

COM600 series 5.1 GOOSE Analyzer Operator's Manual



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1. About this manual

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1.3. General information

This manual provides thorough information on COM600 GOOSE Analyzer and the use of GOOSE Analyzer WebHMI.

GOOSE Analyzer can be used for monitoring and tracing real-time substation events, and for analyzing their delivery in terms of GOOSE.

1.4. Document conventions

The following conventions are used for the presentation of material:

- The words in names of screen elements (for example, the title in the title bar of a window, the label for a field of a dialog box) are initially capitalized.
- Capital letters are used for the name of a keyboard key if it is labeled on the keyboard. For example, press the ENTER key.

- Lowercase letters are used for the name of a keyboard key that is not labeled on the keyboard. For example, the space bar, comma key, and so on.
- Press CTRL+C indicates that you must hold down the CTRL key while pressing the C key (to copy a selected object in this case).
- Press ESC E C indicates that you press and release each key in sequence (to copy a selected object in this case).
- The names of push and toggle buttons are boldfaced. For example, click **OK**.
- The names of menus and menu items are boldfaced. For example, the **File** menu.
 - The following convention is used for menu operations: MenuName > Menu-Item > CascadedMenuItem. For example: select File > New > Type.
 - The Start menu name always refers to the Start menu on the Windows taskbar.
- System prompts/messages and user responses/input are shown in the Courier font. For example, if you enter a value out of range, the following message is displayed:

```
Entered value is not valid. The value must be 0 - 30 .
```

• You can be asked to enter the string MIF349 in a field. The string is shown as follows in the procedure:

MIF349

• Variables are shown using lowercase letters:

sequence name

1.5. Use of symbols

This publication includes warning, caution, and information icons that point out safetyrelated conditions or other important information. It also includes tip icons to point out useful information to the reader. The corresponding icons should be interpreted as follows.



The electrical warning icon indicates the presence of a hazard which could result in electrical shock.



The warning icon indicates the presence of a hazard which could result in personal injury.



The caution icon indicates important information or warning related to the concept discussed in the text. It may indicate the presence of a hazard which could result in corruption of software or damage to equipment or property.



The information icon alerts the reader to relevant facts and conditions.



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

1.6. Terminology

The following is a list of terms associated with COM600 that you should be familiar with. The list contains terms that are unique to ABB or have a usage or definition that is different from standard industry usage.

Term	Description
Alarm	An abnormal state of a condition.
Alarms and Events; AE	An OPC service for providing information about alarms and events to OPC clients.
Device	A physical device that behaves as its own communication node in the network, for example, a protection relay.
Event	Change of process data or an OPC internal value. Normally, an event consists of value, quality, and timestamp.
Intelligent Electronic Device	A physical IEC 61850 device that behaves as its own commu- nication node in the IEC 61850 protocol.
OPC	Series of standards specifications aiming at open connectivity in industrial automation and the enterprise systems that support industry.
Property	Named data item.

1.7. Abbreviations

The following is a list of abbreviations associated with COM600 that you should be familiar with.

Abbreviation	Description
APPID	Application Identifier
DCS	Distributed Control System
DOI	Data Object Instance
FCD	Functional Constraint Data
FCDA	Functional Constraint Data Attribute

Abbreviation	Description
GoCB	GOOSE Control Block
GOOSE	Generic Object Oriented Substation Event
WebHMI	Web Human Machine Interface
IEC	International Electrotechnical Commission
IED	Intelligent Electronic Device
NCC	Network Control Center
SCD	Substation Configuration Description
SCL	Substation Configuration Language

1.8. Related documents

Name of the manual	MRS number
COM600 User's Manual	1MRS756125
COM600 Operator's Manual	1MRS756705
COM600 HMI Configuration Manual	1MRS756740

1.9. Document revisions

Document version/date	Product revision	History
A/31.5.2012	4.0	Document created
B/Not released	-	Not released
C/13.3.2015	4.1	Document revised
D/24.5.2017	5.0	Document revised
E/6.3.2018	5.1	Document revised

2. Introduction

2.1. General information about the COM600 series

The COM600 product series are versatile Substation Management Units that help realize smart substation and grid automation solutions in industrial and utility distribution networks.

They get deployed together with protection and control IEDs, substation devices such as RTUs, meters and PLCs in dedicated cabinets and switchgear.

The COM600 product is an all-in-one unit that functions as:

- Communication gateway
- Web Human Machine Interface (WebHMI)
- Automation controller
- Real-time and historical data management unit

The COM600 product series use process information and device data, acquired over Ethernet or serial communication protocol interfaces to execute specific substation functions and applications. Thus, they are critical building blocks to realize substation secondary system solutions and in the process solving diverse customer needs.

2.2.

COM600 product series variants and rationale

To facilitate substation and grid automation solutions in IEC and ANSI market areas, a variant-based system similar to Relion[®] 615 and 620 series is being followed from COM600 5.0 release.

The main reasons for such an approach are the following:

- To ensure all COM600 product series features are advantageously used in end-customer projects in the medium voltage substation automation domain.
- To ensure an optimum feature set to be bundled together to realize specific applications required in IEC and ANSI market areas.
- To ensure a future-proof product approach.

This release then comprises of two variants, based on the primary intent or application are defined as follows:

- COM600S IEC COM600 for substation automation, analysis and data management (for IEC markets)
 - COM600S IEC is a substation automation, analyzer and data management unit that integrates devices, facilitates operations, manages communication and runs analysis applications pertinent to equipment or operations in utility or industrial distribution substations.
- COM600F ANSI COM600 as distribution automation controller (for ANSI markets)

• COM600F is a dedicated distribution automation controller unit that runs distributed grid and feeder applications for ANSI power networks and inherits all core features of the COM600 series.

2.3. Overview of GOOSE Analyzer

The GOOSE Analyzer functionality in COM600 can be used throughout the whole life cycle of the IEC 61850 substation automation system. It supports the commissioning, maintenance and upgrade phases of the IEC 61850 system by means of communication diagnosis enabling features, communication status follow-up and storing of GOOSE events for auditing purposes.

GOOSE Analyzer consists of a server and a WebHMI. The GOOSE Analyzer server includes a real-time analysis engine to diagnose live GOOSE packets (messages) over the connected subnetwork and output GOOSE events and GOOSE diagnostic events to the historical database.

With the GOOSE Analyzer WebHMI, you can view the GOOSE connection diagram with a real-time diagnosis and event list, query historical events, build GOOSE test cases, view reports and plot specific network load trend graphs.

3. Getting started with COM600 GOOSE Analyzer

3.1. Starting COM600 GOOSE Analyzer

GOOSE Connection Viewer is available in the WebHMI page, user can navigate to different views here in the GOOSE Analyzer diagnostics page.

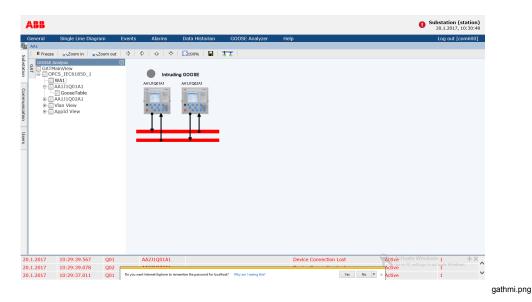


Figure 3.1-1 GOOSE Analyzer tab on COM600 WebHMI menu bar

3.2. Logging in to GOOSE Analyzer

To log in to GOOSE Analyzer:

- 1. Click the GOOSE Analyzer diagnostics Icon in the tool box in GOOSE Analyzer diagnostics WebHMI page.
- 2. Password, user name and IP are automatically filled in, and GOOSE Analyzer diagnostics application should be automatically logged in.

ABB							0	Substation (station) 20.1.2017, 10:37:13
	0 2001		ie. Alarme	GOOSE Ambres Username: Password: 19 Address:	CORE Analysis Iden		GOOSE Analyzer	Lag out [com600]
1.2017	10:29:39.567	Q01	AA2J1Q01A1			Connection Lost	ActiveCtivate Wind	lows 1 + X
.1.2017	10:29:39.078 10:29:37.011	Q02 Q01	AA2J1Q02A1 AA1J1Q01A1			Connection Lost Connection Lost	Active	1

Figure 3.2-1 Logging in to GOOSE Analyzer

3.3. Logging out from GOOSE Analyzer

To log out from GOOSE Analyzer:

- 1. Move the cursor to the top of the screen to show the title bar. The title bar is displayed (see Figure 3.3-1).
- 2. Click **x** or **Logout** on the title bar to exit GOOSE Analyzer.

Locout	About	Help	
Logour	noout	1 July	

GOOSELogout.jpg

Figure 3.3-1 Title bar

3.4. General overview of GOOSE Analyzer WebHMI

3.4.1. GOOSE Analyzer WebHMI

When logging in, you are prompted to the main screen of the WebHMI (see Figure 3.3-1).

The user interface consists of:

- Title bar
- Menu bar
- Content page

3.4.2. Title bar

By default, the title bar is hidden in the main screen. To show the title bar, move the cursor to the top of the screen (see Figure 3.3-1 and Figure 3.3-1).

- To exit GOOSE Analyzer, click **%** or **Logout** on the title bar.
- To access general information about GOOSE Analyzer, click About on the title bar.
- To open the GOOSE Analyzer help document, click Help on the title bar.

3.4.3. Menu bar

On the menu bar, you can see GOOSE Analyzer functionalities (see Figure 3.3-1):

- **GOOSE Connection Viewer** shows GOOSE connection views on the content page.
- **Historical Events** provides means to query historical events.
- **GOOSE Tester Manager** provides means to manage GOOSE test cases and view test reports.
- **Network Statistic** shows historical network statistic trends.

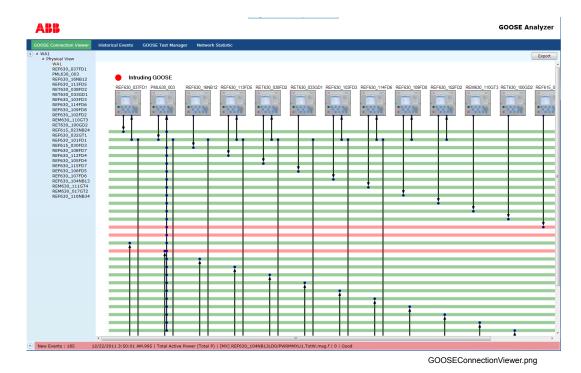
3.4.4. Content page

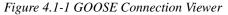
The content page is the center of the WebHMI screen for displaying information. It is located below the menu bar (see Figure 3.3-1).

4. GOOSE Connection Viewer

4.1. Using GOOSE Connection Viewer

GOOSE Connection Viewer presents graphical views of GOOSE signal flow from publishers to subscribers on the content page. The real-time diagnosis of the GOOSE signal flow dynamically controls the display of the graphical views.





To open the connection viewer, click on GOOSE Connection Viewer on the menu bar.

The viewer is split into two panels, the left panel is a navigation tree and the right panel shows the corresponding connection diagram (see Figure 4.1-1).

You can use the navigation tree to view the selected GOOSE connection diagram. The tree consists of different nodes for various GOOSE connection diagrams. The navigation tree provides a Physical View that groups the natural initial publishing/subscription diagrams from the system configurations. The Physical View consists of the subnetwork level, IED level and VLAN level views.

To expand/collapse the navigation tree, click the \mathbb{N} / \mathbb{A} arrow.

4.2. Viewing subnetworks

4.2.1. Viewing subnetwork level connections

To see GOOSE connections for a chosen subnetwork, select the name of the subnetwork in the navigation tree.

In Figure 4.1-1, each GOOSE publisher connects to a horizontal bar (later referred to as GOOSE bus) with an outward arrow exclusively, representing the publishing of all signals despite its internal GOOSE configuration.

In Figure 4.1-1, each GOOSE subscriber connects to several existing GOOSE buses with an inward arrow, representing different subscriptions to other IEDs. Dots are used on the inward connecting lines to IEDs for the notation of multiple subscriptions.

4.2.2. Highlighting GOOSE connection

To quickly position connection relationships within a large system, click each GOOSE bus to view the data flow from a single publisher to one or multiple subscribers in different

colors (see Figure 4.2.2-1). The publishing IED is differentiated from the subscribing IEDs by coloring.

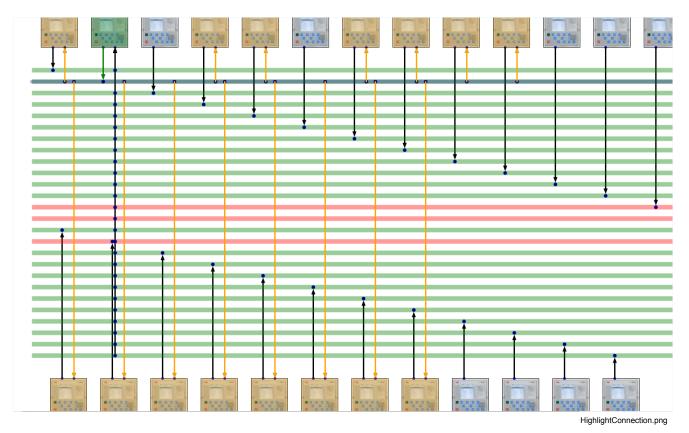


Figure 4.2.2-1 Highlighting GOOSE connection

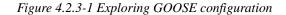
4.2.3. Exploring GOOSE configuration

To explore the sets of GOOSE signals associated with GOOSE control blocks, doubleclick the selected GOOSE bus (see Figure 4.2.3-1).

Each set is grouped according to the DatSet configuration of a GOOSE control block.

PML630_003LD0/LLN0.GCB_ShdLoad1	Ref	Value
	[ST] PML630_003LS_1/LSPTRC1.Tr.general	False
PML630_003LD0/LLN0.GCB_ShdLoad3 PML630_003LD0/LLN0.GCB_ShdLoad4	[ST] PML630_003LS_1/LSPTRC1.Tr.q	Invalid
PML630_003LD0/LLN0.GCB_ShdLoad5	[ST] PML630_003LS_2/LSPTRC1.Tr.general	False
PML630_003LD0/LLN0.GCB_ShdLoad6	[ST] PML630_003LS_2/LSPTRC1.Tr.q	Invalid
	[ST] PML630_003LS_3/LSPTRC1.Tr.general	False
	[ST] PML630_003LS_3/LSPTRC1.Tr.q	Invalid
	[ST] PML630_003LS_4/LSPTRC1.Tr.general	False
	[ST] PML630_003LS_4/LSPTRC1.Tr.q	Good

ExploringGOOSEconfiguration.png



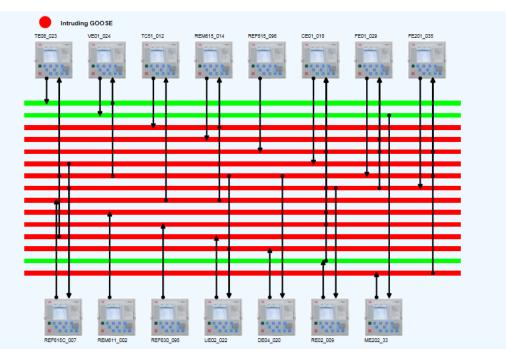
4.2.4. Monitoring GOOSE bus status

You can analyze the GOOSE bus status and mark it with different colors using GOOSE Analyzer (see Figure 4.2.4-1).

GOOSE bus has four possible statuses:

- **Normal**: transmission of GOOSE packets is according to its configuration and thus treated as normal (marked with green).
- **Partial timeout**: partial unavailability of intended GOOSE messages, which means that the subscriber might not be able to receive all GOOSE messages in a defined time interval. A GOOSE receiving error might be reported by the subscribing IEDs.
- All timeout: unavailability of intended GOOSE messages, which means that the subscriber might not be able to receive all GOOSE messages in a defined time interval. A GOOSE receiving error might be reported by the subscribing IEDs.
- **Unknown**: unknown status, which might mean problems have been found with GOOSE Analyzer in COM600.

For a more detailed explanation of GOOSE bus statuses, see 9.3.2, GOOSE bus analyzer.



GOOSE_Bus_Diagnosis.png

Figure 4.2.4-1 Monitoring GOOSE bus status

4.2.5. Monitoring subnetwork status

GOOSE Analyzer monitors intruding GOOSE conflicts (see Figure 4.2.4-1).

For a more detailed explanation of the statuses, see 9.2.1, Subnetwork analyzer group.

4.3. Viewing GOOSE connections

4.3.1. Viewing IED level connections

To view GOOSE connections for a selected IED, select the IED name in the navigation tree (see Figure 4.3.1-1).

ABB		· ·	GOOSE Analyzer
	OOSE Test Manage Network Statistic PET 153, 039F02 PULSED, 039F PULSED, 039F PULSE	RETERIO_038FF02.DOILLN0.geb_A Flow Status Destination Mac Address VLAN MISS VLAN ND VLAN Priority APPID DatSet Reference Confikev Simulation Needs Commission DatSet Structure Disorder	COOSE Analyzer
New Events : 105 12/23/2011 5:43:16 AM.3	43 Switch, general [ST] REF630_103FD3LD	D0/GNRLCSWI1.Pos Questionable	GOOSEDetail.png

Figure 4.3.1-1 IED level GOOSE connection view

As shown in Figure 4.3.1-1, the selected IED is positioned in the middle. The arrows on the left side of the selected IED indicate the subscribed GOOSE signals from other publishers, and the arrows on the right side indicate its published GOOSE signals to be subscribed by other IEDs.

To explore the subscribed GOOSE signals, click the connection line from the source IED to the destination (see Figure 4.3.1-1).

4.3.2. Monitoring GOOSE control block status

GOOSE Analyzer can monitor the transmission of specific GOOSE messages for each GOOSE control block within a selected IED (see Figure 4.3.1-1).

For a more detailed explanation, see 9.4.1, GOOSE control block analyzer group.

4.4. Viewing VLAN level connections

The VLAN level view of GOOSE connections is shown according to the actual configurations in the substation automation system.

4.5. Exporting views

To export the GOOSE connection views and GOOSE configurations into external html files, click **Export**.

Exported information contains a subnetwork level view (see Figure 4.5-1), an IED level view (see Figure 4.5-2), and a detailed view of GOOSE configuration (see Figure 4.5-3).

To navigate to different views, click the IED name in the first column.

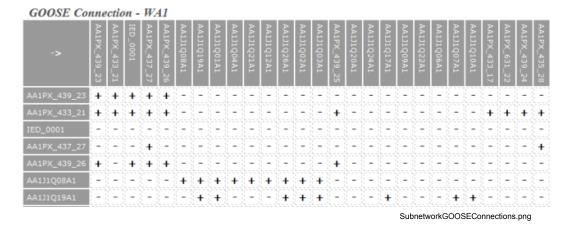


Figure 4.5-1 Subnetwork level view of GOOSE connections

	AA1PX_439_23	AA1PX_433_21	IED_0001	AA1PX_437_27	AA1PX_439_26	AA1J1Q08A1	AA1J1Q19A1	AA1J1Q01A1	AA1J1Q04A1	AA1J1Q21A1		AA1J1Q26A1	AA1J1Q02A1	AA1J1Q03A1	AA1PX_439_25	AA1J1Q20A1	AA1J1Q24A1	AA1J1Q17A1	AA1J1Q09A1	AA1J1QZZA1	AA1J1Q06A1	AA1J1Q07A1	AA1J1Q10A1	AA1PX_433_17	AA1PX_631_22	AA1PX_439_24
AA1J1Q04A1LD0/LLN0.gcbProt																										
	-	-	- 6	- 6	-	-	- 1	- 1	-	-	-	- 1	-	-	- 1	- 1	-	-	-	- 1	-	-	-	- 1	-	-

IEDLevelGOOSEConnections.png

Figure 4.5-2 IED level view of GOOSE connections

AA1J1Q04A1LD0/LLN0.gcbProt

GoCBName	gcbProt
GoCBRef	AA1J1Q04A1LD0/LLN0.gcbProt
AppID	AA1J1Q04A1LD0/LLN0.gcbProt
DataSet	AA1J1Q04A1LD0/LLN0.HorizProt
Min Time(ms)	4
Max Time(ms)	10000
Mac Address	01-0C-CD-01-00-00
APPID	3004
VLAN ID	001
VLAN Priority	4

GOOSEConfigurationDetailedView.png

Figure 4.5-3 Detailed view of GOOSE configuration

5. Monitoring of events

5.1. Monitoring events

GOOSE provides fast and reliable system-wide distribution of substation events over the switched networks. GOOSE Analyzer enables you to monitor these substation events transmitted over the subnetwork.

GOOSE Analyzer monitors the transmission reliability of GOOSE messages and provides you with diagnostic events to verify the health of GOOSE with comparison to its configuration.

GOOSE Analyzer provides a continuous list view of real-time events, and you can query the historical database for information.

5.2. Viewing real-time event list

You can check the real-time event list on the status bar at the bottom of the GOOSE Connection Viewer screen.

New Events : 91 12/22/2011 5:48:49 AM.348 | Switch, general | [ST] REF630_104NB13LD0/GNRLCSWI1.Pos | Good

RealtimeEventIndicationBar.png

Figure 5.2-1 Real-time event indication bar

To expand the real-time event indication bar, click the \bigcirc arrow (see Figure 5.2-2). The list view is displayed.

Events are grouped into two categories, GOOSE events and GOOSE diagnosis events.

Each GOOSE event record has the following properties:

- Arrival Time: date and time of received events in the UTC format
- Object Text: descriptive text for data
- Reference: reference of data attribute
- Event: specific event of reference transmitted by the GOOSE message
- Quality: attribute q of Data Object Instance (DOI)
- Timestamp: attribute t of DOI
- Subnetwork: subnetwork name
- IED: IED name
- GOOSE Control Block: reference of GOOSE control block
- StNum: GOOSE state number
- SqNum: GOOSE sequence number

ABB								GOO	SE Analy
OOSE Connection Viewer	Historical Events G	OOSE Test Manager Network Statistic							
 WA1 Physical View WA1 REF630_03751 REF630_03751 REF630_03751 REF630_160812 REF630_038501 REF630_103F03 REF630_102F03 REF630_102F03 REF630_102F03 REF630_102F03 REF630_102F03 REF630_102F03 REF630_023G11 REF630_021G11 REF630_010FD1 REF6	EEF630_037FD1	ng GOOSE PMIS30_007 REF630_104912 REF630_113FD5	RET630_038FD2 RET63	00_033GD1 REF630	0_103F03 REF630_114F1	06 REF630_109FD	8 REF630_102FD2 REM630_1100	T3 RET63	0_100GD2 REF
REF630_112FD4 OSE Events GOOSE Diagn	osis Events		m						
Filter								1	
Arrival Time 2/22/2011 5:51:48 AM.328	Object Text Switch, general	Reference [ST] REF630_16NB12LD0/GNRLCSWI1.Pos.stVal	Event off_or_false	Quality Tim Good	vestamp Subnetwork WA1	IED	GOOSE Control Block REF630_16NB12LD0/LLN0.gcb_A	StNum 517845	SqNum 0
/22/2011 5:51:48 AM.198	Switch, general	[ST] REF630_16NB12LD0/GNRLCSWI1.Pos.stVal	intermediate_state	Good	WAI	-			0
/ EC/2011 3.31.40 AM.190	Switch, general								
/22/2011 5-51-47 AM 288	Switch general	[ST] REE620_16NR12LD0/GNRLCSWI1 Ros etVal	intermediate, state			REF630_16NB12	REF630_16NB12LD0/LLN0.gcb_A		
2/22/2011 5:51:47 AM.288	Switch, general	[ST] REF630_16NB12LD0/GNRLCSWI1.Pos.stVal	intermediate_state	Good	WA1	REF630_16NB12	REF630_16NB12LD0/LLN0.gcb_A	517842	0
2/22/2011 5:51:47 AM.410	Trip	[ST] REM630_017GT2LD0/TRPPTRC1.Tr.general	false	Good Good	WA1 WA1	REF630_16NB12 REM630_017GT2	REF630_16NB12LD0/LLN0.gcb_A REM630_017GT2LD0/LLN0.gcb_A	517842 332516	0
2/22/2011 5:51:47 AM.410	Trip Switch, general	[ST] REM630_017GT2LD0/TRPPTRC1.Tr.general [ST] REF630_16NB12LD0/GNRLCSWI1.Pos.stVal	false on_or_true	Good Good Good	WA1 WA1 WA1	REF630_16NB12 REM630_017GT2 REF630_16NB12	REF630_16NB12LD0/LLN0.gcb_A REM630_017GT2LD0/LLN0.gcb_A REF630_16NB12LD0/LLN0.gcb_A	517842 332516 517843	0 0 0
1/22/2011 5:51:47 AM.410 1/22/2011 5:51:47 AM.428 1/22/2011 5:51:46 AM.229	Trip Switch, general Switch, general	[ST] REM630_017GT2LD0/TRPPTRC1.Tr.general [ST] REF630_16NB12LD0/GNRLCSW1.Pos.stVal [ST] REF630_16NB12LD0/GNRLCSW11.Pos.stVal	false on_or_true off_or_false	Good Good Good Good	WA1 WA1 WA1 WA1	REF630_16NB12 REM630_017GT2 REF630_16NB12 REF630_16NB12	REF630_16NB12LD0/LLN0.gcb_A REM630_017GT2LD0/LLN0.gcb_A REF630_16NB12LD0/LLN0.gcb_A REF630_16NB12LD0/LLN0.gcb_A	517842 332516 517843 517841	0
1/22/2011 5:51:47 AM.410 1/22/2011 5:51:47 AM.428 1/22/2011 5:51:46 AM.229 2/22/2011 5:51:46 AM.88	Trip Switch, general Switch, general Switch, general	[ST] REMG30_017GT2LD0/TRPPTRC1.Tr.general [ST] REMG30_16NB12LD0/GNRLCSW11.Pos.stVal [ST] REFG30_16NB12LD0/GNRLCSW11.Pos.stVal [ST] REFG30_16NB12LD0/GNRLCSW11.Pos.stVal	false on_or_true off_or_false intermediate_state	Good Good Good Good	WA1 WA1 WA1 WA1	REF630_16NB12 REF630_017GT2 REF630_16NB12 REF630_16NB12 REF630_16NB12	REF630_16NB12LD0/LLN0.9cb_A REM630_017GT2LD0/LLN0.9cb_A REF630_16NB12LD0/LLN0.9cb_A REF630_16NB12LD0/LLN0.9cb_A REF630_16NB12LD0/LLN0.9cb_A	517842 332516 517843 517841 517840	0 0 0
//22/2011 5:51:47 AM.410 //22/2011 5:51:47 AM.428 //22/2011 5:51:46 AM.229 2/22/2011 5:51:46 AM.88 //22/2011 5:51:45 AM.790	Trip Switch, general Switch, general Switch, general Switch, general	[ST] REM630_017GT2LD0/TRPPTRC1.Tr.general [ST] REF630_16NB12LD0/GNRLCSWI1.Pos.stVal [ST] REF630_16NB12LD0/GNRLCSWI1.Pos.stVal [ST] REF630_16NB12LD0/GNRLCSWI1.Pos.stVal [ST] REF630_103FD3LD0/GNRLCSWI1.Pos.stVal	false on_or_true off_or_false intermediate_state on_or_true	Good Good Good Good Good Good	WA1 WA1 WA1 WA1 WA1	REF630_16NB12 REM630_017GT2 REF630_16NB12 REF630_16NB12 REF630_16NB12 REF630_103FD3	REF630_16NB12LD0/LLN0.gcb_A REM630_017GT2LD0/LLN0.gcb_A REF630_16NB12LD0/LLN0.gcb_A REF630_16NB12LD0/LLN0.gcb_A REF630_16NB12LD0/LLN0.gcb_A REF630_103FD3LD0/LLN0.gcb_A	517842 332516 517843 517841 517840 203490	0 0 0 0
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//2/2011 5:51:47 AM.410 //22/2011 5:51:47 AM.428 //22/2011 5:51:46 AM.229 2/22/2011 5:51:46 AM.88 //22/2011 5:51:45 AM.790 //22/2011 5:51:45 AM.789 //22/2011 5:51:45 AM.785	Trip Switch, general Switch, general Switch, general Switch, general Total Active Power (Total P) Total Active Power (Total P)	[51] REM300_017GT2LD0/TRPTRC1.7r.general [51] RES00_164012LD0/04RLCSWIT.Pos.stVal [51] RES00_164012LD0/04RLCSWIT.Pos.stVal [51] RES00_164012LD0/04RLCSWIT.Pos.stVal [51] RES00_164012LD0/04RLCSWIT.Pos.stVal [51] RES00_164012LD0/04RLCSWIT.Pos.stVal [51] RES00_164012LD0/04RLCSWIT.Pos.stVal [52] RES00_164012LD0/04RLCSWIT.Pos.stVal [52] RES00_164012LD0/04RLCSWIT.Pos.stVal [53] RES00_164012LD0/04RLCSWIT.Pos.stVal [54] RES00_164012LD0/04RLCSWIT.Pos.stVal [55] RES00_164012LD0/04RLCSWIT.Pos.st	false on_or_true off_or_false intermediate_state on_or_true 100 100	Good Good Good Good Good Good Good	WA1 WA1 WA1 WA1 WA1 WA1 WA1	REF630_16NB12 REF630_017GT2 REF630_16NB12 REF630_16NB12 REF630_16NB12 REF630_103FD3 REF630_102FD2 REF630_101FD1	REF630_16NB12LD0/LLN0.gcb_A REF630_16NB12LD0/LLN0.gcb_A REF630_16NB12LD0/LLN0.gcb_A REF630_16NB12LD0/LLN0.gcb_A REF630_105D12D0/LLN0.gcb_A REF630_1037D12D0/LLN0.gcb_A REF630_1027D2LD0/LLN0.gcb_A	517842 332516 517843 517841 517840 203490 203492 203492	
/22/2011 5:51:47 AM.410 /22/2011 5:51:47 AM.428 /22/2011 5:51:46 AM.229 2/22/2011 5:51:46 AM.88 /22/2011 5:51:45 AM.780 /22/2011 5:51:45 AM.789 /22/2011 5:51:45 AM.782	Trip Switch, general Switch, general Switch, general Switch, general Total Active Power (Total P) Total Active Power (Total P) Switch, general	[51] REMG30_017GTLDQ/TRPTRC1,Tr.general [51] REFG30_16NB312DQ/GMLCSWII.Pos.stVal [51] REFG30_16NB312DQ/GMLCSWII.Pos.stVal [51] REFG30_16NB312DQ/GMLCSWII.Pos.stVal [51] REFG30_1037D31DQ/GMLCSWII.Pos.stVal [64] REFG30_1037D31DQ/GMLCSWII.Pos.stVal [64] REFG30_1017D1DQ/GMLCSWII.TeXm.map.f [51] REFG30_1017D1DQ/GMLCSWII.TeXm.map.f	false on_or_true off_or_false intermediate_state on_or_true 100	Good Good Good Good Good Good Good Good	WA1 WA1 WA1 WA1 WA1 WA1 WA1 WA1	REF630_16NB12 REF630_16NB12 REF630_16NB12 REF630_16NB12 REF630_16NB12 REF630_103FD3 REF630_103FD3 REF630_101FD1 REF630_101FD1	REF630_16NB12LD0/LLN0.gb_A REF630_1017GT2LD0/LLN0.gb_A REF630_16NB12LD0/LLN0.gb_A REF630_16NB12LD0/LLN0.gb_A REF630_1012LD0/LLN0.gb_A REF630_103FD2LD0/LLN0.gb_A REF630_103FD2LD0/LLN0.gb_A REF630_101FD1LD0/LLN0.gb_A	517842 332516 517843 517840 203490 203492 203492 203492 203490	
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222/2011 5:51:47 AM.410 y22/2011 5:51:47 AM.428 y22/2011 5:51:46 AM.229 y22/2011 5:51:46 AM.88 y22/2011 5:51:45 AM.789 y22/2011 5:51:45 AM.785 y22/2011 5:51:45 AM.782 y22/2011 5:51:45 AM.782	Trip Switch, general Switch, general Switch, general Switch, general Total Active Power (Total P) Switch, general Switch, general	[ST] REM630_017GT2LD0/TRPTRC1.Tr.general [ST] REF630_16NB3LD0/GNRLCSW11.Pos.stVal [ST] REF500_16NB3LD0/GNRLCSW11.Pos.stVal [ST] REF50_1612D0/GNRLCSW11.Pos.stVal [ST] REF50_1012D0/GNRLCSW11.Pos.stVal [ST] REF50_1012D0/D0/GNRLCSW11.Pos.stVal [ST] REF50_1012D0/D0/GNRLCSW11.Pos.stVal [ST] REF50_1012D0/D0/GNRLCSW11.Pos	false on_or_true off_or_false intermediate_state on_or_true 100 100	Good Good Good Good Good Good Good Questionable	WA1 WA1 WA1 WA1 WA1 WA1 WA1 WA1 WA1	REF630_16NB12 REF630_16NB12 REF630_16NB12 REF630_16NB12 REF630_16NB12 REF630_103FD3 REF630_102FD2 REF630_101FD1 REF630_101FD1 REF630_104NB13	REF630IM812LD0/LIN0.gbb_A REF630_017G72LD0/LIN0.gbb_A REF630_018912LD0/LIN0.gbb_A REF630_018912LD0/LIN0.gbb_A REF630_018912LD0/LIN0.gbb_A REF630_01075DLD0/LIN0.gbb_A REF630_01075DLD0/LIN0.gbb_A REF630_01075DLD0/LIN0.gbb_A	517842 332516 517843 517840 203490 203492 203492 203492 203491 203491 203494	

RealtimeEvents.png

Figure 5.2-2 Real-time event list – GOOSE Events

Each GOOSE diagnosis event record has the following properties:

- Detected Time: date and time of a diagnostic event
- Subnetwork: subnetwork name
- IED: IED name
- GOOSE Control Block: GOOSE control block reference
- Object Text: descriptive text for the event
- Event: diagnostic event

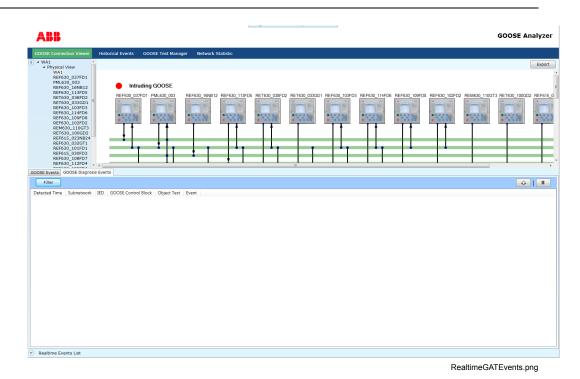


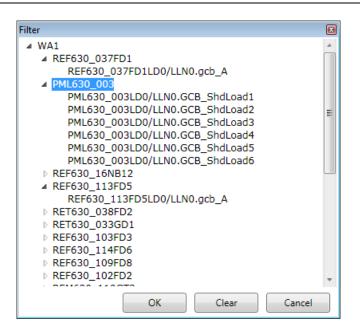
Figure 5.2-3 Real-time event list – GOOSE Diagnosis Events

To configure the filter of the displayed list:

1. Click Filter.

The Filter configuration dialog (see Figure 5.2-4) appears.

- 2. Select the specific branch to view.
- 3. Click **OK**, or click **Cancel** to cancel filtering.



RealtimeEventListFilter.png

Figure 5.2-4 Real-time event list filter

To freeze/unfreeze the display of the event list, click or respectively (see Figure 5.2-2).

5.3. Using Historical Events

To view historical events, click on **Historical Events** on the menu bar. A new dialog box opens displaying all historical events (see Figure 5.3-1).

Number of the second	ABB				-	-						GO	OSE Ar	nalyz
Submetwork: IED: Gold: IED: Rest: IED: IED: Rest:	GOOSE Connection V	iewer Histo	rical Events G	DOSE Test Manager Net	work Statistic									
DateTime: 1222/2011 6 (s) 1 1222/2011 6 (s) 1 Arrival Time Object Text Reference Event Quality Timestamp Subnetwork RED GOODSE Control Block SNUm Solventwork 1222/2011 22:65:2 Mirking Object Text Reference Event Quality Timestamp Subnetwork REF GOODSE Control Block SNUm Solventwork Arrival Time Object Text Reference Event Quality Timestamp Subnetwork REF GOODSE Control Block 44339 0 12/22/2011 23:63:2 Arrival Time Office Taxt Ref Good Walit REF30_100021DULN0,dp.A 44339 0 12/22/2011 SaidsArAGO Switch, general IST REF30_10002DDUCMRECSWILPsext Questromable Walit REF30_1014DULN0,dp.A 4935 0 12/22/2011 SaidsArAGO Switch, general IST REF30_10000RRECSWILPsext Questromable Walit REF30_1014DULN0,dp.A 4935 0 12/22/2011 SaidsArAGO <th>OOSE Events GOOSE</th> <th>Diagnostic Event</th> <th></th>	OOSE Events GOOSE	Diagnostic Event												
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Arrival Time Object Text Reference Event Quality Timestam Subnetwork IED GOOSE Control Block SNM April 1/22/2011 2:36:32 AM.50 Switch, general [ST] REFSD_LONBILID/OKMLCSWII.Pos.stVal intermediate_state Good Wal REF3D_LONBILID REF3D_LONBILID/OLIND.qb,A 44935 0 1/22/2011 2:36:32 AM.60 Switch, general [ST] REF3D_LONBOLD/OKMLCSWII.Pos.stVal ort_ort_two Good Wal REF3D_LONBOLD REF3D_LONBOLD/OLIND.qb,A 44935 0 1/22/2011 2:36:33 AM.60 Switch, general [ST] REF3D_LONDOLD/OKMLCSWII.Pos.stVal ort_ort_two Good Wal REF3D_LONDOLD/OLIND.qb,A 49534 0 1/22/2011 2:36:33 AM.60 Switch, general [ST] REF3D_LONDOLD/OKMLCSWII.Pos Quaetrionable Wal REF3D_LONDOLD/OLIND.qb,A 19534 0 1/22/2011 2:36:33 AM.60 Switch, general [ST] REF3D_LONDOLD/OKMRCSWII.Pos Quaetrionable Wal REF3D_LONDOL REF3D_LONDOLD/OLIND.qb,A 19534 0 1/22/2011 2:36:33 AM.60 Switch, general [ST] REF3D_LONDOLD/OKMRCSWII.Pos Quaetrionable </td <td>DateTime :</td> <td>12/21/2011 15</td> <td>6:5:3-</td> <td>12/22/2011 15 6 : 5 : 3</td> <td></td>	DateTime :	12/21/2011 15	6:5:3-	12/22/2011 15 6 : 5 : 3										
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Lipzzyzoli 1:2:36:33 AM.69 Total Active Power (Total P) MKI RETESD_1000D2/LDRUMO,dp.A MKI RETESD_1000D2/LDRUMO,dp.A MESS MAIL RETESD_1000D2/LDRUMO,dp.A Mess Mess 1/22/2011 2:36:33 AM.610 Switch, general [ST] REF63D_101FD1LDQ/GWRLCSWII.Pos.tKW On_or_true Good WAI REF63D_101FD1LDQ/LIN0,dp.A 1963 0 1/22/2011 2:36:33 AM.612 Switch, general [ST] REF63D_101FD1LDQ/GWRLCSWII.Pos.tKW On_or_true Good WAI REF63D_101FD1LDQ/LIN0,dp.A 1963 0 1/22/2011 2:36:33 AM.614 Switch, general [ST] REF63D_102FD2LDQ/GWRLCSWII.Pos.tKW On_or_true Good WAI REF63D_101FD1LDQ/LIN0,dp.A 1963 0 1/22/2011 2:36:33 AM.614 Switch, general [ST] REF63D_102FD2LDQ/GWRLCSWII.Pos.tKW On_or_true Good WAI REF63D_102FD2LDQ/LIN0,dp.A 1963 0 1/2/22/2011 2:36:33 AM.614 Switch, general [ST] REF63D_102FD2LDQ/GWRLCSWII.Pos Questionable WAI REF63D_103FD3LDQ/LIN0,dp.A 1963 0 1/2/22/2011 2:36:33 AM.624 Switch, general [ST] REF63D_105FD3LDQ/GWRLCSWII.Pos Questionable WAI REF63D_104FD	12/22/2011 2:36:33 AM	4.605 Sw	itch, general	[ST] RET630_100GD2LD0/G	NRLCSWI1.Pos.stVal	on_or_true	Good		WA1	RET630_100GD2	RET630_100GD2LD0/LLN0.gcb_A	196347	0	
Name Control C	12/22/2011 2:36:33 AM	4.607 Sw	itch, general	[ST] RET630_100GD2LD0/G	NRLCSWI1.Pos		Questionable		WA1	RET630_100GD2	RET630_100GD2LD0/LLN0.gcb_A	196348	0	
NUMPORT Sends Sends Sends Number REF630_1017D11D0(UNR,UNG,pcb,A 100 Good Number REF630_1017D11D0(UNR,UNG,pcb,A 100 Sends Number REF630_1017D11D0(UNR,UNR,pcb,A 100 Sends Number REF630_1017D11D0(UNR,pcb,A 100 Sends Number REF630_1017D11D0(UNR,pcb,A 100 Sends Number Sends Number Sends	12/22/2011 2:36:33 AM	4.609 Total Act	ive Power (Total P)	[MX] RET630_100GD2LD0/P	WRMMXU1.TotW.mag.f	100	Good		WA1	RET630_100GD2	RET630_100GD2LD0/LLN0.gcb_A	196349	0	
12/22/2011 2:36:33 AM.631 Total Active Power (Total P) [MX] REF630_1017D1L00/WRMMUULTOW.mapf 100 Good WA1 REF630_1017D1 REF630_1017D1L00/LN0.qb.A 1965:0 0 12/22/2011 2:36:33 AM.631 Total Active Power (Total P) [MX] REF630_1027D2LD0/UN0.qb.A 1965:0 0 12/22/2011 2:36:33 AM.614 Switch, general [ST] REF630_1027D2LD0/UN0.qb.A 1965:0 0 12/22/2011 2:36:33 AM.615 Switch, general [ST] REF630_1037D2LD0/UN0.qb.A 1965:0 0 12/22/2011 2:36:33 AM.622 Switch, general [ST] REF630_1037D2LD0/UN0.qb.A 1965:0 0 12/22/2011 2:36:33 AM.622 Switch, general [ST] REF630_1037D2LD0/UN0.qb.A 1965:0 0 12/22/2011 2:36:33 AM.622 Switch, general [ST] REF630_1037D2LD0/UN0.qb.A 1965:0 0 12/22/2011 2:36:33 AM.622 Switch, general [ST] REF630_1037D2LD0/UNRLCSWI1.Pos Questionable WA1 REF630_1037D3 REF630_1037D3LD0/UN0.qb.A 1965:0 0 12/22/2011 2:36:33 AM.622 Switch, general [ST] REF630_10481LD0/UN0.qb.A 1965:0 0 0 0 0 0 0 0 0 <td>12/22/2011 2:36:33 AM</td> <td>4.610 Sw</td> <td>itch, general</td> <td>[ST] REF630_101FD1LD0/Gf</td> <td>NRLCSWI1.Pos.stVal</td> <td>on_or_true</td> <td>Good</td> <td></td> <td>WA1</td> <td>REF630_101FD1</td> <td>REF630_101FD1LD0/LLN0.gcb_A</td> <td>196518</td> <td>0</td> <td></td>	12/22/2011 2:36:33 AM	4.610 Sw	itch, general	[ST] REF630_101FD1LD0/Gf	NRLCSWI1.Pos.stVal	on_or_true	Good		WA1	REF630_101FD1	REF630_101FD1LD0/LLN0.gcb_A	196518	0	
V2/22/011 2:36:33 AM.61 Switch, general [ST] REF630_1027D2LD0/GNRLCSWI1.Pos.stWal on_ortrue Good WA1 REF630_1037D2 REF630_1037D2LD0/LIN0.gb, A 196518 0 2/22/2011 2:36:33 AM.615 Switch, general [ST] REF630_1037D2LD0/GNRLCSWI1.Pos.stWal 00 Good WA1 REF630_1037D2 REF630_1037D2LD0/LIN0.gb, A 196518 0 2/22/2011 2:36:33 AM.615 Switch, general [ST] REF630_1037D2LD0/GNRLCSWI1.Pos.stWal 0.0 Good WA1 REF630_1037D2 REF630_1037D2LD0/LIN0.gb, A 195518 0 2/22/2011 2:36:33 AM.622 Switch, general [ST] REF630_1037D3LD0/GNRLCSWI1.Pos.stWal 0.0 Good WA1 REF630_1037D3LD0/LIN0.gb, A 195518 0 2/22/2011 2:36:33 AM.622 Switch, general [ST] REF630_1037D3LD0/GNRLCSWI1.Pos.stWal 0.0 Good WA1 REF630_1047D3 REF630_1047D3 195520 0 2/22/2011 2:36:33 AM.622 Switch, general [ST] REF630_1047RE50_10481D3/GNRLCSWI1.Pos Questionable WA1 REF630_1047B1 195520 0 1 2/22/2011 2:36:33 AM.622 Switch, general [ST] REF6	12/22/2011 2:36:33 AM	4.612 Sw	itch, general	[ST] REF630_101FD1LD0/GF	NRLCSWI1.Pos		Questionable		WA1	REF630_101FD1	REF630_101FD1LD0/LLN0.gcb_A	196519	0	
Number Number<	12/22/2011 2:36:33 AM	4.613 Total Act	ive Power (Total P)	[MX] REF630_101FD1LD0/P	WRMMXU1.TotW.mag.f	100	Good		WA1	REF630_101FD1	REF630_101FD1LD0/LLN0.gcb_A	196520	0	
102/22/2011 2:36:33 AM.62 Switch, general [ST] REF630_1037D1LD0/UNRLSWILPs.ut/w 0:0 Good WA1 REF630_1037D3 REF630_1037D1LD0/LIN0.gb, A 1955 0 12/22/2011 2:36:33 AM.62 Switch, general [ST] REF630_1037D1LD0/UNRLSWILPs.ut/w Questionable WA1 REF630_1037D3 REF630_1037D3LD0/LIN0.gb, A 1955 0 12/22/2011 2:36:33 AM.62 Switch, general [ST] REF630_1037D3LD0/UNRLSWILPs.ut/w Questionable WA1 REF630_1037D3 REF630_1047D3LD0/LIN0.gb, A 1955 0 12/22/2011 2:36:33 AM.624 Total Advive Power (Total P) [VK1 REF630_1047B13LD0/UNRLSWILPs.ut/w Questionable WA1 REF630_1047B13 REF630_1048L3LD0/UNR.gb, A 19552 0 12/22/2011 2:36:33 AM.624 Total Advive Power (Total P) [VK1 REF630_1048B13LD0/UNRLSWILPs.ut/w On_or_Tuw Good WA1 REF630_1048B13LD0/UNR.gb, A 19552 0 12/22/2011 2:36:33 AM.624 Total Advive Power (Total P) [VK1 REF630_1048B13LD0/UNRLSWILPs.ut/w On_or_Tuw Good WA1 REF630_1048B13LD0/UNR.gb, A 19552 0 12/22/2011 2:36:33 AM.624 Total Advive Power (Total P)	12/22/2011 2:36:33 AM	4.614 Sw	itch, general	[ST] REF630_102FD2LD0/GF	NRLCSWI1.Pos.stVal	on_or_true	Good		WA1	REF630_102FD2	REF630_102FD2LD0/LLN0.gcb_A	196518	0	
X/2/2/2011 2:36:13 AM.621 Switch, general [ST] REF630_1037D1LD0/GWLCSWI1.Pos.st/val on_or_true Good WA1 REF630_1037D1LD0/LLN0.qbc,A 1951 0 2/22/2011 2:36:13 AM.622 Switch, general [ST] REF630_1037D1LD0/GWLCSWI1.Pos.st/val Questionable WA1 REF630_1037D1 REF630_1037D1LD0/LLN0.qbc,A 1951 0 2/22/2011 2:36:13 AM.624 Total Addive Power (Total P) [MT] REF630_1037D1LD0/GWLCSWI1.Pos.st/val 0_0 of the Good WA1 REF630_1049D1 REF630_1049D1LN0.qbc,A 1950 0 2/22/2011 2:36:13 AM.624 Total Addive Power (Total P) [ST] REF630_1049B1LD0/GWLCSWI1.Pos.st/val on_or_true Good WA1 REF630_1049B1L REF630_104B1LD0/LLN0.qbc,A 1950 0 2/22/2011 2:36:33 AM.624 Total Addive Power (Total P) [ST] REF630_104B1LD0/GWLCSWI1.Pos.st/val on_or_true Good WA1 REF630_104B1L D0/LLN0.qbc,A 1952 0 2/22/2011 2:36:33 AM.624 Total Advive Power (Total P) [ST] REF630_104B1LD0/GWLCSWI1.Pos.st/val ne_r_true Good WA1 REF630_104B12 D0/LLN0.qbc,A 49362 0 2/22/2011 2:36:33 AM.624 Switch, general [ST	12/22/2011 2:36:33 AN	4.616 Sw	itch, general	[ST] REF630_102FD2LD0/Gf	NRLCSWI1.Pos		Questionable		WA1	REF630_102FD2	REF630_102FD2LD0/LLN0.gcb_A	196519	0	
Virtual 22/22/2011 2:36:33 AM.622 Switch general [ST] REF630_103703L00/GNRLCSWI1.Pos Questionable WA1 REF630_103FD3 REF630_103FD3L00/LNR.gds 105 0 2/22/2011 2:36:33 AM.624 Total Active Power (Total P) [MC] REF630_103FD3LD0/LNR.gds 100 Good WA1 REF630_103FD3 REF630_104FD3LD0/LNR.gds 1955 0 2/22/2011 2:36:33 AM.624 Total Active Power (Total P) [MC] REF630_104HB3LD0/GNRLCSWI1.Pos.stVial on_or_true Good WA1 REF630_104HB3L REF630_104HB3LD0/LNR.gds 19552 0 2/22/2011 2:36:33 AM.625 Switch, general [ST] REF630_104HB3LD0/GNRLCSWI1.Pos.stVial on_or_true Good WA1 REF630_104HB3LD0/LNR.gds 19552 0 2/22/2011 2:36:33 AM.625 Total Active Power (Total P) [MC] REF630_104HB3LD0/GNRLCSWI1.Pos.stVial on_or_true Good WA1 REF630_104HB3LD0/LNR.gds 19552 0 2/22/2011 2:36:33 AM.625 Switch, general [ST] REF630_104HB3LD0/GNRLCSWII.Pos.stVial Good WA1 REF630_104HB3LD0/LNR.gds 494360 0 2/2/2/2011 2:36:33 AM.645 Switch, general [ST] REF630_104HB3LD0/GNRLCSWII.Pos.stVial <td>12/22/2011 2:36:33 AM</td> <td>4.619 Total Act</td> <td>ive Power (Total P)</td> <td>[MX] REF630_102FD2LD0/P</td> <td>WRMMXU1.TotW.mag.f</td> <td>100</td> <td>Good</td> <td></td> <td>WA1</td> <td>REF630_102FD2</td> <td>REF630_102FD2LD0/LLN0.gcb_A</td> <td>196520</td> <td>0</td> <td></td>	12/22/2011 2:36:33 AM	4.619 Total Act	ive Power (Total P)	[MX] REF630_102FD2LD0/P	WRMMXU1.TotW.mag.f	100	Good		WA1	REF630_102FD2	REF630_102FD2LD0/LLN0.gcb_A	196520	0	
12/22/2011 2:36:33 AM.624 Total Adive Power (Total P) [NK] REF630_104/NB13LD0/GNRLCSWI1.Post.Wal 100 Good WA1 REF630_104/NB13 REF630_104/NB13LD0/LN0.qcb_A 1950 0 12/22/2011 2:36:33 AM.625 Switch, general [ST] REF630_104/NB13LD0/GNRLCSWI1.Post.Wal on_or_true Good WA1 REF630_104/NB13 REF630_104/NB13LD0/LN0.qcb_A 1950 0 12/22/2011 2:36:33 AM.625 Switch, general [ST] REF630_104/NB13LD0/GNRLCSWI1.Post.Wal On_or_true Good WA1 REF630_104/NB13 REF630_104/NB13LD0/LN0.qcb_A 1950 0 12/22/2011 2:36:33 AM.625 Total Adrive Power (Total P) [M1] REF630_104/NB13LD0/GNRLCSWI1.Post.Wal On_or_true Good WA1 REF630_104/NB13LD0/LN0.qcb_A 1952 0 12/22/2011 2:36:33 AM.625 Total Adrive Power (Total P) [M1] REF630_104/NB13LD0/GNRLCSWI1.Post.Wal Good WA1 REF630_104/NB13LD0/LN0.qcb_A 1952 0 12/22/2011 2:36:33 AM.625 Switch, general [ST] REF630_104/NB12LD0/GNRLCSWII.Post.Wal Good WA1 REF630_104/NB12LD0/LN0.qcb_A 49436 0 12/22/2011 2:36:33 AM.455 Switch, general [ST] REF630	12/22/2011 2:36:33 AN	4.621 Sw	itch, general	[ST] REF630_103FD3LD0/Gf	NRLCSWI1.Pos.stVal	on_or_true	Good		WA1	REF630_103FD3	REF630_103FD3LD0/LLN0.gcb_A	196518	0	
V/2/2/2011 2:36:33 AM.625 Switch, general [ST] REF630_104NB13LD0/GNRLCSWI1.Pos.stVal on_or_true Good WA1 REF630_104NB13	12/22/2011 2:36:33 AM	4.622 Sw	itch, general	[ST] REF630_103FD3LD0/GF	NRLCSWI1.Pos		Questionable		WA1	REF630_103FD3	REF630_103FD3LD0/LLN0.gcb_A	196519	0	
V2/27/2011 2:36:33 AM.628 Switch general [ST] REF63_104NB13LD0/GNRLCSWI1.Pos. Questionable WA1 REF63_104NB13_REF63_104NB13_REF63_0_104NB13_LD0/LN0.gdb_A 196521 0 12/22/2011 2:36:33 AM.628 Total Active Power (Total P) [M1] REF63_0_104NB13_REF63_0_104NB13_LD0/LN0.gdb_A 196522 0 12/22/2011 2:36:33 AM.628 Total Active Power (Total P) [M1] REF63_0_104NB13_LD0/GNRLCSWI1.Pos.tWal netmodulae_state Good WA1 REF63_0_104NB13_REF63_0_104NB13_LD0/LN0.gdb_A 196522 0 12/22/2011 2:36:33 AM.628 Switch, general [ST] REF63_0_104NB12LD0/GNRLCSWI1.Pos.tWal netmodulae_state Good WA1 REF63_0_104NB12_D0/LN0.gdb_A 494362 0 12/22/2011 2:36:34 AM.765 Switch, general [ST] REF63_0_104NB12LD0/GNRLCSWI1.Pos.tWal net	12/22/2011 2:36:33 AM	1.624 Total Act	ive Power (Total P)	[MX] REF630_103FD3LD0/P	WRMMXU1.TotW.mag.f	100	Good		WA1	REF630_103FD3	REF630_103FD3LD0/LLN0.gcb_A	196520	0	
2/22/2011 2:36:33 AM.62% Total Active Power (Total P) [NU] REF630_104NB13LD0/LN0.gdc, A 196522 0 2/22/2011 2:36:33 AM.62% Total Active Power (Total P) [NU] REF630_104NB13LD0/LN0.gdc, A 196522 0 2/22/2011 2:36:33 AM.705 Switch, general [ST] REF630_104NB12LD0/GNRLCSWI1.Pos.stVal intermediate_state Good WA1 REF630_104NB12 REF630_104NB12LD0/LN0.gdc, A 494360 0 2/22/2011 2:36:33 AM.64% Switch, general [ST] REF630_104B12LD0/GNRLCSWI1.Pos.stVal intermediate_state Good WA1 REF630_104B12 REF630_14B12LD0/LN0.gdc, A 494360 0 2/22/2011 2:36:33 AM.64% Switch, general [ST] REF630_164B12LD0/GNRLCSWI1.Pos.stVal intermediate_state Good WA1 REF630_164B12 REF630_164B12LD0/LN0.gdc, A 494360 0 2/22/2011 2:36:34 AM.76 Switch, general [ST] REF630_164B12LD0/GNRLCSWI1.Pos.stVal intermediate_state Good WA1 REF630_164B12LD0/LN0.gdc, A 494362 0 2/22/2011 2:36:34 AM.76 Switch, general [ST] REF630_164B12LD0/LN0.gdc, A 494362 0 0 0 0 0 0 0	12/22/2011 2:36:33 AM	4.625 Sw	itch, general	[ST] REF630_104NB13LD0/0	GNRLCSWI1.Pos.stVal	on_or_true	Good		WA1	REF630_104NB13	REF630_104NB13LD0/LLN0.gcb_4	196520	0	
V2/22/2011 2:36:33 AM.705 Switch, general [ST] REF630_16NB12LD0/GNRL2SW11.Pos.stVal intermediate_state Good WA1 REF630_16NB12 REF630_16NB12LD0/LIN0.dpb,A 49436 0 V2/22/2011 2:36:33 AM.845 Switch, general [ST] REF630_16NB12LD0/GNRL2SW11.Pos.stVal n_or_ruru Good WA1 REF630_16NB12 REF630_16N	12/22/2011 2:36:33 AM	4.627 Sw	itch, general	[ST] REF630_104NB13LD0/0	GNRLCSWI1.Pos		Questionable		WA1	REF630_104NB13	REF630_104NB13LD0/LLN0.gcb_4	196521	0	
Z/2/2/2011 2:36:33 AM.845 Switch, general [ST] REF630_10K812LD0/GNRL2SWI1.Pos.stval on_or_true Good WA1 REF630_10K812 REF630_10K812LD0/LUR0.gdp.A 444361 0 2/2/2/2011 2:36:34 AM.845 Switch, general [GT] REF630_10K812LD0/GNRL2SWI1.Pos.stval intermediate_state Good WA1 REF630_10K812 REF630_10K812 REF630_10K812 REF630_10K812 A 494361 0 2/27/2011 2:36:34 AM.845 Switch, general [GT] REF630_10K812LD0/GNRL2SWI1.Pos.stval intermediate_state Good WA1 REF630_10K812 REF630_10K812 A 494361 0 2/27/2011 2:36:34 AM.745 Gwitch, newaral [GT] REF630_10K812/ID0/GNRL2SWI1.Pos.stval intermediate_state Good WA1 REF630_10K812 REF630_10K112.D0/LUR0.gdp.A 494362 0 2/27/2011 2:36:34 AM.745 Gwitch, newaral [GT] REF630_10K110.00 M A 444363 0	2/22/2011 2:36:33 AM	4.628 Total Act	ive Power (Total P)	[MX] REF630_104NB13LD0/	PWRMMXU1.TotW.mag.f	100	Good		WA1	REF630_104NB13	REF630_104NB13LD0/LLN0.gcb_4	196522	0	
2/2/2/2011 2:36:34 AM.615 Switch general [CT] REF630_16V8122.D0/GVRLI2SW11 / Ros.stval intermediate_state Good WA1 REF630_16V8122.D0/LUR0.gob_A 494362 0	12/22/2011 2:36:33 AM	4.705 Sw	itch, general	[ST] REF630_16NB12LD0/G	NRLCSWI1.Pos.stVal	intermediate_state	Good		WA1	REF630_16NB12	REF630_16NB12LD0/LLN0.gcb_A	494360	0	
17/17/01/11 >1/3/-24 AM 745 Cwilth namenal ICTI DEEXIN IAUBI'S DUILNEI CAUTI Dev ethal off or false Good WA1 DEEXIN IAUBI'S DUILNEI CAUTI AN A 4843/3 D	2/22/2011 2:36:33 AM	4.845 Sw	itch, general	[ST] REF630_16NB12LD0/G	NRLCSWI1.Pos.stVal	on_or_true	Good		WA1	REF630_16NB12	REF630_16NB12LD0/LLN0.gcb_A	494361	0	
	2/22/2011 2:36:34 AM	4.615 Sw	itch, general	[ST] REF630_16NB12LD0/G	NRLCSWI1.Pos.stVal	intermediate_state	Good		WA1	REF630_16NB12	REF630_16NB12LD0/LLN0.gcb_A	494362	0	
ee a 1/1	9/99/9011 9:36:34 M	4 745 Gu	itch neneral	CTT REERON 16NR12LDO/G	UDI COMITI Die etVal	off or fales	Good		WA1	REE630 16NB12	REE630 16NB12LD0/LLN0 och A			

GOOSEEvents.png

Figure 5.3-1 Historical event list

The historical event list is similar to the real-time event list but its data source is the historical database.

To query specific events from the database, use conditional settings. You can reset the query conditions for new queries and export the queried events to text in csv format.

6. GOOSE Tester Manager

6.1. Using GOOSE Tester Manager

GOOSE Tester Manager enables capturing raw GOOSE packets and associated events into a single record, and presenting graphical and system-oriented views of the recorded information.

To start the GOOSE Tester Manager, click on **GOOSE Tester Manager** on the menu bar. The Tester Manager page opens (see Figure 6.1-1).

ABB	· · · · · · · · · · · · · · · · · · ·	GOOSE Analyzer
GOOSE Connection Viewer Historical Events	GOOSE Test Manager Network Statistic	
New Remove	test Overview 🕷	
test	Type : Manual Duration : 600sec	Start
	Test Contents Trigger Options	
	Record File Name Size Date	Delete View
	test_2011_12_22_07_51_46_4654.bin 5829KB 12/22/2011 7:51:47 AM	
1% Clear		

GOOSETester.png

Figure 6.1-1 Main view of GOOSE Tester Manager

On the left side of the Tester Manager, you can see the list of all test cases. Each test case can be activated to capture the defined GOOSE packets as well as their associated events. At the bottom of the left panel, you can see the disk consumption of the generated test records on the Server side. When the disk is almost full, an empty record file with zero packet & event will be generated. It occupies about 4 KB of the server's disk. When there is no space left for the empty record file, no records can be generated.

To remove all test records, click **Clear**. To remove single test cases, select a test case and click **Remove**.

To create a configuration, click New.

To see the configuration details of a test case, double-click the test case. The details are shown on the right. To start or stop a test case, click **Start** or **Stop**. Test records created in the test case are listed at the lower part of the page. You can view the record details by clicking **View** and delete the record by clicking **Delete**.

6.2. Creating and handling test cases

GOOSE Tester Manager provides two different types of scripts, manual and auto.

- To run a manual script, you have to start it manually. These tests can be stopped either manually, or they stop when the pre-configured duration time elapses.
- Auto scripts do not need to be started manually, as they are triggered by the configured conditions.

To create a new tester script:

- 1. Go to the **Tester Overview** tab.
- 2. Click New.

A new tab opens for creating a test case (see Figure 6.2-1).

GOOSE Connection View Historical Events GOOSE Test Manager Network Statistic Image: Network Remove New Test Case IM Image: Network Statistic Image: Network Remove Type : Auto Duration : Imin Test Contents Packet Recording Level : Subnetwork Level Image: Network Statistic Image: Network Statistic	zer
Name : test Type : Auto Duration : min Test Contents Packet Recording Level : Subnetwork Level	
Add >> << Dates	
Trigger Options New. Remove	/e
CreatingTesterScription	

Figure 6.2-1 Creating a tester script

- 3. Enter a name for the script.
- 4. Select script type: Auto or Manual.
- 5. Set the parameter for how long the script runs. To change the unit of duration, click the drop-down list and select the suitable unit. The default value is minute (min).
- 6. Configure the testing scope.
 - Select the packet recording level by clicking on the drop-down list and selecting the correct value (specific subnetwork, GOOSE sending IED or control block).
 - Select one or multiple subnetworks, IEDs, or GoCBs.
 - The selections are listed.
- 7. For manual scripts, click **OK** to close the script creation process. For auto scripts, configure the trigger options, by clicking **New...**.
- The configuration dialog box is displayed (see Figure 6.2-2).
- 8. Select GOOSE events or diagnostic events as trigger options (see Figure 6.2-2).
- 9. Click **OK** to close the configuration.

The newly created tester script is added to the Test Overview list (see Figure 6.1-1).

Subnetwork : WA1 • IED :	PML630_003 GoCB : PML630_003LD0/LLN0.GCB
Analyzer Details	GOOSE Details
GOOSE Timeout	ST] PML630_003LS_1/LSPTRC1.Tr.general
🔲 GOOSE Dest. Mac Addr. Mismatch	[ST] PML630_003LS_1/LSPTRC1.Tr.q
GOOSE APPID Mismatch	[ST] PML630_003LS_2/LSPTRC1.Tr.general
GOOSE VLAN Tag Missing	[ST] PML630_003LS_2/LSPTRC1.Tr.q
GOOSE VLAN ID Mismatch	[ST] PML630_003LS_3/LSPTRC1.Tr.general
GOOSE VLAN Priority Mismatch	[ST] PML630_003LS_3/LSPTRC1.Tr.q
GOOSE DataSet Ref. Mismatch	[ST] PML630_003LS_4/LSPTRC1.Tr.general
GOOSE ConfRev Mismatch	[ST] PML630_003LS_4/LSPTRC1.Tr.q
GOOSE in Simulation	
GOOSE NeedsCommission	
GOOSE DataSet Structure Mismatch	
GOOSE Reboot Detected	
GOOSE Disorder Detected	
	OK Cancel

AddNewTriggerOptions.png

Figure 6.2-2 Configuring trigger options for auto tester scripts

Handling tester scripts:

- To view existing scripts in COM600, click 📄 (refresh).
- To activate the execution of a script, select the script and click **Start**. Manual scripts are started immediately, while auto scripts are only started when the configured conditions become active.
- To delete a script, select the script and click **Remove**.

6.3. Exploring test record

6.3.1. Viewing test records

To view test records, open the test overview tab, select the record file and click **View**. A new tab opens displaying the record details.

200SE Connection Viewer Historical Events GOOSE Test Manager Network Statistic	
New Remove test Export Packets Statistics Received Packets in total : 8531 Detected GOOSE Control Blocks :38	COOSE Dugnostic Events Date Time Object Text Event COOSE Events Date Time Object Text Reference Event Quality, T Shlum Sqlvum

Figure 6.3.1-1 Test report overview

The record tab shows:

- Statistics information about received packets
- Detected GOOSE control blocks

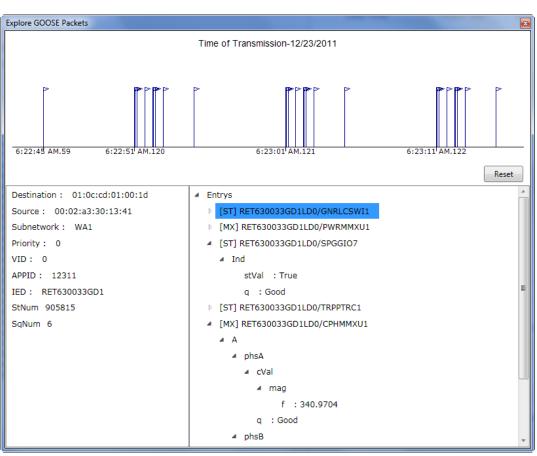
You can export the packets by clicking Export Packets....

Details of GOOSE control blocks are listed in the navigation tree under **subnetwork** > **IED** > **GoCB**.

- To view associated GOOSE Diagnostic Events and GOOSE Events, select a GOOSE control block.
- To explore GOOSE Packets, GOOSE Events and GOOSE Diagnosis, right-click a GOOSE control block entry. A context menu opens.

6.3.2. Exploring GOOSE packets

To open a new dialog box for the graphical and system-oriented presentation of GOOSE packets and their decoding, click the context menu for **Explore GOOSE Packets** (see Figure 6.3.2-1).



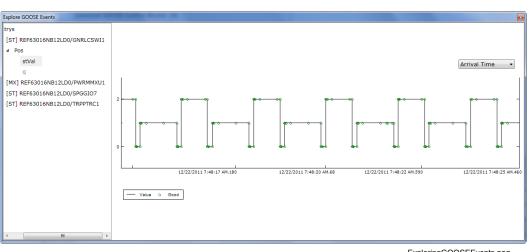
ExploringGOOSEPackets.png

Figure 6.3.2-1 Exploring GOOSE packets

GOOSE Packets Diagnosis explore the time based view of specific GOOSE packets that are captured from the network.

6.3.3. Exploring GOOSE events

To open a new dialog box for the graphical representation of GOOSE events, click the context menu for **Explore GOOSE Events** (see Figure 6.3.3-1).



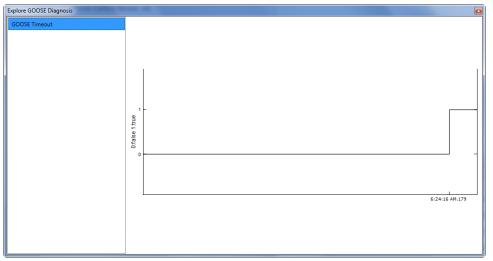
ExploringGOOSEEvents.png

Figure 6.3.3-1 Exploring GOOSE events

GOOSE Event Diagnosis discover and plot the trend of GOOSE message values of certain GOOSE Signal within the Tester's triggering time frame.

6.3.4. Exploring GOOSE diagnosis

To open a new dialog box for the graphical representation of GOOSE diagnosis events, click the context menu for **Explore GOOSE Diagnosis** (see Figure 6.3.4-1).



ExploringGOOSEDiagnosis.png

Figure 6.3.4-1 Exploring GOOSE diagnosis

GOOSE Diagnosis explore the GOOSE analyze Events, for instance GOOSE Packets time out, and plot out the Diagnosis result in Time based.

7. Network statistics

7.1. Viewing network statistics information

GOOSE Analyzer can calculate the amount of GOOSE load periodically and store the calculations in the historical database. The configuration of the statistic interval is set in SAB600.

From the network statistics you can query the GOOSE load and GOOSE diagnostic counters.

To view statistics:

1. Click Network Statistic on the menu bar.

The Network Statistic dialog box opens. The statistic trend view is structured according to the queried information. It provides statistics information on GOOSE packets, events, or bytes.

ABB			GOOSE Analyzer
GOOSE Connection Viewer Historical Events GOOSE Test Manager Network Stat	istic		
Subnetwork : WA1 • IED : [RET630_033GD1 •	WA1 REF630_16NB12 REF630_ 12/25/2011 7:17:29 AM - Network Statistic Diagnostic		D1 ¥ Statistic Interval : 3 min
		Value	
GoCB :	Received GOOSE Bytes	10.78 MB	
Start Time : 12/25/2011 15 7 : 16 : 45	Received GOOSE Packets		
End Time : 12/26/2011 15 7 : 16 : 45	Received GOOSE Events	2241	
Analyze Reset			
	-Su-flywydawy	mmun man han man an a	Mon June June June June June June June Jun
	011 417/40 FH.329 12/25/201 16NB 12 REF630_16NB 12LDD/LLN0 geb_AIR#	27/17/44 MIAO 12/25/2011 10:17/47 MIAB2 12/26/2011 11:17/02 MILA	1226/2011 +17:56 AM:599

NetworkStatistic.png

Figure 7.1-1 The Network Statistic dialog

- 2. Select a network, IED or GoCB.
- 3. Set the appropriate time span.
- 4. Click **Analyze** to open a new tab showing the query results.
- 5. Click the subtab for Diagnostic Events Statistic for the relevant diagnostic counters.

WA1 % WA1 REF630_16NB12 REF630_16	
12/25/2011 7:17:29 AM - 12/26/2011 Network Statistic Diagnostic Events Statist	
Description	Value
GOOSE Timeout Counter	0
Dest Mac Address Mismatch Counter	0
VLAN Miss Counter	0
VLAN ID Mismatch Counter	0
VLAN Priority Mismatch Counter	0
ADDID Mismatch Counter	<u></u>

DiagnosticStatisticTab.png

Figure 7.1-2 Diagnostic Events Statistic

To view a statistic trend, click an entry in the Network Statistic tab to plot the corresponding trend.



Figure 7.1-3 Network statistic trend

You can compare different trends on the plotting area by clicking a similar trend. To remove the plotting, click the entry again.

8. Interaction with COM600 WebHMI

8.1. Viewing GOOSE Analyzer diagnostic events in COM600 WebHMI

The diagnostic events generated in GOOSE Analyzer can be viewed in the Events List in COM600 WebHMI. This functionality is used in cases where the GOOSE Analyzer diagnostics WebHMI is not started.

ABB				Logout About Help 🥃 🕷 /			GOOSE Analyze
GOOSE Connection Viewer	Historical E	vents Ne	atwork Statistic	GOOSE Test Manager			
4 OPCS_IEC61850_1 4 WA1							Expor
Physical View WA1 REU615C_078 REF615C_073 RED615C_075 OOSE Events GOOSE Diagnos		Intruding G(0615C_075RED615C_076			
Filter							
Detected Time	OPC Server	Subnetwork	IED	GOOSE Control Block	Object Text	Event	
2014-02-24 14:13:32.910 OF	C5_IEC61850_1	WA1	REU615C_078	REU615C_078LD0/LLN0.gcbGOOSE_LOOP	GOOSE Disorder Detected	false	
2014-02-24 14:13:28.819 OF	CS_IEC61850_1	WA1	REU615C_078		IED GOOSE State	Normal	
2014-02-24 14:13:28.818 OF	C5_IEC61850_1	WA1	REU615C_078	REU615C_078LD0/LLN0.gcbGOOSE_LOOP	GOO5E Timeout	false	
2014-02-24 14:13:26.305 OF	CS_IEC61850_1	WA1	REU615C_078	REU615C_078LD0/LLN0.gcbGOOSE_LOOP	GOOSE Disorder Detected	true	
2014-02-24 14:12:23.632 OF	CS_IEC61850_1	WA1	REU615C_078		IED GOOSE State	All Timeout	
2014-02-24 14:12:23.631 OF	CS_IEC61850_1	WA1	REU615C_078	REU615C_078LD0/LLN0.gcbGOOSE_LOOP	GOOSE Timeout	true	
							GATFigure 1.1-1.pn

Figure 8.1-1 GOOSE Analyzer diagnostic events in GOOSE Analyzer diagnostics WebHMI

51	A_01		n Even	ts Alarms	Data Historian GOOSE Analyzer Helo	Logout	
		- ≠ Filter III I	Freeze 🛛 🖈	view Alarms	20 • 📣 🐼 Newest 🔆 👌 🐼	31. Goto Day	
		y 1865 (18	10020	p tien seinis	20 T NY HEREE V V VI	31 0000 001	
	Events **	* 7.2.2014 - 24.2	2.2014 ***	20.93 / 50MB			
	Date	Time	Bay		Object Text Event		Qualit
	24.2.2014	14:13:32.910	BAY037	REU615C_078	REU615C_078LD0/LLN0.gcbG00SE_L00P:G00SE Disorder Detected	False	
	24.2.2014	14:13:29.555	BAY037	REU615C_078		Connection OK	
	24.2.2014	14:13:28.818	BAY037	REU615C_078	REU615C_078LD0/LLN0.gcbG00SE_LOOP:G00SE Timeout	False	
	24.2.2014	14:13:26.305	BAY037	REU615C_078	REU615C_078LD0/LLN0.gcbGOOSE_LOOP:GOOSE Disorder Detected	True	
	24.2.2014	14:12:34.654	BAY037	REU615C_078		Device Connection Lost	
	24.2.2014	14:12:23.631	BAY037	REU615C_078	REU615C_078LD0/LLN0.gcbG00SE_LOOP:G00SE Timeout	True	
	24.2.2014	13:59:12.603				User logged in: com600	
	24.2.2014	13:57:49.655	BAY037	REU615C_078		Connection OK	
	24.2.2014	13:57:49.156	BAY033	REM615C_074		Connection OK	
	24.2.2014	13:57:48.656	BAY001	REF615_010		Connection OK	
	24.2.2014	13:57:48.156	BAY036	RET615C_077		Connection OK	
	24.2.2014	13:57:47.657	BAY032	REF615C_073		Connection OK	
	24.2.2014	13:57:47.155	BAY035	RED615C_076		Connection OK	
	24.2.2014	13:57:46.655	BAY034	RED615C_075		Connection OK	
	24.2.2014	13:57:46.159	BAY028	REF615_069		Connection OK	
	24.2.2014	13:29:28.353	BAY036	RET615C_077		Connection OK	
	24.2.2014	13:29:25.176	BAY036	RET615C_077	RET615C_077LD0/LLN0.gcbGOOSE_LOOP:GOOSE Timeout	False	
J	24.2.2014	13:29:23.413	BAY036	RET615C_077		Device Connection Lost	
	24.2.2014	13:29:22.665	BAY036	RET615C_077	RET615C_077LD0/LLN0.gcbGOOSE_LOOP:GOOSE Reboot Detected	False	
					RET615C_077LD0/LLN0.pcbG00SE_L00P/G00SE		

GATFigure 1.1-2.png

Figure 8.1-2 Corresponding GOOSE Analyzer diagnostic events in COM600 WebHMI



Note that only diagnostic events can be viewed in COM600 WebHMI. These can be used to verify the health of GOOSE.

9. GOOSE Analyzer Engine

9.1. Using GOOSE Analyzer Engine

GOOSE Analyzer Engine provides means to verify and validate GOOSE signals against GOOSE configurations in the substation configuration description (SCD). The engine continuously analyzes the decoded GOOSE packets and monitors the availability, reliability, and status transitions of GOOSE. Outputs from the engine are updated to the user interface in various ways.

Three types of analyzers are implemented in the analyzer engine:

- Subnetwork analyzer group
- IED analyzer group
- GOOSE control block analyzer group

9.2. Subnetwork analyzers

9.2.1. Subnetwork analyzer group

This group is designed to analyze subnetwork wide GOOSE with comparison to the corresponding configurations in the SCD.

The following analyzers belong to this group:

- Intrusion analyzer
- Statistic analyzer

9.2.2. Intrusion analyzer

GOOSE intrusion is a GOOSE message whose configuration is not listed in the system configuration. It might harm the switched network and the distribution applications.

The analyzer compares the GOOSE control block references of the received GOOSE messages (packets) with those in the SCD. In normal status, all references conform to the values in the configuration description.

When a GOOSE control block reference is not listed in the active configuration, the analyzer issues a specific diagnostic event to warn users of the status transition.

9.2.3. Statistic analyzer

Network load and GOOSE load within the specific subnetwork determine the secure operation of the communication system. The analyzer continuously calculates the network load and GOOSE load of the subnetworks during the configured interval.

For each interval, the analyzer sums up:

- Received network packets
- Received network bytes
- Received GOOSE packets
- Received GOOSE bytes
- Received GOOSE events for users

9.3. IED analyzers

9.3.1. IED analyzer group

The IED analyzer group is designed to analyze IED wide GOOSE with comparison to the corresponding configurations in the SCD.

The following analyzers belong to this group:

- GOOSE bus analyzer
- Statistic analyzer

9.3.2. GOOSE bus analyzer

GOOSE bus is a unique representation of each GOOSE sending IED. It is used to mirror the transmission status of GOOSE messages.

Each GOOSE bus can have three statuses:

- Unknown: unknown status, which might mean problems have been found with GOOSE Analyzer in COM600 (see 9.4.7, Timeout (flow status) analyzer).
- **Normal**: transmission of GOOSE packets is according to its configuration and thus treated as normal (marked with green).
- Alarm: indicates that the transmission of GOOSE by the sending IED is abnormal, when the timeout analyzer shows timeout.

The analyzer is a synergy of different timeout analyzers within the same server of the IED.

9.3.3. Statistic analyzer

The analyzer traces the GOOSE load from the specific sending IED. It calculates the GOOSE load from the specific sending IEDs based on the GOOSE control block references during the configured interval.

For each interval, the analyzer sums up respectively:

- Received GOOSE packets
- Received GOOSE bytes
- Received GOOSE events for users

9.4. GOOSE control block analyzers

9.4.1. GOOSE control block analyzer group

This group is designed to analyze GoCB wide GOOSE with comparison to the corresponding configurations in the SCD.

The following analyzers belong to this group:

- Destination MAC address analyzer
- Application Identifier (APPID) analyzer
- VLAN ID analyzer
- VLAN User Priority analyzer
- Vlan Tag analyzer
- Timeout (flow status) analyzer
- DatSet reference analyzer
- ConfRev analyzer
- Needs Commission (NdsCom) analyzer
- Simulation analyzer
- Disorder analyzer
- DatSet structure analyzer
- Data changes analyzer
- Statistic analyzer

9.4.2. Destination MAC address analyzer

The multicast destination MAC address is configured to allow chip level filtering at all receivers of GOOSE messages. This way the analyzer can secure IED performance.

The allowed GOOSE multicast address range is 01-0C-CD-01-00-00 until 01-0C-CD-01-FF-FF.

The destination MAC address analyzer compares the multicast MAC address contained in the received GOOSE message (packet) with that in SCD based on the reference of the GOOSE control block. In normal status, the MAC address conforms to the value in the configuration.

When a destination MAC address mismatch is detected, the analyzer issues a specific diagnostic event to warn users of the status transition.

9.4.3. APPID analyzer

APPID is used to select ISO/IEC 8802-3 frames containing GSE management and GOOSE messages and to distinguish application association. In addition to destination MAC address, APPID is also used for GOOSE message filtering at a low level.

The reserved value range for GOOSE type 1 is 0x0000 to 0x3FFF. For GOOSE type 1A (Trip), the reserved value range is 0x8000 to 0xBFFF. If no APPID is configured, the default value is 0x0000. This default value indicates the lack of configuration.

It is recommended to use a unique, source-orientated GOOSE APPID within a system. For more detailed explanation of APPID, refer to Annex C.2 in the IEC standard IEC 61850-8-1.

The APPID analyzer compares the APPID contained in the received GOOSE message (packet) with that in the SCD based on the reference of the GOOSE control block. In normal status, the APPID conforms to the value in the configuration.

When an APPID mismatch is detected, the analyzer issues a specific diagnostic event to warn users of the status transition.

9.4.4. VLAN ID analyzer

VLAN specification restricts the data flow of multicast messages to those IEDs that need the messages. This way the load over a switched network can be optimized. VLAN specification is handled in the switches and it needs the switches to support it.

The value range for VLAN is 000 to FFF.

The VLAN ID analyzer compares the VLAN ID contained in the received GOOSE message (packet) with that in the SCD based on the reference of the GOOSE control block. In normal status, the VLAN ID conforms to the value in the configuration.

When a VLAN ID mismatch is detected, the analyzer issues a specific diagnostic event to warn users of the status transition.

9.4.5. VLAN user priority analyzer

User priority can help guarantee real-time performance, especially in a burst situation. User priority is handled in the switches and it needs the switches to support it.

Priority value is between 0-7, where a higher number indicates a higher priority message, which is handled in the priority queues of the switches (vendor specific). 4 is the recommended value for GOOSE.

VLAN user priority analyzer compares the user priority contained in the received GOOSE message (packet) with that in the SCD based on the reference of the GOOSE control block. In normal status, the user priority conforms to the value in the configuration.

When a user priority mismatch is detected, the analyzer issues a specific diagnostic event to warn users of the status transition.

9.4.6. VLAN tag analyzer

VLAN tag analyzer allows users to check the existence of a VLAN tag in the GOOSE frames, in case a VLAN tag is not supported and removed by ethernet switches. When a VLAN tag is missing from the GOOSE frames, the analyzer issues a specific event to warn users of the status transition.

9.4.7. Timeout (flow status) analyzer

The timeout attribute of GOOSE messages indicates whether the association to the GOOSE publisher is lost or not. A timeout alarm usually indicates a break in the communication bus, a power-down in an IED, or other problems. It is a crucial parameter for validating the correct operations of distributed functionalities.

The timeout analyzer checks the time interval between the previous GOOSE message and the current one. In normal status, the interval is within the configured due time. Otherwise, a timeout is detected and the analyzer issues a specific diagnostic event to alarm users of such status transition.

9.4.8. DatSet reference analyzer

The attribute DatSet represents the reference of the data set whose values are transmitted. The members of the data set are uniquely numbered starting with 1. This number is called the MemberOffset of a given member. Each member of the data set has a unique number and a MemberReference, Functional Constraint Data (FCD), or Functional Constraint Data Attribute (FCDA).

The DatSet reference analyzer compares the DatSet contained in the received GOOSE message (packet) with that in the SCD based on the reference of the GOOSE control block. In normal status, the DatSet reference conforms to the value in the configuration.

When a DatSet mismatch is detected, the analyzer issues a specific diagnostic event to warn users of the status transition.

9.4.9. ConfRev analyzer

The attribute ConfRev represents the number of times that the configuration of the dataset referenced by DatSet has been changed.

Changes to be counted are:

- Deleting a member of the data set
- Adding a member to the data set
- Reordering members of the data set
- Changing the value of the attribute DatSet

The counter is incremented when the configuration changes. At configuration time, the configuration tool is responsible for incrementing/maintaining the ConfRev value. When configuration changes occur due to SetGoCBValues, the IED is responsible for incrementing the value of ConfRev. If the value of DatSet is set through a SetGoCBValues service to the same value, the ConfRev value is still to be incremented.

The initial value for ConfRev is outside the scope of this part of IEC 61850. Value 0 is reserved. The value of ConfRev, when the IED is restarted, is a local issue.

The ConfRev analyzer compares the ConfRev contained in the received GOOSE message (packet) with that in the SCD based on the reference of the GOOSE control block. In normal status, the ConfRev conforms to the value in the configuration.

When a ConfRev mismatch is detected, the analyzer issues a specific diagnostic event to warn users of the status transition.

9.4.10. NdsCom analyzer

The NdsCom attribute has the value TRUE if the GoCB requires further configuration.

Further configuration is required in the following cases:

- The attribute DatSet has the value NULL.
- The number or size of values conveyed by the elements in the data set referenced by DatSet exceeds the constraint determined by the SCSM or the implementation.

When the NdsCom bit changes, the analyzer verifies the NdsCom bit contained in the received GOOSE message (packet) and issues a specific diagnostic event to warn users of the status transition.

9.4.11. Simulation analyzer

Simulation indicates with the value TRUE that a message and its value have been issued by a simulation unit. The GOOSE subscriber reports the value of the simulated message to its application instead of the "real" message depending on the setting of the receiving IED.

When the simulation bit changes, the analyzer verifies the simulation bit contained in the received GOOSE message (packet) and issues a specific diagnostic event to warn users of the status transition.

9.4.12. Disorder analyzer

Disorder means that StNum and SqNum for GOOSE packets from the specific GOOSE Control Block are not in series.

StNum and SqNum are integers ranging from 1 to 4 294 967 295. If counter SqNum overruns, it has to be set to 1.

The disorder analyzer verifies StNum and SqNum contained in the received GOOSE message (packet) for each GOOSE control block. If counters for StNum and SqNum do not behave serially as stated above, the analyzer treats it as a disorder and issues a specific diagnostic event to warn users of the status transition.

9.4.13. DatSet structure analyzer

DatSet structure represents the structure of members in the referenced data set.

The DatSet structure analyzer compares the structure contained in the received GOOSE message (packet) with that in the SCD based on the reference of the GOOSE control block. In normal status, the DatSet structure conforms to the value in the configuration.

When a DatSet structure mismatch is detected, the analyzer issues a specific diagnostic event to warn users of the status transition.

9.4.14. Data changes analyzer

The analyzer continuously monitors the data values in the received GOOSE message (packet), comparing it with the corresponding recordings from the previous GOOSE message. If the data changes analyzer detects a value change, it reports the change.

9.4.15. Statistic analyzer

The analyzer traces GOOSE load from a specific GOOSE control block of the sending IED.

The analyzer calculates the GOOSE load from the specific GOOSE control block references during the configured interval.

For each interval, the analyzer sums up respectively:

- Received GOOSE packets
- Received GOOSE bytes
- Received GOOSE events for users



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