attribute 'XCBR_1.BlkOpn.stVal', refers to 'Blkopn.stVal' attribute of the first instance of the XCBR Logical Node (first instance under the functional object CBR).

During upload, the Uploader parses this syntax and puts the appropriate OPC Item ID for this attribute.

Use the above syntax to predefine the **Control Connection** aspect of the functional objects and use this predefined attribute in the faceplate element/graphic element.

Figure 124 shows a snapshot of an example of **Control Connection** aspect in the CBR Object Type.

3000 3000 3000 3000 3000 3000 3000
3000 3000 3000
3000 3000
3000
3000

Figure 124. Example of Control Connection Aspect Configuration in a Functional Object.

Figure 125 shows an example of OPC Item ID that is added by the Uploader, by parsing the name given in the **Control Connection** aspect.

🚵 QA1 : Control C	onnection				
G 🖸 🔻 🗕 QA1:	Control Connection	E	- 🗳 P 🎍 💀	- 🗌 -	
Property View Prope	rty Info Additional Info	OPC	Item Properties	System	
Property: CSW	CSWI_1.Health.stVal				
Item ID: AA1	AA1WA1\AA1A1\LD0\SCSWI1\Health\stVal				
Access Path:					
Property	Item ID			Access Path	
CSWI_1.Health.stV		AA1WA1\AA1A1\LD0\SCSWI1\Health\stVal			

Figure 125. Example of OPC Item ID Addition by Uploader

Section 6 Guidelines to Import and Export

This section describes the guidelines to be followed to Import and Export the 800xA IEC 61850 Project (*.scd* files).

Exporting 800xA IEC 61850 Project

To export the SCD files, consider the following guidelines:



It is recommended to do *Functional Structure* export and *Control Structure* export, and store them in the same *.afw* file.

- 1. Go to Start > Programs > ABB Industrial IT 800xA > System > Import Export.
- 2. Open the Plant Explorer and select the *Functional Structure*.
- 3. Drag and drop the *Functional Structure* to the **Import / Export** dialog box.
- 4. Select the option **Include Dependencies** in **Add Item** dialog box and click **OK**.
- 5. In the **Import / Export** dialog box, click **Save** to save the *.afw* files to the desired location.



First export the Functional Structure starting from the "Substation" Object.

- 6. Select the **Control Structure**.
- 7. Drag and drop the **Control Structure** to the **Import / Export** dialog box.
- 8. Select the option **Include Dependencies** in **Add Item** dialog box and click **OK**.

9. In the **Import / Export** dialog box, click **Save** to save the *.afw* files to the desired location.



Export the Control Structure starting from the IEC 61850 OPC Server object.



If the *Control Structure* has dependencies, the OPC DA Service associated with the OPC Server object is not exported. The user must manually create the new OPC DA Service and assign the newly created service to the OPC Server object. Refer to this procedure in Import CET Project into Same CET Versions on page 124.



After import or restore, manually configure the OPC DA Connector Service.

Importing 800xA IEC 61850 Project

To import the IEC 61850 Connect Structure files into the Plant Explorer:

Import Functional Structure before importing Control Structure.

- 1. Browse to the *Functional Structure* **.***afw* files.
- 2. Double-click on .afw file to open Import Export.
- 3. The progress of loading file appears. Click **Done** when finished.
- 4. In the Import / Export dialog box,
 - a. Select the **Structure View** button.
 - b. Right-click Functional Structure and select Import.
- 5. In the **Import objects and aspects** dialog box, click **Finish**.
- 6. Browse to the *Control Structure* .afw files.
- 7. Double-click .*afw* file to open Import Export.
- 8. The progress of loading file appears. Click **Done** when finished.
- 9. In the **Import / Export** dialog box,
 - a. Select the **Structure View** button.

- b. Right-click Control Structure and select Import.
- 10. In the Import objects and aspects dialog box,
 - a. Select the Import Options tab.
 - b. Under Overwrite Existing Data, select Yes.
 - c. Click Finish.
- 11. Go to *Service Structure*. Create a New Service Group and Service Provider for IEC 61850 OPC DA Server (Example: SG and SP) as shown in Figure 126.



Ensure that the exact node name and the ProgID from the **Configuration** and **Special Configuration** tabs are selected respectively.

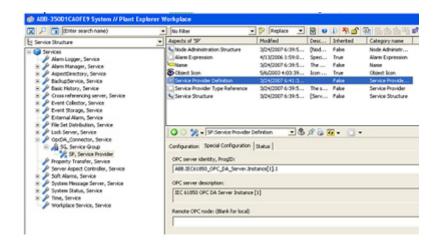


Figure 126. Service Group 1

12. Go to **OPC Server Object** and refer this Service in the **OPC Data Source Definition** aspect.

🔀 🔎 🔳 (Enter search name)	Vio Filter	• 👂 Replace 💌	8 0 1 7	💕 🔁 🛍 🖄 🖄 📽
Control Structure	 Aspects of '11' 	Modified	Desc Inherited	d Category name
Control Science Control Science Control Contr	Control Structure Controler Name EC61050 CPC Server Type Refer EC61050Uploader Name Object Icon CPC Data Source Definition	3/24/2007 5:08:4 3/24/2007 3:25:2	[Con False Obje False False The I False The False Icon True	Control Shuchur Controller Name ECC61850 OPC ECC61850Uploa Name Object Icon OPC Data Sour
	Connectivity OPC Configuration Service Group Sci Service Group Parameters F Allow parallel redundancy Do not use standard look, ser		🗚 🗟 🐼 + 🛛 🤇	
	Connectivity OPC Configuration	ver for process object lock		

Figure 127. Service Group 2

Section 7 Reconfiguration

This section describes the reconfiguration of SCD files, importing reconfigured SCD file to the IEC 61850 OPC Server and uploading the reconfigured SCD files to the Plant Explorer.

Overview

When the user re-configures the substation or communication section, it is assumed that a new version of the SCD file is generated. The user uploads the new version of the SCD file. The Uploader preserves all the aspects that are added by the user on the existing object instances.

If some of the objects are added, deleted and renamed in the updated SCD file, then the Uploader adds, deletes, and renames the corresponding object instances in the Plant Explorer.

Reconfiguring SCD Files

To make changes to the existing uploaded SCD Files in Plant Explorer, follow the instructions provided in *Section 2, Working with SCD Files* of *System 800xA - AC 800M IEC 61850 Configuration (9ARD171385*).*

Importing Reconfigured SCD File to the IEC 61850 OPC Server

To import the reconfigured SCD file to IEC 61850 Connect OPC Server, follow the instructions provided in SCL Import on page 93.



During the reconfiguration of the SCD files, if objects are added and the reconfigured SCD files are imported in the CET, the SCD files are populated over the existing objects.



After renaming or deleting objects in SCD files, delete the existing configuration present in CET tool and import the modified SCD file to the CET. To perform this action, follow the instructions provided in SCL Import on page 93.



If the default library is used during direct upload and the user defined library is used during reconfiguration, then only the changed object belongs to the user defined library.

Uploading Reconfigured SCD File to the Plant Explorer

To upload reconfigured SCD file to the Plant Explorer, follow the instructions provided in Upload Using Standard Tab on page 156 and Upload Using Advanced Tab on page 160.



The corresponding object name in the SCD file is saved in the **Controller Name** aspect of the Plant Explorer. So, if the object name is changed in the Plant Explorer, then the Uploader preserves the name of the object instances.



Each Logical Node object is uniquely identified. The following is the naming convention for Logical Node Objects:

Subnetwork\IED\Logical Device\Logical Node.

These Logical Node objects are shared among *Control Structure* and *Functional Structure*. While uploading in *Functional Structure*, if the Logical Node exists in *Control Structure*, the same object is inserted in *Functional Structure* and if the Logical Node exists in the *Functional Structure*, the same object is inserted in the *Control Structure*. Else, it creates a new Logical Node object.



Renaming an object in SCD configuration creates a new object in the Plant Explorer after uploading, if that particular object does not exist in the Plant Explorer. Adding, deleting, and renaming of the IED, the Logical Devices, the Logical Nodes, the Voltage Levels, the Bay, the Conducting Equipment, the Child Logical Nodes of Bay and the Child Logical Nodes of the conducting equipment is supported in the Uploader.

Section 8 Object Type Specific Graphics for BAY

This functionality provides the development of an object type specific faceplate for Bay. The object type specific faceplate in the Bay level is able to access data from different conducting equipments and logical nodes. The faceplates included in the Bay object types must have conducting equipment or logical node references. The Uploader provides the complete path for each reference during instantiation or upload. So, the business unit faceplate/library developer can define the properties for Bay object in the *Object Type Structure*. The Uploader sets the complete path for each property during the upload operation.

Configuration

This section describes the configuration of the object type specific graphics for Bay and guides an user to obtain the values in Bay level faceplate.

Perform the following steps to get values in the Bay level faceplate:

- 1. Define property at Bay level for the conducting equipment or logical node.
- 2. Latebind mechanism to refer to attributes of the process object.
- 3. Set the complete path of conducting equipment or logical node to each property reference during the upload operation.

Define Property at Bay Level

The application engineer defines the properties for conducting equipment and logical nodes that are required for the faceplate development. This section explains the procedure to define the property for the conducting equipments/logical nodes.

A property must be defined for each conducting equipment or logical node. The property is an unresolved reference for the conducting equipment/logical node in the *Object Type Structure*. The unresolved references are used in the faceplate expression builders and are required to bind with the appropriate process objects during runtime.

Procedure to Define Property

Perform the following steps to define the properties:

- 1. Open Plant Explorer.
- 2. Navigate to Library Structure.
- 3. Create a new major version of the library and associate below mentioned extension libraries to this version.
 - IEC61850_ObjectTypes_UploaderExtLib
 - IEC61850_ObjectTypes_CCAExtLib

User cannot delete the newly created version of Extension library IEC61850_CCAExtLib because it is a part of main IEC 61850 base library 1.0.0.

To delete the new version of CCA extension library, make the base extension library of CCAExtnLib active.

- IEC61850_ObjectTypes_ControllerNameExtLib
- IEC61850_ObjectTypes_PCAUploadExtLib
- IEC61850_ObjectTypesGraphicsExt



The above mentioned extension libraries are the minimum required extension libraries. The user can associate all other extension libraries if required.



For information on guidelines for creating user defined/BU specific libraries, refer to Section 10, Guidelines for Creating User Defined/BU Specific Libraries.

- 4. Navigate to **Object Type Structure > IEC61850 Object Types, Object Type Group**.
- 5. Select the new library version of IEC61850 Object Types.
- 6. Select Functional Objects and select Bay.

- 7. Add General Properties aspect to the Bay object.
- 8. Right-click the General Properties aspect and select Details.

Aspects of 'Bay'	Modified	C	esc	Inheri
Control Events Control Events Control Connection Control Events Control Connection Controller Name Functional Designation Controller Structure Collect Type Structure Collect Type Structure Collect Type Reference Collect Type Reference Collect Type Structure Collect	1/22/2 1/21/2 1/21/2 1/21/2 1/21/2 1/21/2 1/21/2 1/21/2 1/21/2 1/21/2 1/21/2 1/21/2 1/21/2 1/21/2	Main View Config View New Aspect . Cut Copy Paste Delete Rename Override References Send To		+
Image: Several Prope Name Value		Reserve Release Manage Add To Aspec Engineering R Details		

Figure 128. General Properties Details Selection

- 9. In the **Details** dialog box,
 - a. Select the Aspect Info tab.
 - b. Clear the **Inheritance enabled** check box.
 - c. Click **Add** to add the aspect key.
 - d. In the next window, select Auto-instantiate Aspect and click OK.

e. Click Apply.

Priority	Aspect Keys		
<no priority=""></no>	IEC61850_ObjectTypes_Co	ontrolerNameExtLib 2.0	Add
New View			Remove
			New
Inheritance	Default aspect	[∀iew
	Blob Name	Blob Si	ze (bytes)
	Main blob	0	
	L		

Figure 129. Details Dialog Box

10. Right-click the General Properties aspect and select Config View.

Aspects of 'Ba	M	
🤯 General Pr	operties	1/
Aspect C	Main Yiew	
Bay Type	Config View	
Control Control	New Aspect	

Figure 130. General Properties Config View Selection

- 11. In the General Properties dialog box,
 - a. Click Add to add properties.
 - b. Enter the Name as per the syntax: CE-CBR_1.

	-
	Delete
	10 m
Write	
Yes	
	a contract

c. Enter the other fields as shown in Figure 131.

Figure 131. General Properties Dialog Box

The General Properties aspect of the Bay object is used to define the properties and the type. Each property must be a string. It must have both read and write permission. Figure 131 defines the property CE-CBR_1.

Configuring Properties to Obtain Data from Conducting Equipment

The **General Properties** aspect of the Bay objects can have predefined properties which are referred in faceplates/graphics elements. These predefined properties can be made to obtain data from a particular conducting equipment.

The conducting equipment is referred by the object type and the instance. The instance can be a reference to the type of conducting equipment, object type, or the instances of the object type under a particular Bay.

Table 37 lists the various scenarios to add properties to the **General Properties** aspect of the Bay to refer the conducting equipments.

Table 37. Add Properties to Refer to The Conducting Equipments.

Instance	Description
CE-CBR_2	A part of property name which specifies "CBR_2" is from the conducting equipments. This property is a symbolic reference to the second instance of type CBR.
CE-CBR_2N	A part of property name which specifies "CBR_2N" is from the conducting equipments. This property is a symbolic reference to the second instance of a conducting equipment and its name starts with CBR.
CE-CBR_2T	A part of property name which specifies "CBR_2T" is from the conducting equipments. This property is a symbolic reference to the second instance of type CBR.
CE-CBR100	A part of property name which specifies "CBR100" is from the conducting equipments. This property is a symbolic reference of a conducting equipment and its name is CBR100 which is present in a particular Bay.

•

In case of item id filling in the General Properties aspect of a Bay.

When updating the General Properties aspect of a Bay, there is a limitation for type based and name based convention. The identifier (name/type) referring to the Logical Nodes & Conducting Equipments must not contain an underscore character (_) in the identifier.

The workaround is to follow the direct naming of the Logical Nodes & Conducting Equipments.

Configuring Properties to Obtain Data from a Logical Node

The **General Properties** aspect of the Bay objects can have predefined properties which are referred in faceplate/graphic elements. These predefined properties may be used to obtain data from a particular Logical Node.

The Logical Node is referred by the object type and the instance. The instance can be a reference to the type of the Logical Node, Object type, or the Instances of the Logical Node under a particular Bay.

Table 38 lists the various scenarios to add properties to the General Propertiesaspect of the Bay to refer the Logical Nodes.

Instance	Description
LN-XCBR_2	A part of property name specifies "XCBR_2" is from Logical Nodes. This property is a symbolic reference of second instance of type XCBR.
LN-XCBR_2N	A part of property name specifies "XCBR_2N" is from Logical Nodes. This property is a symbolic reference of second instance of a Logical Node and its name starts with CBR.
LN-XCBR_2T	A part of property name specifies "XCBR_2T" is from Logical Nodes.This property is a symbolic reference of second instance of type XCBR.
LN-XCBR100	A part of property name specifies "XCBR100" is from Logical Nodes.This property is a symbolic reference of a Logical Node and its name is XCBR100 comes and is present in a particular Bay.

Table 38. Add Properties to Refer to The Logical Nodes

Configuring Properties to Obtain Data from Logical Node (Child of Conducting Equipment)

The **General Properties** aspect of the Bay object have predefined properties which are referred in faceplates/graphic elements. These predefined properties are made to obtain data from a particular Logical Node which is the child of specific conducting equipment.

Table 39 lists the 16 different ways of defining property.

Table 39. Add Properties to General Aspect to Refer to Logical Nodes

Test Case	Property Name
Case 1	CE-CBR_1-XCBR_1
Case 2	CE-CBR_1-XCBR_1N
Case 3	CE-CBR_1-XCBR_1T
Case 4	CE-CBR_1-XCBR100
Case 5	CE-CBR_1N-XCBR_1
Case 6	CE-CBR_1N-XCBR_1N
Case 7	CE-CBR_1N-XCBR_1T
Case 8	CE-CBR_1N-XCBR100
Case 9	CE-CBR_1T-XCBR_1
Case 10	CE-CBR_1T-XCBR_1N
Case 11	CE-CBR_1T-XCBR_1T
Case 12	CE-CBR_1T-XCBR100
Case 13	CE-CBR100-XCBR_1
Case 14	CE-CBR100-XCBR_1N
Case 15	CE-CBR100-XCBR_1T
Case 16	CE-CBR100-XCBR100

Latebind Mechanism

Latebind Mechanism to Refer to Attributes of Conducting Equipment

During the faceplate development, the business unit faceplate/library developer can utilize the Latebind mechanism provided by PG2 graphics to refer to the attributes of conducting equipment or logical node.

It is not possible to bind the system entities during the configuration process. The Graphics Builder can be accessed through Expression Functions. The functions locate the entities based on the names that implement late binding.

The following is an example function for latebinding:

LateBoundPropertyRef

Returns reference to a property found based on the specified parameters, or null. The function also activates a subscription to property by the rate of updateRate. aspectSpec may be left empty on all aspects of the object.

The following are the parameters for this function:

- String objectPath: A string that refers to the target object,
- String aspectSpec: The name of the aspect or "(empty string)".
- String propName: The name of the data entity being referred to.
- Boolean unique.
- Integer updateRate.

In AspectSpecifier, a search is done with respect to the name specified or on all objects if it is specified as "".

Single reference functions return a single value. All single reference functions possess a property called the **Boolean Unique**. This property enables the user to decide if the search yields a unique value.

If the Unique is set to **True** and there is more than one reference based on the function parameters, the function returns a null value.

If the Unique is set to **False**, the function arbitrarily returns one value of several candidates found.

Figure 132 shows how the input field control in graphics editor can be binded to different object during runtime.

			Items		-
			0 9		
Buttons			Graphic Display		
Charts			fi Input Field1 [Input fi Input Field10 [Input		
Classic Symbols		6	[] Input Field11 [Input		
Graphic Primitives			fi Input Field12 (Input	Field]	
Shapes			Properties		-
Special					
Standard Symbols	_		EntryWindowOnTop	False	0
			Font	Font("Tahoma", 12 ,Regular, Normal)	0
			Foreground	SymbolLabe/Color	0
			FrameColor	SymbolFrameColor1	
			FrameWidth	3.	
				3.	
		1	Height		
			HorizontalAlignment	Near	0
			Maximum	Empty	
			MaxNoOfChars	0	
			Minimum	Empty	
			Name	Input Field1	
			NumberOfDecimals	2	
			OverrideValue	**	
			PropertyReference	LateBoundPropertyRef(\$'CE-CBR_1', "Control Connection", "MMXU_1.PPV.phsAB.cVal.mag", True, 0))
			Rotation	0	-
			SelectFrameLine	Pen(White, 1.)	
			SelectFrameVisible	False	0
			StepSize	1.	
			TargetArrayIndices	541 541	-
				Fatse	
			TextMode	Faise	00
			Tooltip		0

Figure 132. Process Graphic Editor

Input field control can be dragged and dropped into the New Graphic editor. Select the properties of input field.

The value for "property reference" is LateBoundPropertyRef.

The following are the parameters bind the Input field to a specific OPC attribute:

- CE\:CBR_1 specifies a specific process object. The Uploader sets the value for CE\:CBR_1 in **General properties** aspect, which specifies the complete path of process object.
- Control Connection provides Aspect information.
- CILO_1.Mod.ctlVal, True, 0 specifies the attribute from the Aspect.

Example for the late bind reference:

LateBoundPropertyRef(\$'.:General Properties:CE-CBR_1', "Control Connection", "MMXU_1.PPV.phsAB.cVal.mag", True, 0)

Set Complete Path

Set the Complete Path of Conducting Equipment to Each Property

During the upload operation, the IEC Connect Uploader sets value for each property.

Path:

[Functional Structure]Root/AA1/E/Q1/CBR1

Examples of value set value by the Uploader are:

Q1 is a Bay with the **General Properties** aspect. The following are the properties of Q1:

- 1. CE-CBR_1
- 2. CE-CBR_2

The Uploader sets the following value for the property "CE-CBR_1":

[Functional Structure]Root/AA1/E/Q1/CBR1

The Uploader sets the following value for the property "CE-CBR_2":

[Functional Structure]Root/AA1/E/Q1/CBR2

Limitation

LateBound functions cannot differentiate if multiple objects with the same name are present in the same path and if LateBound functions are used for accessing data from same properties of the same aspect.

When multiple logical nodes with same name are assigned to a single Bay, using Latebinding mechanism it is not possible to ascertain which LN data is used in the Property value of the General properties aspect.

For example. A Bay having two CVMMXU1 Logical Nodes are assigned from different sources and with the Property value containing path to CVMMXU1, it is not possible to ascertain which LN value will be used in runtime.

Section 9 Object Type Specific Graphics for IED

This functionality provides for the development of the Object Type Specific Faceplate for IED.

Configuration

This section describes the configuration of the ObjectType Specific Graphics for the IED.

Object type specific graphics for IED

Object type specific graphics for IED to refer attribute from Logical Nodes. The **Control Connection** aspect of the IED has predefined attributes for use in the faceplate/graphic element. These predefined attributes can be configured to obtain data from a particular type of the logical node that is associated with a logical device. The data type of these IED level attributes must match the data type referring attributes. This must be achieved by providing a name syntax for the predefined attribute of the IED. There are eight different ways to define property.

Table 40 describes the syntax for defining property:

Test Case	Property Name
Case 1	LD_1-XCBR_1.BlkOpn.stVal
Case 2	LD_1-XCBR_1T.BlkOpn.stVal
Case 3	LD_1-XCBR_1N.BlkOpn.stVal

Table 40. Add Properties to CCA of IED

Test Case	Property Name
Case 4	LD_1-XCBR100.BlkOpn.stVal
Case 5	LD100- XCBR_1.BlkOpn.stVal
Case 6	LD100- XCBR_1T.BlkOpn.stVal
Case 7	LD100- XCBR_1N.BlkOpn.stVal
Case 8	LD100- XCBR100.BlkOpn.stVal

Table 40. Add Properties to	OCCA of IED	(Continued)
-----------------------------	-------------	-------------

Figure 133 shows a predefined attribute in the **Control Connection** aspect of the IED Object Type.

perty View Property Info					1
Name	Data Type	Access	Update Rate	Value	Quality
	VT_I4 VT_I4	R	3000 3000		
LD_2.ACDR_2.DIKOph.stval	10.74	R.	3000		
< III.					

Figure 133. IED Control Connection

Case 1

LD_1-XCBR_1.BlkOpn.stVal

or

LD_1-XCBR_1T.BlkOpn.stVal

This refers to the 'BlkOpn.stVal' attribute of the first instance of the XCBR type Logical Node (child of first instance of the Logical Device).

During upload, the Uploader parses this syntax and puts the appropriate OPC Item ID for this attribute.

Case 5

LD100- XCBR_1.BlkOpn.stVal

or

LD100- XCBR_1T.BlkOpn.stVal

This refers to the 'BlkOpn.stVal' attribute of the first instance of the XCBR type Logical Node (child of the Logical Device named LD100).

During upload, the Uploader parses this syntax and puts the appropriate OPC Item ID for this attribute.

When updating the Control Connection aspect of an IED, there is a limitation for type based and name based convention. The identifier (name/type) referring to the LD or LN must not contain an underscore character (_) in the identifier.

The workaround is to follow the direct naming of the Logical Device/Logical Node.

Section 10 Guidelines for Creating User Defined/BU Specific Libraries

This section provides the guidelines for creating user defined/BU specific libraries.

Guidelines for Creating User Defined/BU Specific Libraries

This section describes the guidelines to create a new version of the base library *IEC61850_ObjectTypes*. To use this new library, create a new version of all the extension libraries and link these new extension libraries to the newly created base library version.

Ensure that the following extension libraries are mandatorily created:

- IEC61850_ObjectTypes_UploaderExtLib This contains the Uploader aspect.
- IEC61850_ObjectTypes_CCAExtLib This contains the **Control Connection** aspect.
- IEC61850_ObjeVctTypes_ControlerNameExtLib This contains the Controller Name aspect.
- IEC61850_ObjectTypes_PCAUploadExtLib This contains the PCA Upload Type aspect.



If the above extension libraries are not created, then an error occurs during the upload operation.



It is recommended to develop customized faceplates in *Object Type Structure* after creating user defined library in *Library Structure*. Upload the SCD file, selecting the user defined library to get the customized faceplates on all instances of respective objects.

When a new library version is created, the control connection elements of faceplate within the new library still point to properties of main library version.

For proper faceplate reconfiguration, click on "." in the object column of the reconfiguration dialog and select correct object.

While making the new version of libraries and extension libraries, ensure that a major version of the base and extension libraries is created. Create major versions such as 2.0-0 or 3.0-0 and not minor or revisions of base libraries like 1.1-0 or 1.0-1. This is because the IEC 61850 Connect delivers only minor versions and revisions (1.0-0) of the base library in future. If the user creates the minor versions or revisions of the library, there is a potential risk that the libraries delivered by the IEC 61850 Connect overwrites the user defined libraries.

!

At the instance level, the user must not modify the Controller Name aspect.

Navigate to the *Object Type Structure* and open the newly created base library. Add new object types to this library. When new object types are created, ensure that the name of the object types is the same as the name with which it is identified in the SCD file. The Uploader reads the type information in the SCD file and looks for the object type with the same name. So if the above procedure is not followed, the Uploader does not recognize the new object types.

When the new object types are created, the following aspects must be mandatorily added to the newly created object types.

- Control Connection aspect
- Controller Name aspect.
- PCA Upload Type aspect.

During upload in the Uploader, select the newly created object type library to upload. The Uploader has a user interface to select this newly created library. Refer to Figure 134.

🎆 My_OPC : IEC61850Uploader	- 🗆 X
🛛 📀 👪 🗕 My_OPC:IEC61850Uploader 💿 🕏 🧏 🚱 🖅 🗸 🔲 🗶	
Standard Advanced	
Import IEC61850 Objects	
SCD Filename: D:\Substation_deleted\Substation_deleted\RCB_TEST_1.scd	
Sub Network: RCB_TESTWA1	
OCS Filename: C:\OperateITData\Temp\Uploader\{B5BE7240-15C5-4003-9A2C-BA1E4E1FD85	1
Functional Structure Upload: 🔽	
Library Selection: IEC61850_ObjectTypes 1.0-0	
Retrieve ObjectTypes 1.0-0 IEC61850_ObjectTypes 2.0-0	
Cancel Apply H	Help

Figure 134. Library Selection

For more details on Library handling refer to *System 800xA 5.1 Configuration* (*3BDS011222**).



While creating a new user library, the faceplates and Graphics elements appear as undeployed (VB related) and as Unapproved (PG2 related).

User needs to run display tool to deploy those elements. Alternatively deployment can be done via context menu on each element. Uploader operation is recommended to be performed after deploy.

Section 11 SCD Information

This section provides the SCD information for the IEC 61850 Uploader and the OPC Server.

SCD File Information for IEC 61850 Uploader

Communication Section (Control Structure)

The Uploader creates objects in the *Control Structure* using information retrieved by the SCL Model component parsing the communication section of the SCD file. For example: IED, Logical device, Logical Node are added to the *Control Structure*. The following table lists the description of each parameter of the SCD file.

SCD Information	Description
Subnetwork (Name, Description)	The Name and Description field of subnetwork is used from the SCD file by IEC 61850 Uploader.
IED (Name, Description)	The Name and Description field of IED is used from SCD file by the IEC 61850 Uploader.
Logical Device (Name, Description)	The Name and Description field of Logical Device is used from the SCD file by the IEC 61850 Uploader.
Logical Node (Name, Description)	The Name and Description field of Logical Node is used from the SCD file by the IEC 1850 Uploader.
Conducting Equipments (Name, Description)	The Name and Description field of Conducting Equipments is used from the SCD file by the IEC 61850 Uploader.

Substation Section (Functional Structure)

The Uploader creates objects in the *Functional Structure* using information retrieved by the SCL Model component parsing the substation section of the SCD file. For example: Substation, Voltage Level, Bay and Conducting Equipment objects are added to the *Functional Structure*. The following table lists the description of each parameter of the SCD file.

SCD Information	Description
Subnetwork (Name, Description)	The Name and Description field of substation is used from the SCD file by the IEC 61850 Uploader.
Voltage Level (Name, Description)	The Name & Description field of Voltage Level used from the SCD file by the IEC61850 Uploader.
Bay (Name, Description)	The Name & Description field of BAY used from the SCD file by the IEC61850 Uploader.
Logical Node (Name, Description)	The Name and Description field of Logical Node is used from the SCD file by the IEC 1850 Uploader.
Conducting Equipments (Name, Description)	The Name and Description field of Conducting Equipments is used from the SCD file by the IEC 61850 Uploader.
Conducting Equipments with Child LN. (Name, Description)	The Name and Description field of Conducting Equipments with Child LN is used from the SCD file by the IEC 61850 Uploader.

The *Functional Structure* objects such as Isolator and Breaker is instantiated by the IEC61850 Uploader in the *Functional Structure* and is based on substation section of the SCD file. The *Functional Structure* objects contain the faceplates. The operators use these faceplates to operate the respective devices. Based on the application requirements, the faceplates and Object Types can be further engineered.

Private Section Handling in SCD file

For small extensions either by a manufacturer or for a specific project, the private parts can be used. The advantage of private parts is that the data content is preserved at data exchange between tools.

Private data entities appear on several levels of the SCL. The contents of these XML elements is as seen from the SCL, transparent text. If the private part contains XML data, then it must use an explicit name space, which cannot be the SCL name space. The Private element allows also to reference other files by means of an URL at its source attribute.

The handling within tools is as follows:

The private data is owned by a tool respective by a tool category (for example, a picture generator). The owner is allowed to modify its contents, and normally is the only one able to interpret the data. All other tools, which read private data, have to preserve (store) its contents on SCL import, and regenerate it at the same place if an SCL file containing this part is produced/exported.

Data Subscription

For data subscription, OPC Server need to be assigned as a client to RCB () as shown in the Figure 135.

# @ LOVFTUM/ABBIED670_LOVFTUW # @ LPHD1/ABBIED670_PHPIOC # @ PHPIOC1/ABBIED670_PHPIOC # @ REFPDF1/ABBIED670_PHPIOC # @ REFPDF1/ABBIED670_SDOPFUF # @ SMPTRC2/ABBIED670_SMPFTRC # @ SMPTRC2/ABBIED670_SMPFTRC # @ SMPTRC2/ABBIED670_SPFBGGIO # @ SP16GGI01/ABBIED670_SPFBGGIO # @ SP16GGI01/ABBIED670_SPF16GGIO # @ SP16GGI01/ABBIED670_TMM/LTC # @ TMAGGI01/ABBIED670_TMAGGIO # @ TMAGGI01/ABBIED670_TMAGGIO # @ TMAGGI01/ABBIED670_TMAGGIO # @ TMAGGI01/ABBIED670_TMAPORE # @ TMAGBIO1/ABBIED670_TMMPORE # @ TMAGBIO2/ABBIED670_TMMPORE # @ TMAGBIO2/ABBIED670_TMMPORE # @ TMAGGI02/ABBIED670_TMMPORE # @ TMAGGI02/ABBIED670_TMMPOR <th>A second s</th> <th></th> <th></th> <th></th> <th></th> <th></th>	A second s					
{\$ Show Grouping V Filter Bar DisableFilteredOutRows First character only Procext Navigator () LOVPTUV1/ABBIED570_LOVPTUV () Signal Parameter Editor IEC51850 Data Engineering NCC Gatew H © LIVPTUV1/ABBIED570_PHPOC () PHPOC1/ABBIED570_PHPOC Attrbute Editor LEC51850 Data Engineering W W EVENDIABBIED570_PHPOC W PHPOC1/ABBIED570_PHPOC Attrbute Editor Data Set Engineering W W EVENDIABBIED570_PHPOC Signal Parameter Editor Data Set Engineering W W PHPOC1/ABBIED570_PHPIC Signal Parameter Editor Data Set Engineering W SPISGEI07ABBIED570_PHPIC1 W SPISGEI07ABBIED570_PHPIGE0 W SPISGEI07ABBIED570_PHPIGE0 SPISGEI07ABBIED570_PHPIGE0 SPISGEI07ABBIED570_PHPIGE0 SPISGEI07ABBIED570_PHPIGE0 SPISGEI07ABBIED570_PHPIGE0 SPISGEI07ABBIED570_PHPIGE1 SPISGEI07ABBIED570_PHPIGE1						
Project Navigator Project Navigator Signal Parameter Editor EEC1850 Data Engineering NCC Gatew WC UPTUV1/ABBIED670_DPTUV W UPTUV1/ABBIED670_DPTUV W UPTUV1/ABBIED670_PPTOC W OPTUV1/ABBIED670_PEPOIF W OP						
Image: Signal radiated Color LCC0000 Disk Lighteens Number 2010 Image: Signal radiated Color LCC0000 Disk Lighteens Number 2010 Image: Signal radiated Color LCC0000 Disk Lighteens Number 2010 Image: Signal radiated Color LCC0000 Disk Lighteens Number 2010 Image: Signal radiated Color LCC0000 Disk Lighteens Number 2010 Image: Signal radiated Color LCC0000 Disk Lighteens Number 2010 Image: Signal radiated Color LCC0000 Disk Lighteens Number 2010 Image: Signal radiated Color LCC0000 Disk Lighteens Number 2010 Image: Signal radiated Color LCC0000 Disk Lighteens Number 2010 Image: Signal radiated Color LCC0000 Disk Lighteens Number 2010 Image: Signal radiated Color LCC0000 Disk Lighteens Number 2010 Image: Signal radiated Color LCC0000 Disk Lighteens Number 2010 Image: Signal radiated Color LCC0000 Disk Lighteens Number 2010 Image: Signal radiated Color LCC0000 Disk Lighteens Number 2010 Image: Signal radiated Color LCC0000 Disk Lighteens Number 2010 Image: Signal radiated Color Signal radiated Color Number 2010 </th <th>🚯 Show Grouping 🦻 Filter Bar DisableFilteredOutRows</th> <th> First character only </th> <th>• •</th> <th></th> <th></th> <th></th>	🚯 Show Grouping 🦻 Filter Bar DisableFilteredOutRows	 First character only 	• •			
# @ L+H01ABBIED670_LFH0C # @ PHPOC1ABBIED670_PHPOC # @ REFPDIF1ABBIED670_REFPOIF # @ SMPTRC3ABBIED670_SMPTRC # @ SMPTRC3ABBIED670_SMBGBI0 # @ SPI66GI03ABBIED670_SMEGGI0 # @ SPI66GI03ABBIED670_SPI6GGI0 # @ SPI6GGI03ABBIED670_SPI6GGI0 # @ TAMCITC1ABBIED670_TMAGGI0 # @ TAMCGI01ABBIED670_TMAGGI0 # @ TAMGBIC1ABBIED670_TMAGGI0 # @ TAMGBIC1ABBIED670_TMAGGI0 # @ TAMGBIC1ABBIED670_TMAGGI0 # @ TAMGBIC1ABBIED670_TMAGGI0 # @ TAMGBIC1ABBIED670_TMPRDRE # @ TAMCITC1ABBIED670_TMPRDRE # @ TAMCITC1ABBIED670_TMAGGI0 # @ TAMCITABBIED670_TMPRDRE <	Project Navigator	<u>9</u> 2	Signal Parameter Editor	IEC61850 Dat	a Engineering	NCC Gateway
	Project Navigator	<u> </u>	Signal Parameter Editor Attribute Editor Data : Name Prew_rcb Client Lo	P Descr. P Descr. Image: Control of the sector of the sec	P Dat	I Engineering

Figure 135. Data Subscription

Data Format / Data Set

It is a grouping of all required data attributes present in the IED which needs the data subscription from the OPC Server. Refer to the following Figure 136 to form the data set.

Tools Build Help									
Grouping V Filter Bar DisableFilteredOutRows	 First character only 	• .							
ator	9 🖬 🛛	Signal Parameter Editor	IEC61850 Dat	a Engineering	NCC Gatewa	w Engineering			
tation Section	^		Set Engineering	Report Control			ntrol Engineering Logical Node Inp	ut Editor	IEC61850 Object Mapp
unication Section ection		Handade Editor		Thepoil Control	Engricening	40030 00	the Engliseing Edged Hode mp	on E anos	The correspondence in the
AA1A1->AC800M/2									
AA1A2->IED670/3 AA1FP1->IED670/4		<u> </u>							
AA1FP1S1->IEC61850		Data Set	ts	Data	Set Entrie	es	IED Data Model		Filtered Preview
■ □ EF4_1		Add		Remove			Add Func Constraint		
E D LDO		Remove					Modify ST 🗸		
E CON LLNO/ABBIED670_LLNO		new dataset		LD0.SP16GGI	19 Ind (ST)				Name
mew_rcb									nd.stVal
• inew_ds_retgoose							EF4_1.EF4_1PT0C2		nd.q
⊞ B ² Mod							EF4_1.EF4_1PT0C3 EF4_1.EF4_1PT0C4		nd.t
⊞ Beh ⊞ Beh ⊞ Beh							■ (1) EF4 1.EF4 1PTRC1		
							B 🚯 EF4_1.EF4_1RDIR1		
CCRBRF1/ABBIED670_CCRBRF							EF4_1.LLN0		
Q CCRBRF2/ABBIED670_CCRBRF							B (N) EF4_1.LPHD1 B (N) EF4_2.EF4_2PHAR1		
CCRBRF3/ABBIED670_CCRBRF GCRPLD1/ABBIED670_CCRPLD									
CMMXU1/ABBIED670 CMMXU							B (B) EF4_2.EF4_2PTOC2		
CMMXU2/ABBIED670_CMMXU							EF4_2.EF4_2PT0C3		
E O CMMXU3/ABBIED670_CMMXU							■ IP EF4_2.EF4_2PTOC4		
CMMXU4/ABBIED670_CMMXU							EF4_2.EF4_2PTRC1 EF4_2.EF4_2RDIR1		
CMSQI1/ABBIED670_REV1_CMSQI GM CMSQI2/ABBIED670 REV1 CMSQI							⊕ (R) EF4_2.LLN0		
CMSQI3/ABBIED670 REV1 CMSQI							EF4_2.LPHD1		
CMSQI4/ABBIED670_REV1_CMSQI							🕀 😡 EF4_3.EF4_3PHAR1		
E Q CMSQI5/ABBIED670_REV1_CMSQI							■ 00 EF4_3.EF4_3PT0C1		
CVMMXU1/ABBIED670_CVMMXU B CVMMXU1/ABBIED670 EFPIOC							EF4_3EF4_3PT0C2 EF4_3EF4_3PT0C3		
CO ETPMMTR1/ABBIED670_ETPMMTR							EF4 3.EF4 3PTOC4		
							🗄 🔞 EF4_3.EF4_3PTRC1		
IPHD1/ABBIED670_LPHD							EF4_3.EF4_3RDIR1		
PHPIOC1/ABBIED670_PHPIOC									
REFPDIF1/ABBIED670_REFPDIF B B REFPDIF2/ABBIED670_REFPDIF							E CO LD0.CCRBRF1		
SDDRFUF1/ABBIED670 SDDRFUF							E 🔞 LD0.CCRBRF2		
B 🐼 SMPPTRC1/ABBIED670_SMPPTRC							DOLCCRBRF3		
SMPPTRC2/ABBIED670_SMPPTRC	~						CONTROL C		
ore updating instances									
pre updating instances							⊞ (LD0.CMMXU2		

Figure 136. Data Format / Data Set

Version Handling of SCD File

User should make sure that same version of SCD file is used across all the nodes in the system.

Appendix A Renaming Object Names

This appendix provides the information on how to rename the Logical Nodes.



It is recommended that the renaming must be done from the *Functional Structure* and not from the *Control Structure*.

Renaming Object Names

Perform the following steps to rename the object:

- 1. Select the object to be renamed.
- 2. Select the Name Aspect from the Aspects list.
- 3. In the **Name** text box, rename the existing name.

Example of the objects that can be renamed.

- Substation
- Voltage Level
- Bay
- Logical Node



It is recommended not to rename the IED name. The source name is not changed if the user has changed the object names in the functional structure. The source name in the Alarm list is displayed as per the configuration in the OPC Server.

Appendix B Deleting OPC Server Instance

This appendix provides the procedure to delete the OPC Server instance.

Deleting OPC Server Instance

Perform the following steps to delete the OPC Server instance using the CET tool:

- 1. Select the OPC Server instance to be deleted.
- 2. Right-click and select **Delete**.

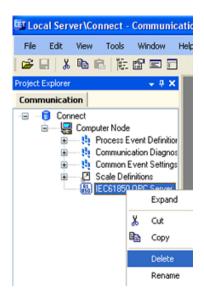


Figure 137. Delete Selection

3. Right-click Computer Node object and Select Management.

Project Explorer	
Communication	
	 Collapse Cut Gopy Delete Rename New Data object dia Management SCL Export Properties

Figure 138. Management Selection (Redundant)

4. In the Management pane, click **Update & reload configuration**.

	EC61850 OPC Server
IEC61	850 OPC Server 1 - S Computer N
Cor	figuration control
1	Update configuration
	Opdate congulation
	Reload configuration

Figure 139. Update & reload configuration Button

Deleting IEC 61850 OPC Server from 800xA System

While deleting the OPC Server Object from Control Structure, it is recommended to delete the corresponding OPC DA Service from the Service Structure.

Perform the following steps to delete the Service in Service Structure:

- 1. Navigate to Service Structure > OpcDA_Connector > Service.
- 2. Navigate to the Service Group for that IEC61850 OPC server object.
- 3. Right-click and delete the corresponding Service Group.

Deleting Unused IEC 61850 OPC Server Instances

Unused OPC Server instances appear during configuration of IEC61850 Service Providers > Special Configuration in PPA Service structure. It is recommended to remove unused OPC Server instances during configuration.

Perform the following steps to remove the unused OPC Server instances:

1. Locate current CLSIDs.

Locate current OPC server CLSID from instance.ini file (located in sys default C:\sc\prog\61850_OPC_Server\IEC61850 OPC Server\bin\OPCS_IEC61850_1\instance.ini)

For example. mys instance.ini:

[Instance]

DAServerClsId={B3828BEA-9DCF-4E96-896C-7CCF766B95B0}

AEServerClsId={0076A00C-D18F-422E-9E2D-A4E6C0FE218A}

2. Remove unnecessary OPC Server instances from registry.

Search through registry using **regedit** command from HKEY_LOCAL_MACHINE for **ABB.IEC61850_OPC_**. This will find for both DA and AE server.

The entries will be located in:

(The two following two keys may or may not exist in registry, depending on the installed product.)

ABB.IEC61850_OPC_DA_Server.Instance[1] in HKEY_LOCAL_MACHINE\SOFTWARE\Classes\. If the CLSID key under this key is **not** among the CLSIDs in instance.ini, the **ABB...** key can be deleted.

ABB.IEC61850_OPC_AE_Server.Instance[1] in HKEY_LOCAL_MACHINE\SOFTWARE\Classes\. If the CLSID key under this key is **not** among the CLSIDs in instance.ini, the **ABB...** key can be deleted.

(The following will be found in registry)

Next set of keys is found in;

HKEY_LOCAL_MACHINE\SOFTWARE\Classes\CLSID\ (e.g. HKEY_LOCAL_MACHINE\SOFTWARE\Classes\CLSID\ {B3828BEA-9DCF-4E96-896C-7CCF766B95B0}\ProgID). The entries is found for both DA and AE servers. If the CLSID is **not** among the CLSIDs in instance.ini, the "{...}" key can be deleted.

3. Remove unused DCOM registrations.

Start dcomcnfg (Run > dcomcnfg). Navigate to Component Services > Computers > My Computer > DCOM Config. In the list locate the multiple instances of *IEC 61850 OPC DA Server Instance [1]*. Delete the DCOM registrations without the current CLSID as Application ID.

Appendix C Sequence for Faceplates

This appendix provides the deployment sequence of the graphic elements faceplate elements for circuit breaker, transformer, and generator faceplates.



This function is only supported and applicable for 800xA IEC 61850 releases before Feature Pack. This section must be ignored for Feature Pack release.

Deployment Sequence for Circuit Breaker Faceplate

Table 41 lists the deployment sequence for circuit breaker faceplate.

Serial No.	Aspect Name	Aspect Type
1	CB Measurement	Faceplate Element
2	geCircuitbreakerReducedCB	Graphic Element
3	fpeBlockingInterlockCB	Faceplate Element
4	fpeMainviewCB	Faceplate Element
5	geAlarmSquareCB	Graphic Element
6	fpeAlarm_CB_User	Faceplate Element
7	fpeBlockingCB	Faceplate Element
8	fpeEditInterlockTextCB	Faceplate Element
9	fpeInterlockCB	Faceplate Element
10	fpeMeasurement16CB	Faceplate Element

Table 41. Deployment Sequence for Circuit Breaker Faceplate

11	fpeParametersCB	Faceplate Element
12	fpeSimulationCB	Faceplate Element
Serial No.	Aspect Name	Aspect Type
13	fpeStatusCB	Faceplate Element
14	fpeStatusExt16CB	Faceplate Element
15	geAlarmControlCB	Graphic Element
16	geFeedbackCB	Graphic Element
17	geMeasurementCB	Graphic Element
18	Alarm Control	Graphic Element

Table 41. Deployment Sequence for Circuit Breaker Faceplate (Continued)

Deployment Sequence for Transformer Faceplate

Table 42 lists the deployment sequence for transformer faceplate.

Serial No.	Aspect Name	Aspect Type
1	TFR Measurement	Faceplate Element
2	geTransformerTR	Graphic Element
3	fpeBlockingInterlockTR	Faceplate Element
4	fpeMainviewTR	Faceplate Element
5	geAlarmSquareTR	Graphic Element
6	fpeAlarms16TR	Faceplate Element
7	fpeBlockingTR	Faceplate Element
8	fpeEditInterlockTextTR	Faceplate Element

Table 42. Deployment Sequence for Transformer Faceplate

9	fpeInterlockTR	Faceplate Element
10	fpeMeasurement16TR	Faceplate Element
Serial No.	Aspect Name	Aspect Type
11	fpeParametersTR	Faceplate Element
12	fpeSimulationTR	Faceplate Element
13	fpeStatusTR	Faceplate Element
14	fpeStatusExt16TR	Faceplate Element
15	geAlarmControlTR	Graphic Element
16	Alarm Control	Graphic Element

Table 42. Deployment Sequence for Transformer Faceplate (Continued)

Deployment Sequence for Generator Faceplate

Table 43 lists the deployment sequence for generator faceplate.

Serial No.	Aspect Name	Aspect Type
1	Generator Measurement	Faceplate Element
2	geGeneratorGEN	Graphic Element
3	geGeneratorReducedGEN	Graphic Element
4	geGeneratorUsedwithReducedGEN	Graphic Element
5	fpeMainviewGEN	Faceplate Element
6	geAlarmSquareGEN	Graphic Element
7	fpeAlarms16GEN	Faceplate Element
8	fpeAVRBlockingGEN	Faceplate Element

Table 43. Deployment Sequence for Generator Faceplate

9	fpeAVRModeHandlerGEN	Faceplate Element
Serial No.	Aspect Name	Aspect Type
10	fpeAVRModesGEN	Faceplate Element
11	fpeCapDiaParamGEN	Faceplate Element
12	fpeDirAdjustGEN	Faceplate Element
13	fpeDirAdjustParamGEN	Faceplate Element
14	fpeEditModeTextGEN	Faceplate Element
15	fpeGOVBlockingGEN	Faceplate Element
16	fpeGOVModeHandlerGEN	Faceplate Element
17	fpeGOVModesGEN	Faceplate Element
18	fpeInterlocksGEN	Faceplate Element
19	fpeLocalModeHandlerGEN	Faceplate Element
20	fpeMeasurements16GEN	Faceplate Element
21	fpeModeIndGEN	Faceplate Element
22	fpeSetpointParamGEN	Faceplate Element
23	fpeSimulationGEN	Faceplate Element
24	fpeStastopHandlerGEN	Faceplate Element
25	fpeStatusExt16GEN	Faceplate Element
26	fpeSyncGEN	Faceplate Element
27	geCapDiaGEN	Graphic Element
28	gdGeneratorGEN	Graphic Element
29	geAlarmcontrolGEN	Graphic Element
30	Alarm control	Graphic Element

 Table 43. Deployment Sequence for Generator Faceplate (Continued)

Serial No.	Aspect Name	Aspect Type
32	geFeedbackGEN	Graphic Element
33	geGenTagNameGEN	Graphic Element
34	geMeasActPowBargraph	Graphic Element
35	geMeasRePowBargraph	Graphic Element
36	geMeasurementGEN	Graphic Element

Table 43. Deployment Sequence for Generator Faceplate (Continued)

Appendix D System Status Viewer

This appendix provides information on the system status viewer.

The function system status adds the functionality for providing and displaying status for IED and Logical Node objects. The user navigates to the **System Status Viewer** aspect on the OPC Server Object to check for the individual status of each IED and the Logical Nodes under them.

3 🕤 🔟 🗕 LD0:System :			S 🚰 🖅 +	-		
ት 🗘 🗖 🗖 🖓 🔓	Control St	ructure	- 5			
Objects	Status	Time	Description	Details	Propagatio	Suppres
🗄 😝 LDO, Logical Device	1 martin					
🕒 LLNO, LLNO	0		*Unable to		Yes	
LPHD1, LPHD	0		*Unable to		Yes	
PDIR1, PDIR	0	9/5/2007 10:18:			Yes	
PDOP1, PDOP	0	9/5/2007 10:18:			Yes	
PDUP1, PDUP	0	9/5/2007 10:18:	10		Yes	
PHIZ1, PHIZ	0	9/5/2007 10:18:			Yes	
PMRI1, PMRI	0	9/5/2007 10:18:			Yes	
PMSS1, PMSS	0	9/5/2007 10:18:			Yes	
POPF1, POPF	0	9/5/2007 10:18:	1		Yes	
PPAM1, PPAM	0	9/5/2007 10:18:			Yes	
PSDE1, PSDE	0	9/5/2007 10:18:			Yes	
PTEF1, PTEF	0	9/5/2007 10:18:			Yes	
PTOF1, PTOF	Ó	9/5/2007 10:18:			Yes	
PUPF1, PUPF	Ó	9/5/2007 10:18:			Yes	
PVOC1, PVOC	Ó	9/5/2007 10:18:			Yes	
A DUDLI DUDLI	Ă	0/5/2007 10-18-			Vor	

Figure 140. System Status Viewer

The 'Health' attribute, a part of 'Common Logical Node' node object (and hence a part of all logical nodes) provides the status of the Logical Nodes. A property translation aspect is used to translate the 'Health.StVal' attribute to 'S_Status' which is understandable by the system status viewer.

While CCT engineering, RCB dataset of LPHD LN for the physical devices to include Health.stVal, PhyHealth.stval attributes. This ensures proper updation of device status in System Status Viewer.

Table 44 shows the Values of 'Helath.StVal' and the corresponding values of 'S_Status' and their status as seen on the System Status Viewer aspect.

Health.Stval	S_Status	Status seen on 'System Status Viewer' aspect
1	0	•
3	1	8
2	2	œ

Table 44. Status Seen in System Status Viewer

The Time column in Figure 140 displays the time and date of the last change in status. The attribute "Health.t" in control connection of all the Logical Node Object Type is mapped to 'S_Time' attribute by the **Property Translator** aspect. The **System Status Reporter** aspect reports this 'S_Time' attribute to the System Status to display in the Time column.

The real time values of the above mentioned attributes such as 'Health.Stval' and 'Health.t' are available from the IEC 61850 OPC Server for all the Logical Node objects.

The Generic Logical Node object do not carry the support for the System Status Viewer. The Generic Logical Node Object Type is present to cater to non-standard Logical Nodes/User defined Logical Nodes. As we do not know the health information of these Logical Nodes, the System Status reporter variables cannot be mapped. Hence this Generic Logical Node Object Type does not carry the **System Status Reporter** aspect.

To get the System Status Reporter functionality, configure this manually.

System Status Reporter for IED Object

The Status of the IED in an IEC 61850 network is represented by the attribute 'PhyHealth.stVal' of the LPHD Logical Node of the IED. So, the **System Status Reporter** aspect uses this attribute to report the status of the IED to the System Status Viewer.

The real time value of the above mentioned attribute 'PhyHealt.stVal' is available from the IEC 61850 OPC Server on the LPHD object for each IED.

The System Status Viewer Aspect

The System Status Viewer aspect is on the following Object Types:

- Sub network Object Type
- IED Object Type
- Logical Device(LD) Object Type



For subnetworks having large number of IEDs (around 50 or more), opening System status viewer at Subnetwork, IED or LD level causes 100% CPU load for 2 to 3 minutes.

It is recommended not to perform other runtime operations on that machine while Opening System Status Viewer aspect.

Appendix E Logical Nodes and Primary Object

Logical nodes can be connected to Primary objects according to the following table. If no specific function is written in the Comment column, the connection is used for displaying the substation structure based on identification for the events and alarms.

Primary Object	Logical Node Class	Mandatory	Comment
Substation			
	LLN0 (Logical Node Device)		Loc data used for station/ remote switch state.
	SIMG (Insulation Medium Supervision (gas))		LN to supervise the insulation medium, for example the gas volumes of GIS (Gas Insulated Switchgear) regarding density, pressure, temperature, etc.

Table 45. Logical No	de Classes and	Primary	Objects
----------------------	----------------	---------	----------------

Primary Object	Logical Node Class	Mandatory	Comment
	CALH (Alarm Handling)		For the communication, there is no difference between alarms and events if a time tag is added to any data transmitted.
			If several events or alarms have to be combined to group alarms, a separate, configurable function is needed. The related LN may be used to calculate new data out of individual data from different logical nodes.
			Remote acknowledgement with different priority and authority shall be possible. The definition and handling of alarms is an engineering issue.
	M*		Metering and Measurement
	G*		Generic references.
	Q*		
Voltage Leve) 		
	SIMG (Insulation Medium Supervision (gas))		

Table 45. Logical Node Classes and Primary Objects

Primary Object	Logical Node Class	Mandatory	Comment
	CALH (Alarm Handling)		For the communication, there is no difference between alarms and events if a time tag is added to any data transmitted.
			If several events or alarms have to be combined to group alarms, a separate, configurable function is needed. The related LN may be used to calculate new data out of individual data from different logical nodes.
			Remote acknowledgement with different priority and authority shall be possible. The definition and handling of alarms is an engineering issue.
	M* (Metering and Measurement)		
	G*		Generic references.
	Q*		
Вау			
	LLN0 (Logical Node Device)		Loc data used for bay remote switch state.
	LPHD (Physical Device Information)		
	SIMG (Insulation Medium Supervision (gas))		
	SARC (Monitoring and diagnostics for arcs)		LN to supervise the gas volumes of GIS (Gas Insulated Switchgear) regarding arcs switching or fault arcs.

Table 45. Logical Node	Classes and	Primary Objects
------------------------	-------------	-----------------

Primary Object	Logical Node Class	Mandatory	Comment
	SIML (Insulation medium supervision)		LN to supervise the insulation medium, for example the gas volumes of GIS (Gas Insulated Switchgear) regarding density, pressure, temperature, etc.
	SPDC (Monitoring and diagnostics for partial discharges)		LN to supervise the gas volumes of GIS (Gas Insulated Switchgear) regarding signatures of partial discharges.
	CALH (Alarm Handling)		For the communication, there is no difference between alarms and events if a time tag is added to any data transmitted.
			If several events or alarms have to be combined to group alarms, a separate, configurable function is needed. The related LN may be used to calculate new data out of individual data from different logical nodes.
			Remote acknowledgement with different priority and authority shall be possible. The definition and handling of alarms is an engineering issue.
	M*		Metering and Measurement
	P*		Protection functions.
	R*		Protection related functions.
	G*		Generic references.
	T*		Instrument transformers.
	Q*		
Circuit Break	ker (CBR)		

Primary Object	Logical Node Class	Mandatory	Comment
	XCBR (Circuit Breaker)		This LN is used for modelling switches with short circuit breaking capability. Additional LNs for example SIMS, etc. may be required to
			complete the logical modelling for the breaker being represented.
	CSWI (Switch Controller)	Mandatory	The switch control LN handles all switchgear operations from the operators and from related automatics. It checks the authorization of the commands.
			It supervises the command execution and gives an alarm in case of an improper ending of the command. It asks for releases from interlocking, synchrocheck, autoreclosure, etc. if applicable.
	RREC (Automatic reeclosing)		AC closing relay is a relay that controls the automatic reclosing and locking out of an AC circuit interrupter (IEEE C37.2- 1996).
			After any successful protection trip, the automatic reclosing tries 1 to 3 times to reclose the open breaker again with different time delays assuming a transient fault.

Table 45. Logical Node C	Classes and Primary Objects
--------------------------	-----------------------------

Primary Object	Logical Node Class	Mandatory	Comment
	RSYN (Synchrocheck/synch ronizing or Synchronism check)		Synchronizing or synchronism-check device is a device that operates when two AC circuits are within the desired limits of frequency, phase-angle and voltage, to permit or to cause the paralleling of these two circuits (IEEE C37.2-1996).
			To avoid stress for the switching device and the network, closing of the circuit breaker is allowed by the synchrocheck only, if the differences of voltage, frequency and phase angle are within certain limits.
	CILO (Interlocking function at bay level)		Interlocking may be totally centralized or totally decentralized. Since the interlocking rules are basically the same on bay level based on all related position indications, the different interlocking LNs may be seen as instances of the same LN class
			Interlocking (IL). All interlocking rules referring to a bay are included in this LN. Releases or blockings of requested commands are issued. In the case of status changes affecting interlocking, blocking commands are issued.
	PTRC (Protection Trip Conditioning)		This LN is used to connect the "operate" outputs of one or more protection functions to a common "trip" to be transmitted to XCBR.
			In addition or alternatively, any combination of "operate" outputs of the protection functions may be combined to a new "operate" of PTRC.

Primary Object	Logical Node Class	Mandatory	Comment
	SIML (Insulation medium supervision)		LN to supervise the insulation medium, for example the gas volumes of GIS (Gas Insulated Switchgear) regarding density, pressure, temperature, etc.
	CALH (Alarm Handling)		For the communication, there is no difference between alarms and events if a time tag is added to any data transmitted. If several events or alarms have to be combined to group alarms, a separate,
			configurable function is needed. The related LN may be used to calculate new data out of individual data from different logical nodes.
			Remote acknowledgement with different priority and authority shall be possible. The definition and handling of alarms is an engineering issue.
	G*		Generic references.
Disconnecto	r (DIS)		
	XSWI (Circuit Switch)		This LN is used for modelling switches without short circuit breaking capability, for example disconnectors, air break switches, earthing switches, etc.
			Additional LNs, SIMS, etc. may be required to complete the logical model for the switch being represented. The closing and opening commands is subscribed from CSWI.
			If no services with real-time capability are available between CSWI and XSWI, the opening and closing commands are performed with a GSE-message.

Primary Object	Logical Node Class	Mandatory	Comment
	CSWI (Switch Controller)	Mandatory	The switch control LN handles all switchgear operations from the operators and from related automatics.
			It checks the authorization of the commands. It supervises the command execution and gives an alarm in case of an improper ending of the command. It asks for releases from interlocking, synchrocheck, autoreclosure, etc. if applicable.
	RREC (Automatic reeclosing)		AC closing relay is a relay that controls the automatic reclosing and locking out of an AC circuit interrupter (IEEE C37.2- 1996).
			After any successful protection trip, the automatic reclosing tries 1 to 3 times to reclose the open breaker again with different time delays assuming a transient fault.
	RSYN (Synchrocheck/synch ronizing or Synchronism check)		Synchronizing or synchronism-check device is a device that operates when two AC circuits are within the desired limits of frequency, phase-angle and voltage, to permit or to cause the paralleling of these two circuits (IEEE C37.2-1996).
			To avoid stress for the switching device and the network, closing of the circuit breaker is allowed by the synchrocheck only, if the differences of voltage, frequency and phase angle are within certain limits.

Table 45. Logical Node Classes and Primary Objects

Primary Object	Logical Node Class	Mandatory	Comment
	CILO (Interlocking function at bay level)		Interlocking may be totally centralized or totally decentralized. Since the interlocking rules are basically the same on bay level based on all related position indications, the different interlocking LNs may be seen as instances of the same LN class
			Interlocking (IL).
			All interlocking rules referring to a bay are included in this LN. Releases or blockings of requested commands are issued. In the case of status changes affecting interlocking, blocking commands are issued.
	PTRC (Protection Trip Conditioning)		This LN is used to connect the "operate" outputs of one or more protection functions to a common "trip" to be transmitted to XCBR.
			In addition or alternatively, any combination of "operate" outputs of the protection functions may be combined to a new "operate" of PTRC.
	SIML (Insulation medium supervision)		LN to supervise the insulation medium, for example the gas volumes of GIS (Gas Insulated Switchgear) regarding density, pressure, temperature, etc.

Table 45. Logical Node	Classes and	Primary Objects
------------------------	-------------	-----------------

Primary Object	Logical Node Class	Mandatory	Comment
	CALH (Alarm Handling)		For the communication, there is no difference between alarms and events if a time tag is added to any data transmitted.
			If several events or alarms have to be combined to group alarms, a separate, configurable function is needed. The related LN may be used to calculate new data out of individual data from different logical nodes.
			Remote acknowledgement with different priority and authority shall be possible. The definition and handling of alarms is an engineering issue.
	G*		Generic references.
Voltage Tran	sformer (VTR)		
	TVTR(Voltage Transformer)		There is one instance per phase. These three/four instances may be allocated to different physical devices mounted in the instrument transformer per phase.
	CALH (Alarm Handling)		For the communication, there is no difference between alarms and events if a time tag is added to any data transmitted.
			If several events or alarms have to be combined to group alarms, a separate, configurable function is needed. The related LN may be used to calculate new data out of individual data from different logical nodes.
			Remote acknowledgement with different priority and authority shall be possible. The definition and handling of alarms is an engineering issue.
	G*		Generic references.

Primary Object	Logical Node Class	Mandatory	Comment
Current Tran	sformer (CTR)		1
	TCTR (Current Transformer)		There is one instance per phase. These three/four instances may be allocated to different physical devices mounted in the instrument transformer per phase.
	SARC(Monitoring and diagnostics for arcs)		LN to supervise the gas volumes of GIS (Gas Insulated Switchgear) regarding arcs switching or fault arcs.
	SPDC (Monitoring and diagnostics for partial discharges)		LN to supervise the gas volumes of GIS (Gas Insulated Switchgear) regarding signatures of partial discharges.
	CALH (Alarm Handling)		For the communication, there is no difference between alarms and events if a time tag is added to any data transmitted.
			If several events or alarms have to be combined to group alarms, a separate, configurable function is needed. The related LN may be used to calculate new data out of individual data from different logical nodes.
			Remote acknowledgement with different priority and authority shall be possible. The definition and handling of alarms is an engineering issue.
	G*		Generic references.
	Q*		
Power Overl	nead Line (LIN)		
	ZLIN (Power Overhead Line)		Supervised overhead line.

Table 45. Logical Node	Classes and	Primary Objects
------------------------	-------------	-----------------

Primary Object	Logical Node Class	Mandatory	Comment
	CALH (Alarm Handling)		For the communication, there is no difference between alarms and events if a time tag is added to any data transmitted.
			If several events or alarms have to be combined to group alarms, a separate, configurable function is needed. The related LN may be used to calculate new data out of individual data from different logical nodes.
			Remote acknowledgement with different priority and authority shall be possible. The definition and handling of alarms is an engineering issue.
	G*		Generic references.
Rotating Rea	ctive Component (RRC	;)	
	ZRRC (Rotating Reactive Component)		This LN controls reactive power flow.
	CALH (Alarm Handling)		For the communication, there is no difference between alarms and events if a time tag is added to any data transmitted.
			If several events or alarms have to be combined to group alarms, a separate, configurable function is needed. The related LN may be used to calculate new data out of individual data from different logical nodes.
			Remote acknowledgement with different priority and authority shall be possible. The definition and handling of alarms is an engineering issue.
	G*		Generic references.
Surge Arrest	or (SAR)		

Table 45. Logical Node Classes and Primary Objects

Primary Object	Logical Node Class	Mandatory	Comment
	ZSAR (Surge Arrestor)		Generic node for information exchange with surge arrestors.
	CALH (Alarm Handling)		For the communication, there is no difference between alarms and events if a time tag is added to any data transmitted. If several events or alarms have to be combined to group alarms, a separate, configurable function is needed. The related LN may be used to calculate new data out of individual data from different logical nodes.
			Remote acknowledgement with different priority and authority shall be possible. The definition and handling of alarms is an engineering issue.
	G*		Generic references.
Thyristor Co	ntrolled Frequency Co	nverter (TCF)	
	ZTCF (Thyristor controlled frequency convertor)		Frequency conversion including AC/DC conversion.
	CALH (Alarm Handling)		For the communication, there is no difference between alarms and events if a time tag is added to any data transmitted.
			If several events or alarms have to be combined to group alarms, a separate, configurable function is needed. The related LN may be used to calculate new data out of individual data from different logical nodes.
			Remote acknowledgement with different priority and authority shall be possible. The definition and handling of alarms is an engineering issue.

Table 45. Logical Node	Classes and	Primary Objects
------------------------	-------------	-----------------

Primary Object	Logical Node Class	Mandatory	Comment
	G*		Generic references.
Thyristor Co	ntrolled Reactive Com	oonent (TCR)	
	ZTCR (Thyristor controlled reactive component)		Controls reactive power flow.
	CALH (Alarm Handling)		For the communication, there is no difference between alarms and events if a time tag is added to any data transmitted.
			If several events or alarms have to be combined to group alarms, a separate, configurable function is needed. The related LN may be used to calculate new data out of individual data from different logical nodes.
			Remote acknowledgement with different priority and authority shall be possible. The definition and handling of alarms is an engineering issue.
	G*		Generic references.
Power Transformer Winding (PTW)			
	G*		Generic references.
-	eder Line (IFL) s for the Incoming Feede	r Link can be c	onfigured in the SLD editor.

Table 45. Logical Node Classe	es and Primary Objects
-------------------------------	------------------------

Primary Object	Logical Node Class	Mandatory	Comment
	CALH (Alarm Handling)		For the communication, there is no difference between alarms and events if a time tag is added to any data transmitted.
			If several events or alarms have to be combined to group alarms, a separate, configurable function is needed. The related LN may be used to calculate new data out of individual data from different logical nodes.
			Remote acknowledgement with different priority and authority shall be possible. The definition and handling of alarms is an engineering issue.
	G*		Generic references.
	Q*		
Generator			·
Powered rules	s for the Generator can b	e configured in	the SLD editor.
	ZGEN (Generator)		Generic node for information exchange with generators.
	G*		Generic references.

Table 45. Logical Node	Classes and Prima	ry Objects
------------------------	-------------------	------------

Index

62311 1HeadingAppA Appendix B 249 63538 3Heading Import 124, 127

About 11

Adding 89

About This Book 11

Configuration 219, 223, 235 Configuring the Control Connection Aspect 211

D

С

Α

Define 223 Deleting OPC Server Instance 251 Deployment Sequence for Circuit Breaker Faceplate 255 Deployment Sequence for Generator Faceplate 257 Deployment Sequence for Transformer Faceplate 256 Disturbance Recording 148 Disturbance Recording via FTP 118 Disturbance Recording via MMS 116

Export 123

F

Е

Faceplates and Graphic Elements Containing Data from Other Connectivity 210 Faceplates and Graphic Elements Containing IEC 61850 Data 207

Guidelines 215

Guidelines for Creating User Defined/BU Specific Libraries 239, 243 Guidelines to Import and Export 215

Hardware Library 219, 223, 235

IEC 19, 23 IEC 61850 Connect 20 IEC 61850 Device Properties on Page 32 35 IEC 61850 OPC Server 19 IEC 61850 Uploader Options - Feature Pack Update 167 IEC Subnetwork Properties on Page 30 33 IED Signal Mapping 172 IED Type Column 174 Importing Reconfigured SCD File to IEC 61850 OPC Server 220 Instance Number 174 Introduction 19

Logical 42 Logical Device properties 42

Object Types 20 OPC Server object 90

Reconfiguring 219 Reconfiguring SCD Files 219 Redundant OPC AE Configuration 197 Redundant OPC DA Configuration 202 Renaming Object Names 249

SCD file 180 SCD File Information for IEC 61850 Uploader 243 SCD Information 243 SCL 93 S

н

0

R

SCL Model Components 20 Sequence for Faceplates 255 System Status Viewer 261

Terminology 14

Т

U

Unique Naming of the Objects 168 Upload Using Advanced Tab 160 Upload Using Standard Tab 156 Uploading Reconfigured SCD File To Plant Explorer 220

Revision History

This section provides information on the revision history of this User Manual.



The revision index of this User Manual is not related to the 800xA 5.1 System Revision.

The following table lists the revision history of this User Manual.

Revision Index	Description	Date
-	Published for 800xA 5.1	June 2010
А	Published for 800xA 5.1 Rev A.	May 2011
В	Published for 800xA 5.1 Feature Pack 4.	February 2013
С	Published for 800xA 5.1 Rev D.	December 2013
D	Published for 800xA 5.1 Rev E.	July 2015

Updates in Revision Index A

The following table shows the updates made in this User Manual for 800xA 5.1 Rev A.

Updated Section/Sub-section	Description of Update
Section 3 Working with Uploader User Interface	Multiple changes across the section.

Updates in Revision Index B

The following table shows the updates made in this User Manual for 800xA 5.1 Feature Pack 4.

Updated Section/Sub-section	Description of Update
Section 2 800xA IEC61850 OPC Server	Included CET OPC Server related Information.
Section 3 Working with Uploader User Interface	IEC 61850 Uploader Options - Feature Pack Update
Section 5 Addition and Modification of Graphic Elements	A caution is provided to restrict the user from referring the usage of graphic elements for Feature Pack release.
All Sections	Multiple changes across all sections.
Appendix E - Sequence for Faceplates	A caution is provided to restrict the user from referring the usage of graphic elements for Feature Pack release.
Appendix E - Logical Nodes and Primary Object	Contains the list of Logical Nodes connected to Primary objects.

Updates in Revision Index C

The following table shows the updates made in this User Manual for 800xA 5.1 Rev D.

Updated Section/Sub-section	Description of Update
The System Status Viewer Aspect	A caution is provided restricting user not to perform other runtime operations while opening System Status Viewer aspect.
Update and Reload Configuration	Steps provided to recover the CET project when computer crashes.

Updated Section/Sub-section	Description of Update
Upload Using Advanced Tab	A caution is provided to upload a correct SCD file, if the SCD file contains special character (& or Space) in the description of any Conducting Equipment or Bay.
Latebind Mechanism	Provided limitations regarding Late Binding using General Properties.

Updates in Revision Index D

The following table shows the updates made in this User Manual for 800xA 5.1 Rev E.

Updated Section/Sub-section	Description of Update
Section 2 800xA IEC61850 OPC Server	Information added on CET migration for revision releases.



www.abb.com/800xA www.abb.com/controlsystems Copyright© 2015 ABB. All rights reserved.

Power and productivity for a better world[™]

