hp Unified Correlation Analyzer

**Unified Correlation Analyzer
for EBC
Problem Detection**

Version 3.1

TeMIP Client User's Guide

Edition: 1.0

for Windows© Operating System

April 2014

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Preface

This document describes how to use the TeMIP Client to exploit and display the Problem Detection (PBD) calculations and results.

It is intended for TeMIP end operators and more generally for anyone involved in the NOC.

Intended Audience

This document is aimed at the following personnel:

- **NOC personnel**: To benefit from the Problem Detection calculation at the TeMIP user interface (TeMIP Client) during operations

- **TeMIP Customers & Network Engineers**: To understand the features of Problem Detection at the TeMIP user interface (TeMIP Client).

- **System Integrators, Software Development Engineers & Solution Developers**: To understand the features of Problem Detection at the TeMIP user interface (TeMIP Client).

- **System Managers and Administrators in charge of the deployment and monitoring of the platform**: To understand the features of Problem Detection at the TeMIP user interface (TeMIP Client).

- In all cases, TeMIP training courses and consulting support are recommended. Please contact TeMIP Training team to get details on available trainings: sophia-temip-training@hp.com and TeMIP Consulting team to get development support: vbe-te-consult@hp.com .

Supported Software

The supported software referred to in this document is as follows:

The software versions referred to in this document are as per the following:	TeMIP	UNIX	TeMIP Client
PBD V3.1 Level 0 Revision C	6.x	HP-UX Itanium (11.31)	TeMIP Client V6.1 for Windows: • Windows XP • Windows Vista • Windows Server 2003
PBD V3.1 Level 0 Revision C	6.x	Red Hat Enterprise Linux Server release 5.8 & 6.3	TeMIP Client V6.2 for Windows: • Windows XP • Windows Vista • Windows Server 2003

The software versions referred to in this document are as per the following:	TeMIP	UNIX	TeMIP Client
			TeMIP Client V6.3 for Windows: • Windows XP • Windows Vista • Windows Server 2003 • Windows Server 2008 • Window7

The term UNIX is used as a generic reference to the operating system, unless otherwise specified. Please note that your HP sales representative should be consulted to verify which of these operating systems are supported in a given product component context (HP personnel – please note that this information is available via the Product Support Matrix which is available at the following URL:

http://support.openview.hp.com/sc/support_matrices.jsp

Typographical Conventions

Courier Font:

- Source code and examples of file contents.
- Commands that you enter on the screen.
- Pathnames
- Keyboard key names

Italic Text:

- Filenames, programs and parameters.
- The names of other documents referenced in this manual.

Bold Text:

- To introduce new terms and to emphasize important words.

Associated Documents

The following documents contain useful reference information:

- *Problem Detection Installation Guide*
- *Problem Detection Release Notes*
- *TeMIP Client Help*

For a full list of TeMIP user documentation, refer to Appendix A of the *HP Software TeMIP Product Family Introduction*.

Support

Please visit our HP Software Support Online site at:

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There you will find contact information as well as details about the products, services, and support HP Software has to offer.

The "HP TeMIP Software support" area of the HP Software web site includes:
- Downloadable documentation
- Troubleshooting information
- Patches and updates
- Problem reporting
- Training information
- Support program information

Chapter 1

Introduction

This document describes how to use the TeMIP Client to exploit and display the Problem Detection (PBD) calculations and results.

As described in Appendix A, the Problem Detection product (PBD) aims at grouping alarms relating to a common problem:

- PBD detects symptom alarms denoting a problem on a network resource
- Then PBD creates from them a summary alarm: the Problem Alarm
- Then PBD attaches them (sub-alarms) to the Problem Alarm

The PBD TeMIP Client plug-in makes it possible:

- To reduce the volume of displayed alarms: hide symptom alarms (sub-alarms) from the main Alarm View and keep instead the single Problem Alarms representing them.
- To drill-down from the Problem Alarm to its symptom sub-alarms and conversely.

This document presents:

- [Chapter 2] The alarm columns (attributes) specific to PBD
- [Chapter 3] How to hide sub-alarms
- [Chapter 4] How to navigate between parent and child alarms (real-time mode)
- [Chapter 5] How to navigate between parent and child alarms (History-like mode)
- [Chapter 6] Alarm navigation compatibility with "similarity" drill down

Chapter 2

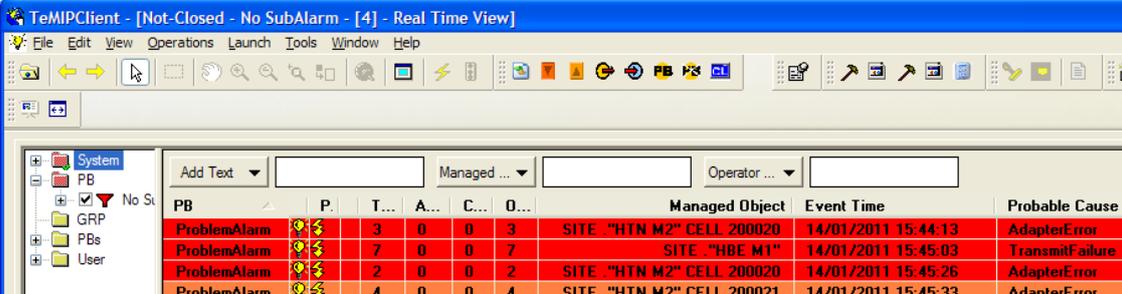# Display PBD alarm attributes

PBD adds specific alarm object attributes:

- *PB* to mark the PBD category of alarms (Refer to A.4.1):

    o ProblemAlarm: is a parent alarm that represents a group of alarms

    o   SubAlarm: is a child alarm that is a symptom and part of the group

    o Alarm: is a standard alarm

    o etc

- Counter alarms for Problem Alarms to indicate how many sub-alarms they have (Refer to A.4.3): in total, acknowledged, cleared and outstanding.

It is recommended to add these attributes by configuration in the Alarm View to know which alarms are Problem Alarms and to know how many sub-alarms they contain.

Figure 1 below shows all PBD attributes in Alarm View:

- [*PB=ProblemAlarm*]: it is a Problem Alarm

- [T=3]: *Number of Total Alarms* is 3

- [A=0]: *Number of Acknowledged Alarms* is 0

- [C=0]: *Number of Cleared Alarms* is 0

- [O=0]: *Number of Outstanding Alarms* is 0

Figure 1: Alarm View with all PBD attributes

Figure 2 below shows Alarm View with minimum PBD attributes (to make the view and columns shorter):

- [*PB*=P.]: it is a Problem Alarm
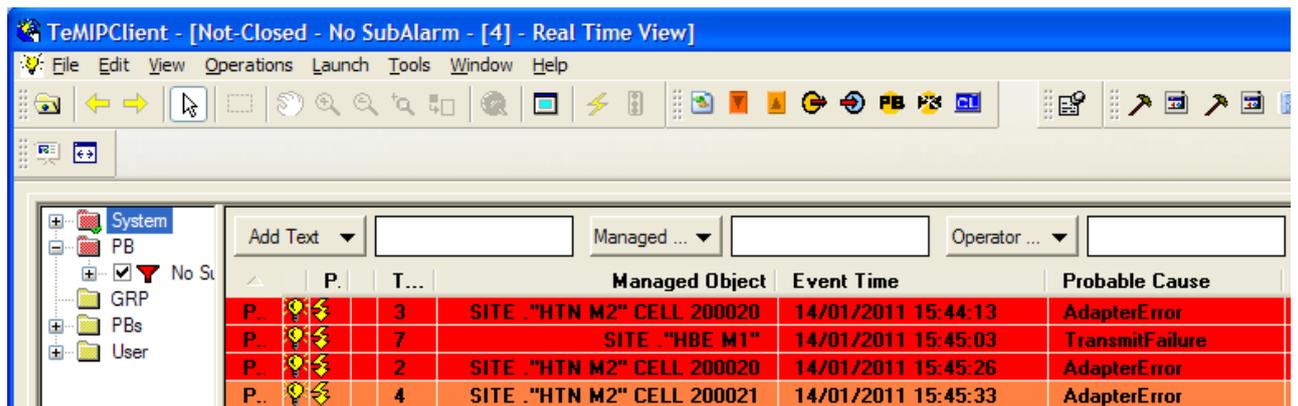
- [T=3]: *Number of Total Alarms* is 3

Figure 2: alarm View with minimum PBD attributes (shorter view)

Chapter 3

Hide sub-alarms

PBD aims at reducing the number of alarms displayed to the end operators. For that purpose, only Problem Alarms that summarize the problems should be displayed in the main Alarm View and all their related symptom sub-alarms should be hidden from it.

The filter pattern [No SubAlarm] is to be activated for that purpose. Note all alarms that are not involved in the PBD processing (flag *PB* not set) are not impacted by this filter pattern and <u>still displayed</u>! Only sub-alarms are hidden.
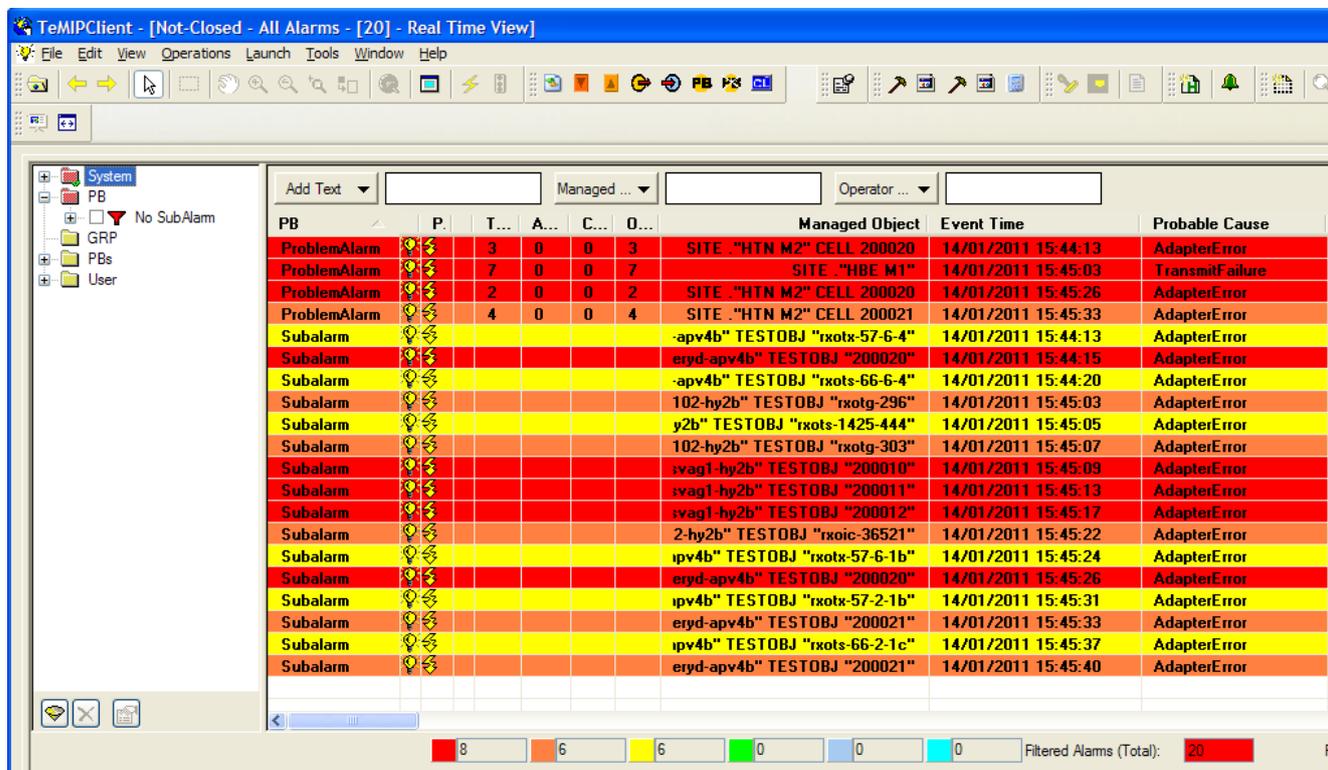

Figure 3: Filter pattern [No SubAlarm] deactivated: 20 alarms displayed

Now activate the Filter pattern [No SubAlarm], only the 4 Problem Alarms are displayed (see Figure below)!
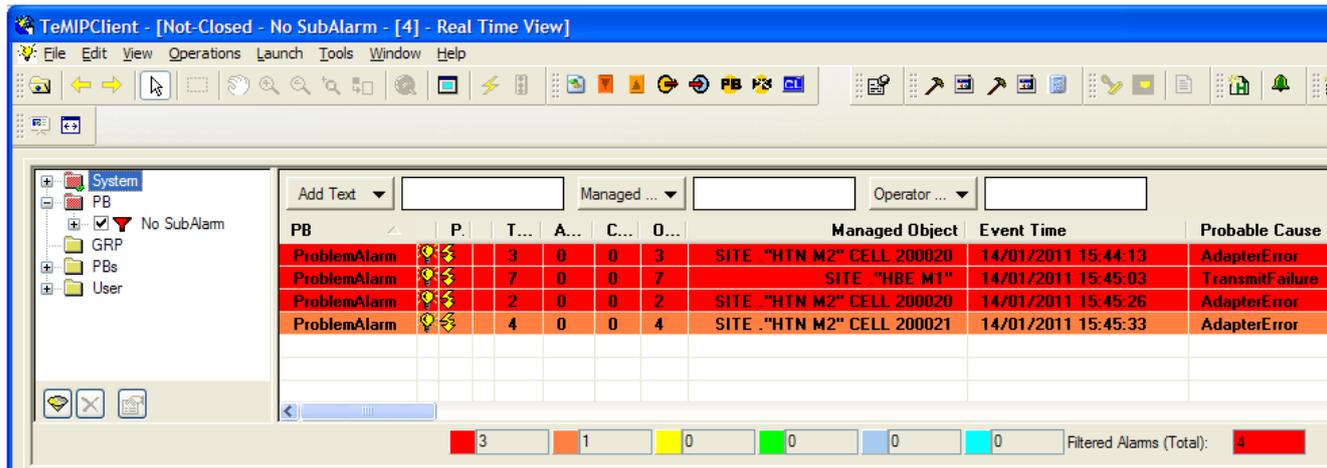
Figure 4: Filter pattern [No SubAlarm] activated: 4 alarms displayed vs. 20

Chapter 4

Alarm navigation (Real-time)

Once the sub-alarms are hidden (see Chapter 3), it is possible to select a Problem Alarm and drill down to its associated sub-alarms. There are 2 possible navigation modes:

1. Real-Time navigation: Navigation from a Real-Time Window into another subsequent Real-Time Window

2. History-like navigation: Navigation from a Real-Time Window into a subsequent history-like Window

It is preferable to use one navigation mode among the two at a time to avoid confusion and mixing them although they are compatible and usable in parallel.

This Chapter presents the Real-Time navigation. Another Chapter (Chapter 5) deals with the History-like navigation.

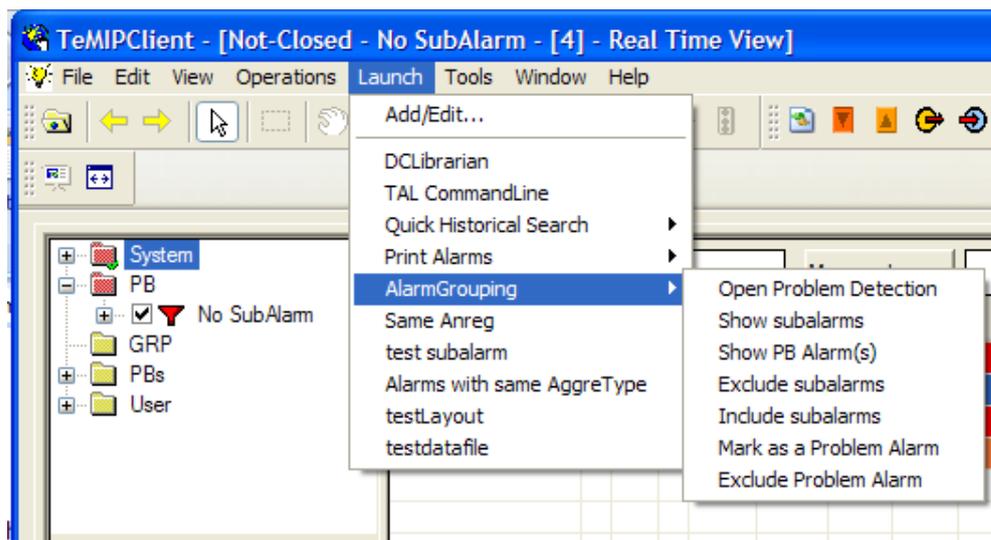The "Real-Time navigation" makes it possible:

- (1) to select a Problem Alarm and drill down to its sub-alarms

- (2) to select a sub-alarm and drill up to its Problem Alarm(s)

These navigation features are accessible

- either through the buttons below in the menu bar

- or through the launch sub-menu [*Alarm Grouping*] below

Drill down (1) is accessible

- Either through the button

- Or through [*Launch/MB3→Alarm Grouping→Show subalarms*]
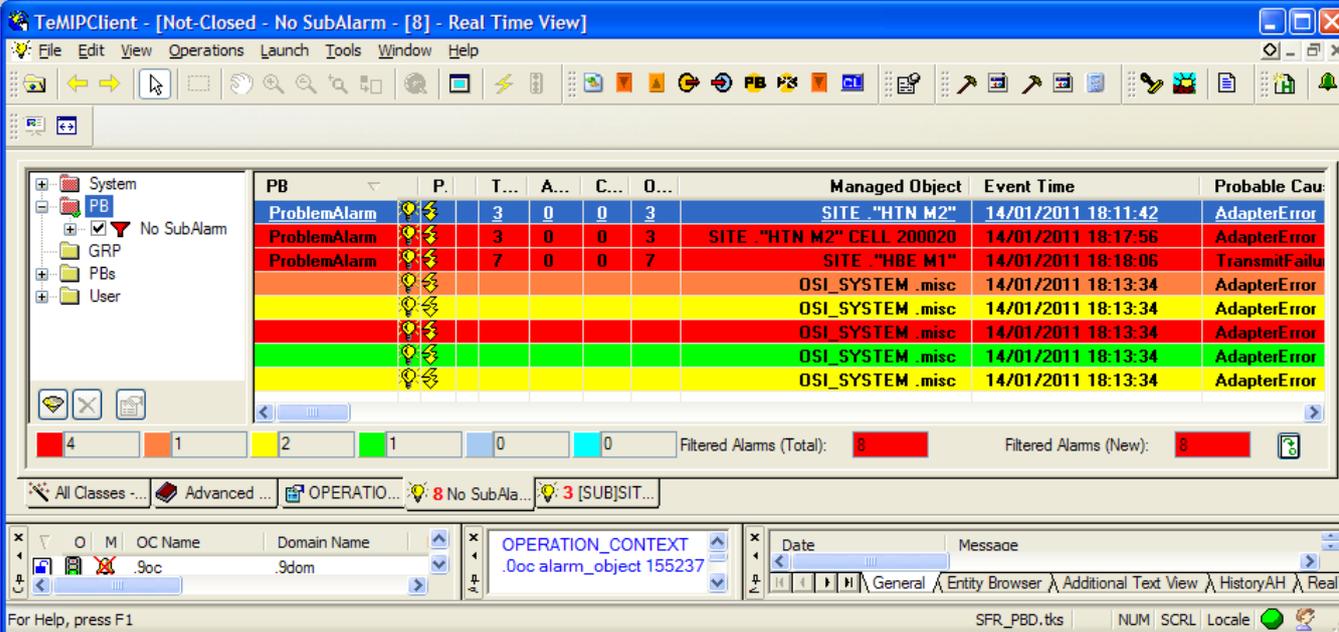
Drill up (2) is accessible

- Either through the button

- Or through [*Launch/MB3→Alarm Grouping→Show PB Alarm(s)*]

4.1 Drill down

Below is illustrated a 2-levels drill down: from a top alarm to leaf alarms and conversely from a leaf alarm to the top alarm.

As described in A.4.1 and as illustrated above, there can be several levels of grouping: a sub-alarm can be itself a Problem Alarm (ProblemSubAlarm) with its own sub-alarms and so on.

Select a Problem Alarm (Figure 5).

Figure 5: Select a Problem Alarm

Then press the button (or [*Launch/MB3→Alarm Grouping→Show subalarms*]), the 3 sub-alarms are displayed in a new Alarm View window (Figure 6). These 3 sub-alarms are at the same time 3 ProblemAlarms (ProblemSubAlarms).
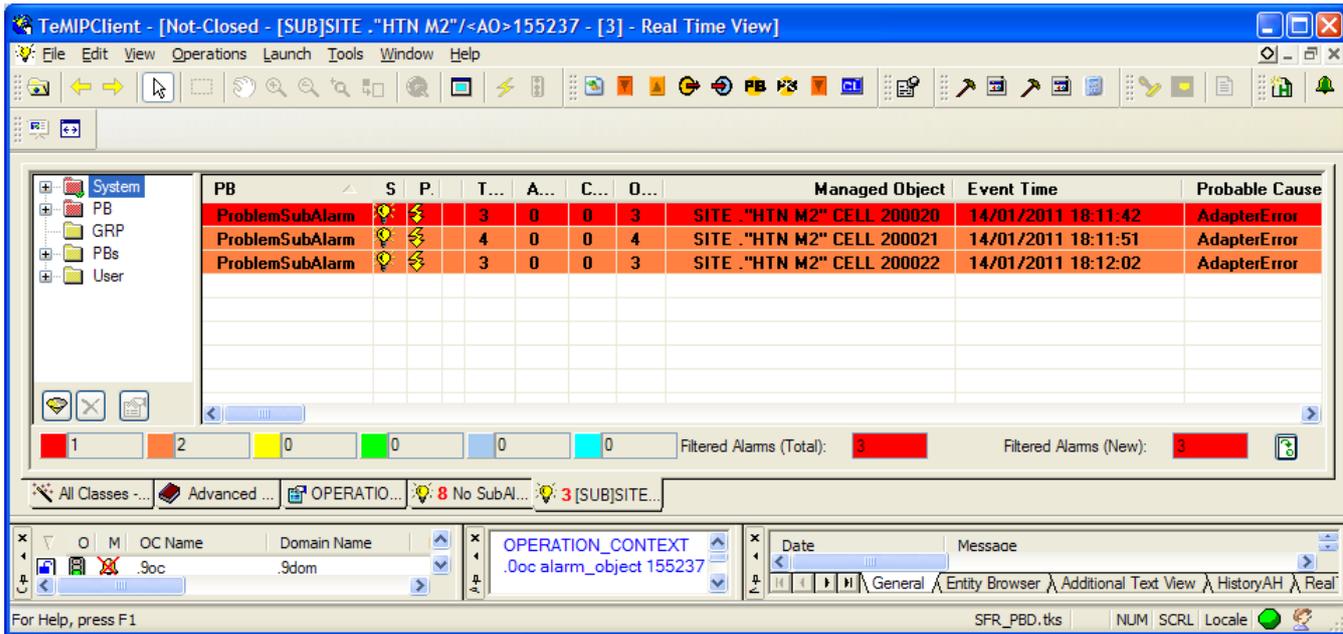
Figure 6: ProblemSubAlarms are displayed by the drill down button

Then select a ProblemSubAlarm and press again the button ▼ (or [*Launch/MB3→Alarm Grouping→Show subalarms*]); its sub-alarms are displayed in a new Alarm View window (Figure 7). These sub-alarms are pure sub-alarms (leaves).
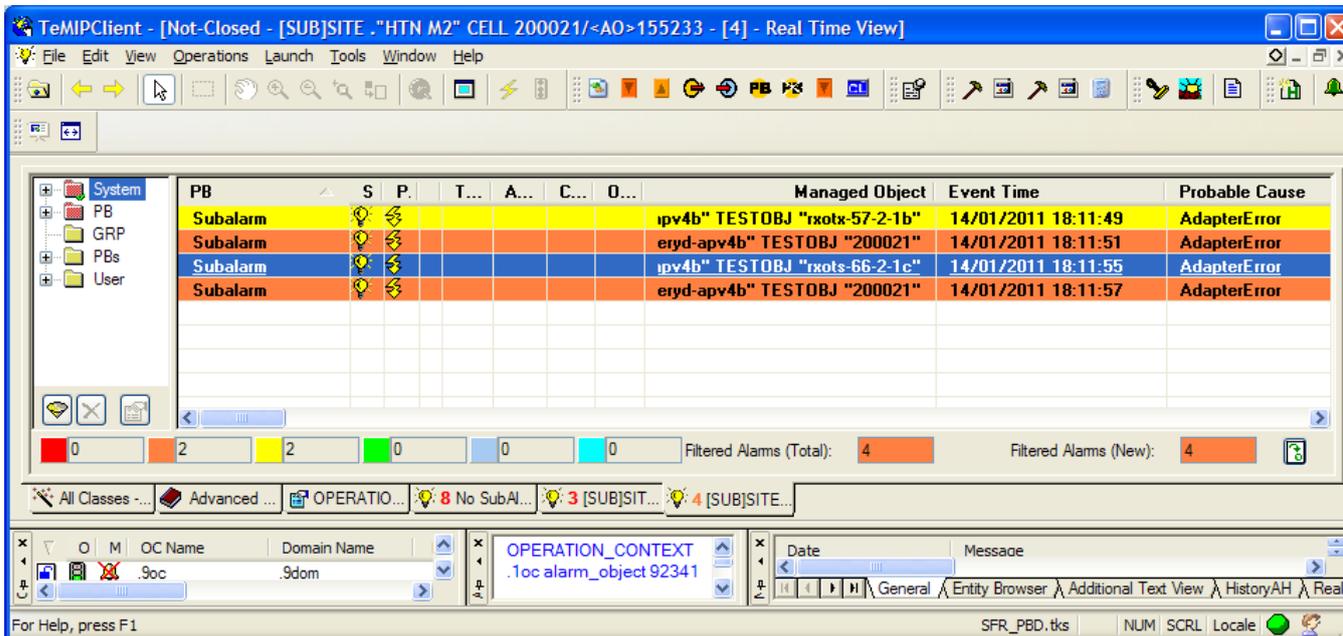
Figure 7: sub-alarms are displayed by the drill down button

Each time the drill down feature (1) is used or the drill up feature (2), a new Alarm View window is opened. Thus these navigation alarm windows have to be closed along to avoid having too many of them.

These sub-alarms windows are real-time which means that later raised sub-alarms are added along and on the fly in the opened navigation window.

4.2 Drill Up

Conversely the drill up (2) feature can be applied by selecting a sub-alarm (Figure 7) and pressing the button ▲ (or [*Launch/MB3→Alarm Grouping→Show PB Alarm(s)*]). The corresponding parent Problem Alarm(s) is (are) displayed in a new window (Figure 8).
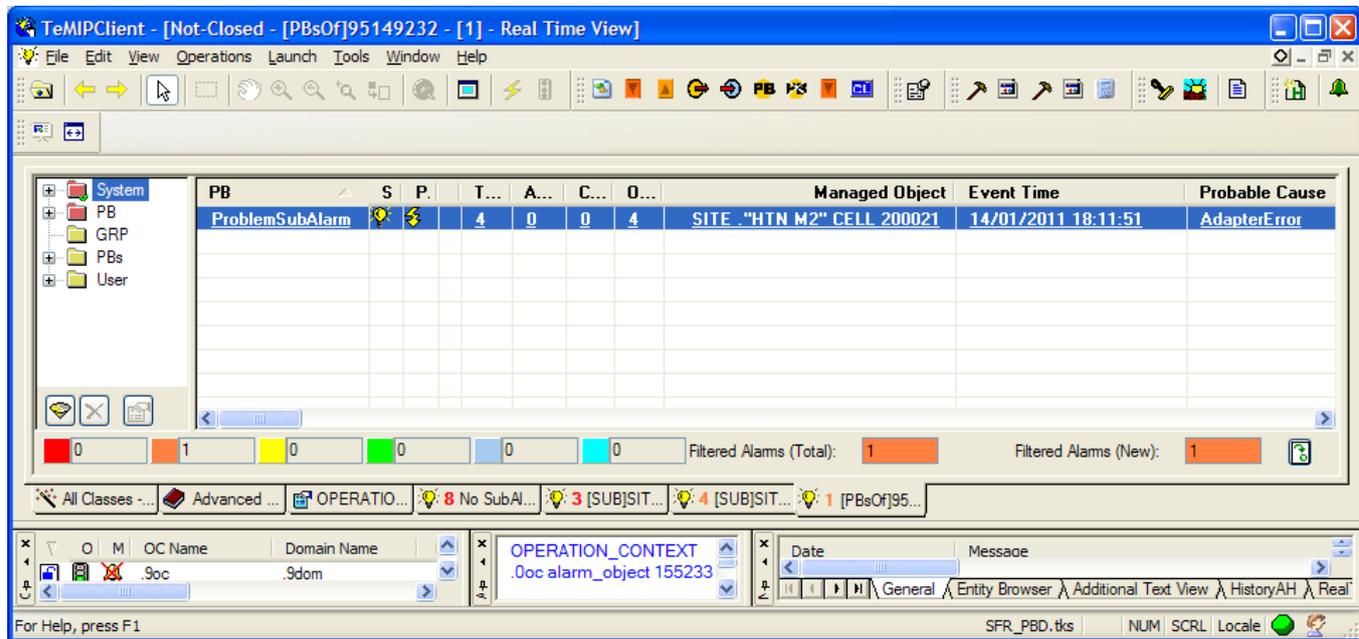
Figure 8: TheProblemSubAlarm is displayed by the drill up button

This ProblemSubAlarm, above is in turn a sub-alarm and thus a drill up (2) can be applied again on it to reach its parent by pressing the button ▲. The corresponding top parent is displayed in a new window.
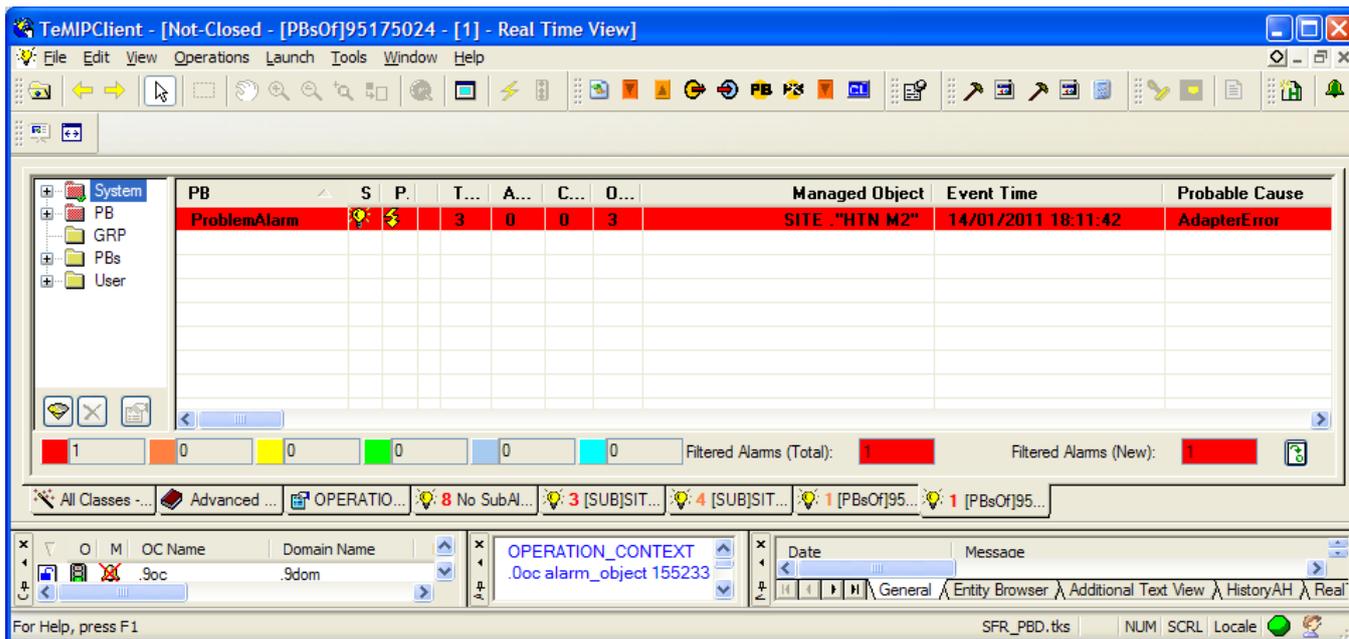
Figure 9: The top ProblemAlarm is displayed by the drill up button

4.3   Error messages

Below are some examples of error messages.

When drilling down, you get an error message if the selected message is not a ProblemAlarm (Figure 10).
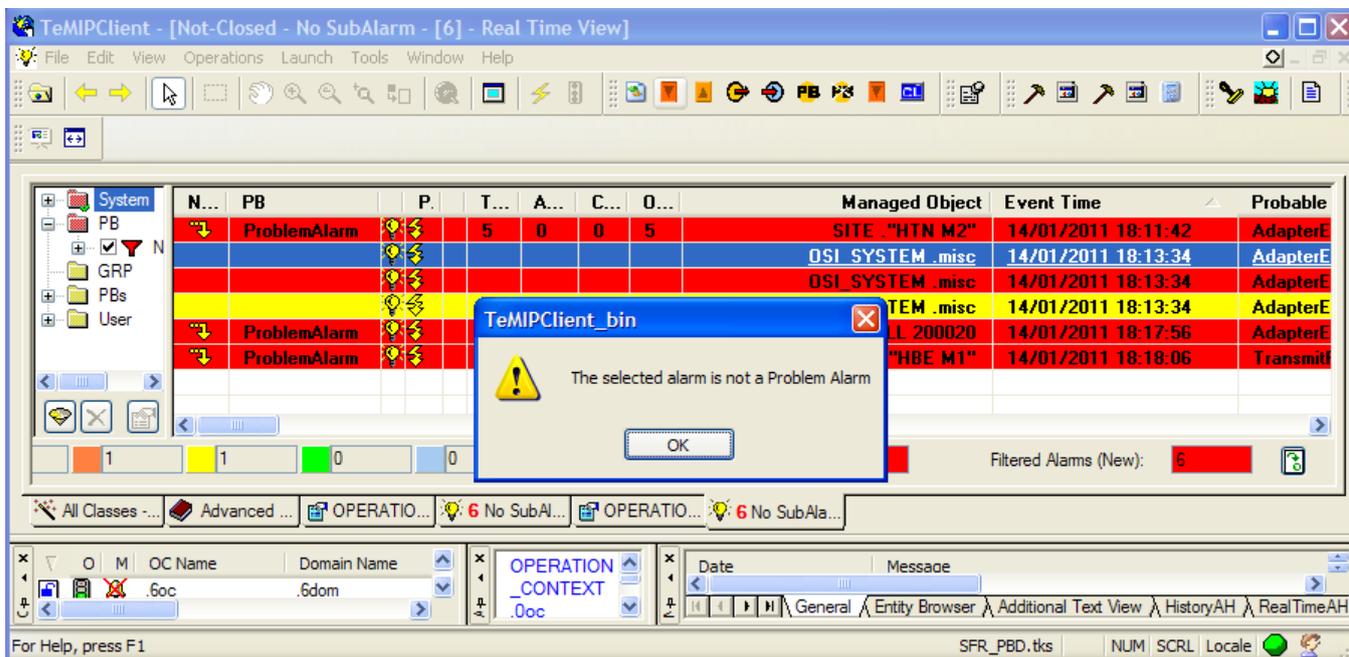
Figure 10: The selected alarm must be a ProblemAlarm when drilling down

When drilling up, you get an error message if the selected message is not a SubAlarm (Figure 11).
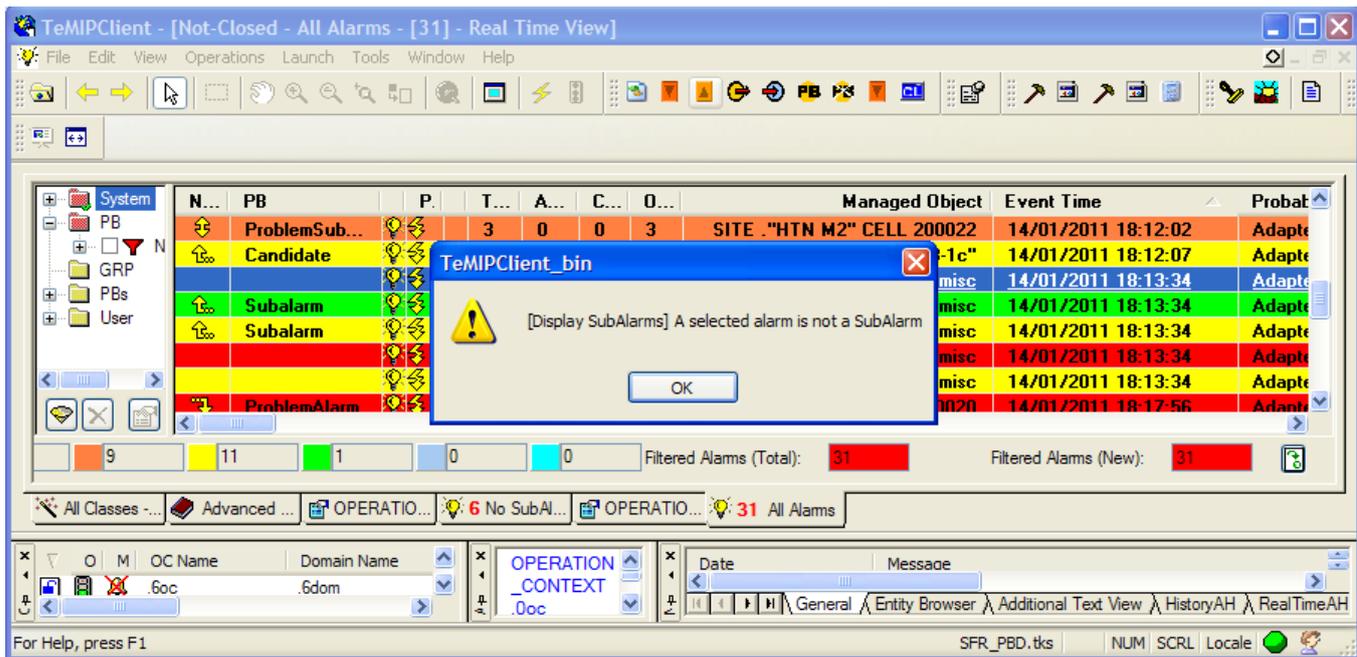
Figure 11: The selected alarm must be a SubAlarm when drilling up

Chapter 5

Alarm navigation (History-like)

Once the sub-alarms are hidden (see Chapter 3), it is possible to select a Problem Alarm and drill down to its associated sub-alarms. There are 2 possible navigation modes:

1. Real-Time navigation: Navigation from a Real-Time Window into another subsequent Real-Time Window

2. History-like navigation: Navigation from a Real-Time Window into an history-like Window

It is preferable to use one navigation mode among the two at a time to avoid confusion and mixing them although they are compatible and usable in parallel.

This Chapter presents the History-like navigation. Another Chapter (Chapter 4) deals with the Real-Time navigation.

The "History-like navigation" makes it possible:

- (1) to select a Problem Alarm and drill down to its sub-alarms

- (2) to select a sub-alarm and drill up to its Problem Alarm(s)

As opposed to the Real-Time navigation which is native into PBD, the History-like navigation requires PBD to explicitly activate it.

In case, the History-like navigation is activated in PBD, Problem Alarms will have the attribute "*Navigation*" filled in and then the following icon present (else not) for the corresponding alarm row (see Figure 12).

In case the History-like navigation is used, the column "PB" (see Chapter 2) can be replaced by the navigation column (see Figure 12):

- [*PB=ProblemAlarm*] is equivalent to [*Navigation=*]

- [*PB=Subalarm*] is equivalent to [*Navigation=*]

- [*PB=Subalarm*] is equivalent to [*Navigation=*]

- [*PB=not-available*] is equivalent to [*Navigation= not-available*]
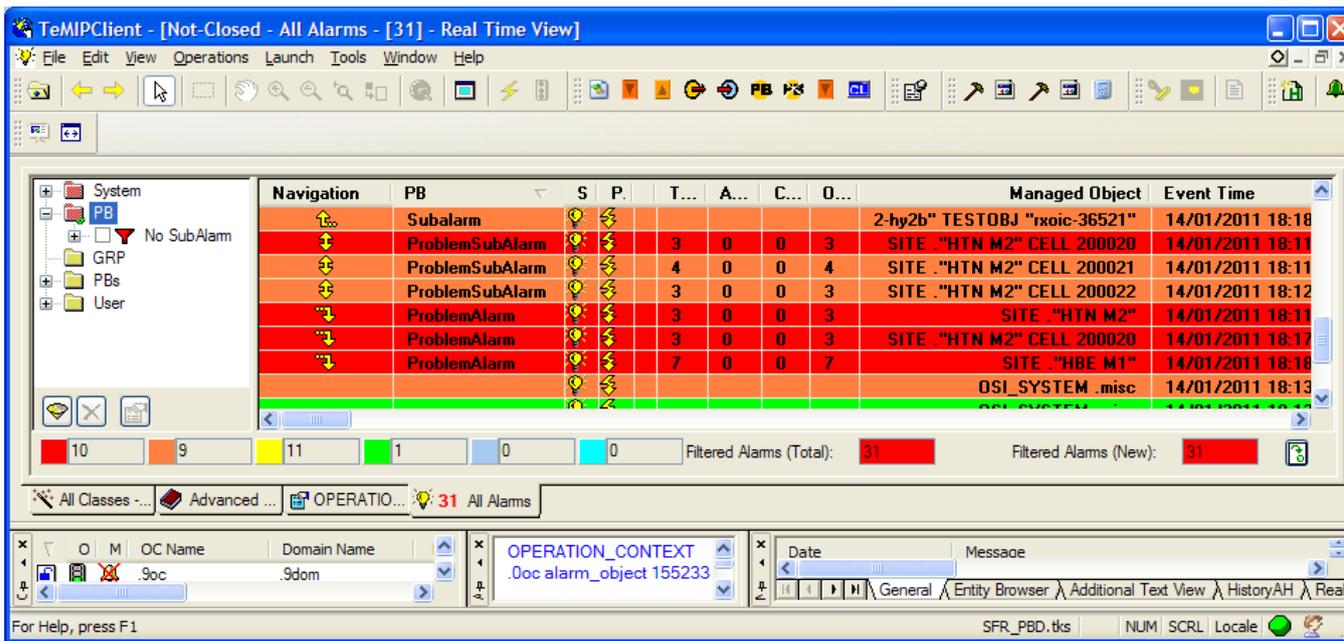
Figure 12: History-like navigation is activated

These navigation features are accessible

- either through the buttons below in the History-like window

- or through the MB3 menu below (from both the RT View or the History-like View)
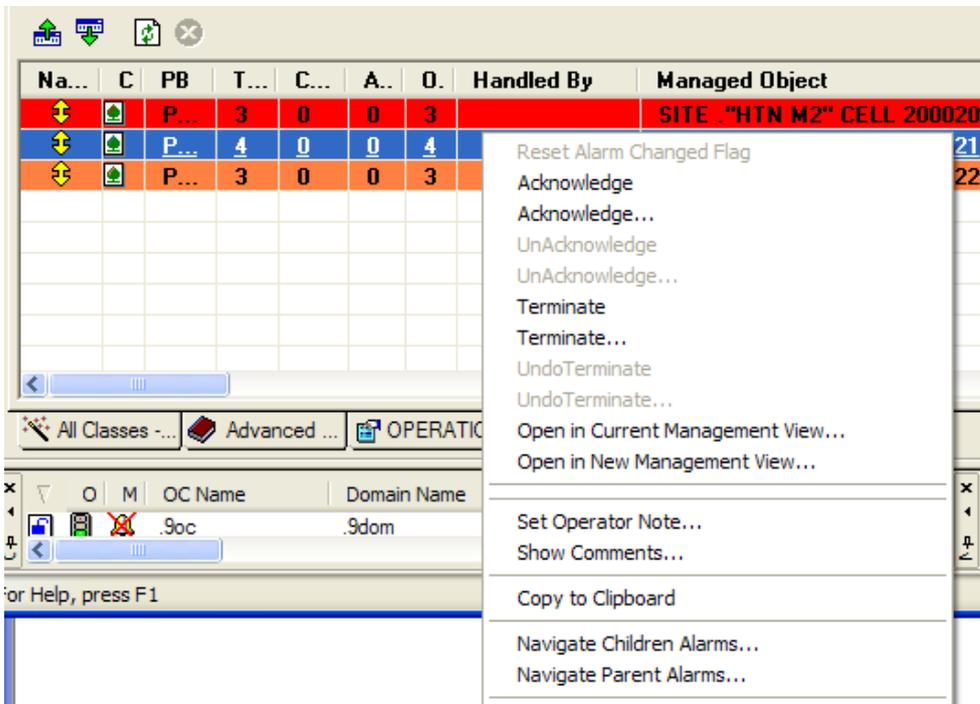
Drill down (1) is accessible

- Either through double-click from both RT Alarm View and History-like View

- Or through [*MB3→Navigate Children Alarms…*] from both RT Alarm View and History-like View

- Or through the button (in History-like View)

Drill up (2) is accessible

- Either through [*MB3→Navigate Parent Alarms…*] from both RT Alarm View and History-like View

- Or through the button (in History-like View)

5.1 Drill down

Below is illustrated a 2-levels drill down: from a top alarm to leaf alarms and conversely from a leaf alarm to the top alarm.

As described in A.4.1 and as illustrated above, there can be several levels of grouping: a sub-alarm can be itself a Problem Alarm (ProblemSubAlarm) with its own sub-alarms and so on.

Select a Problem Alarm (Figure 13).
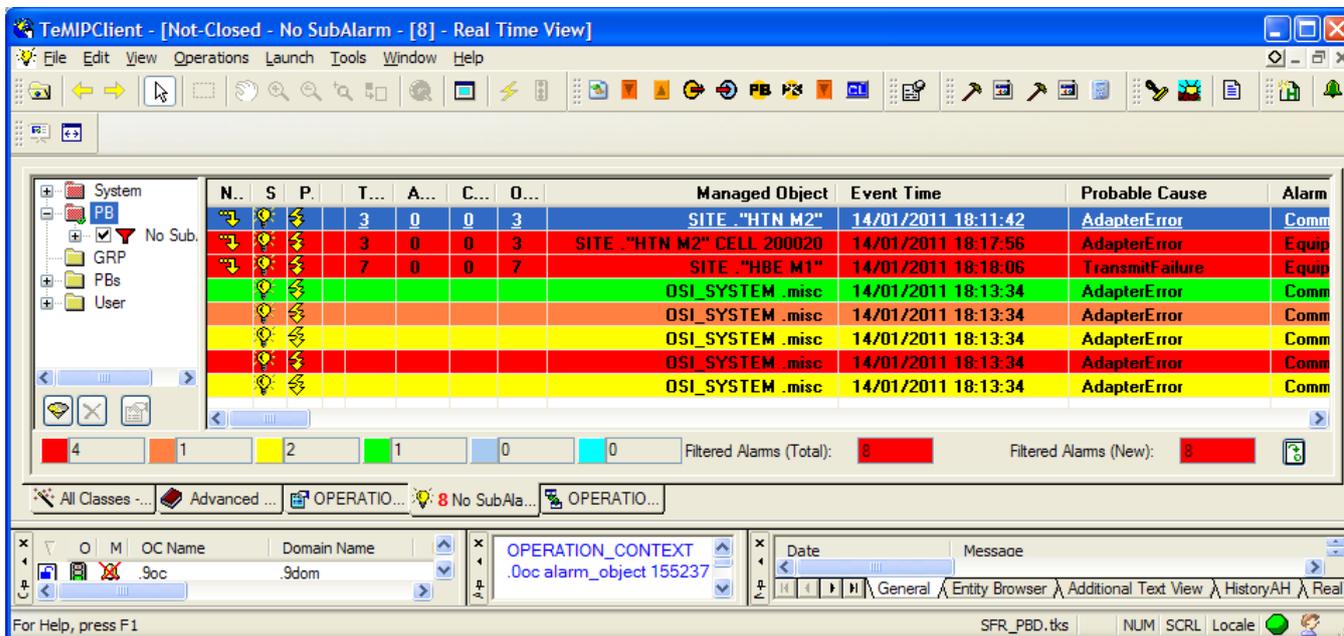
Figure 13: Select a Problem Alarm

Then press double-click on it or [*MB3→ Navigate Children Alarms…*]), the 3 sub-alarms are displayed in a new History-like View window (Figure 6). These 3 sub-alarms are at the same time 3 ProblemAlarms (ProblemSubAlarms /).
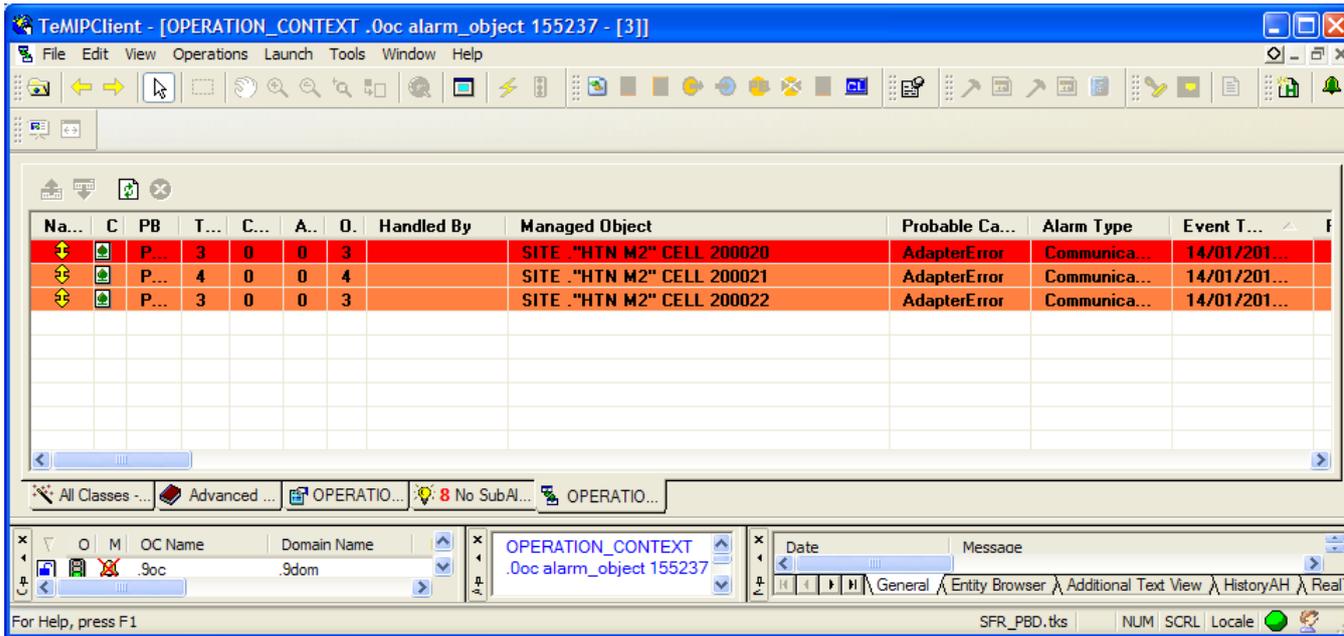
Figure 14: ProblemSubAlarms are displayed by double-clicking

Then select a ProblemSubAlarm and double-click on it (or ![icon] or [*MB3→ Navigate Children Alarms…*]), its sub-alarms are displayed in the same History-like window (Figure 15). These sub-alarms are pure sub-alarms (leaves / ![icon]).
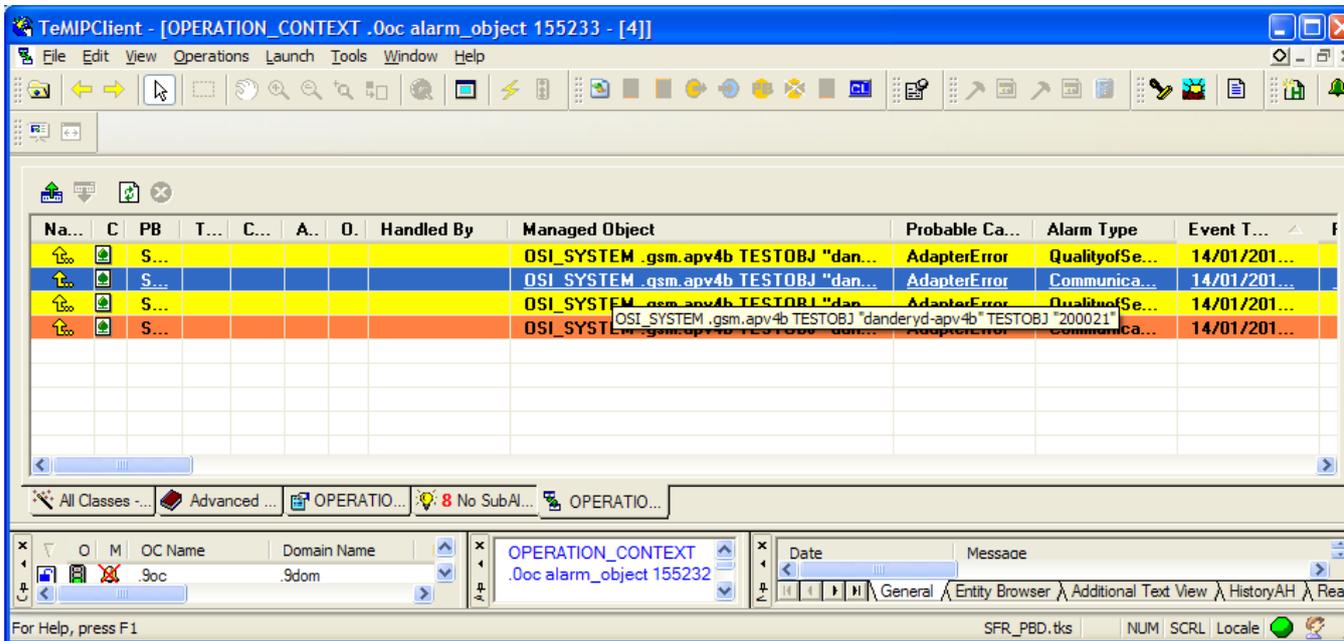
Figure 15: sub-alarms are displayed by double-clicking

Each time the drill down feature (1) is used or the drill up feature (2), the same History-like Alarm View window is reused.

This window is History-like which means that later raised sub-alarms are not added along on the fly in it. Navigation operations must be done again to refresh the History-like window.

5.2 Drill up

Conversely the drill up (2) feature can be applied by selecting a sub-alarm (Figure 15) and

pressing the button (or [*MB3→Navigate Parent Alarms…*]). The corresponding parent Problem Alarm(s) is (are) displayed in the same window (Figure 16).
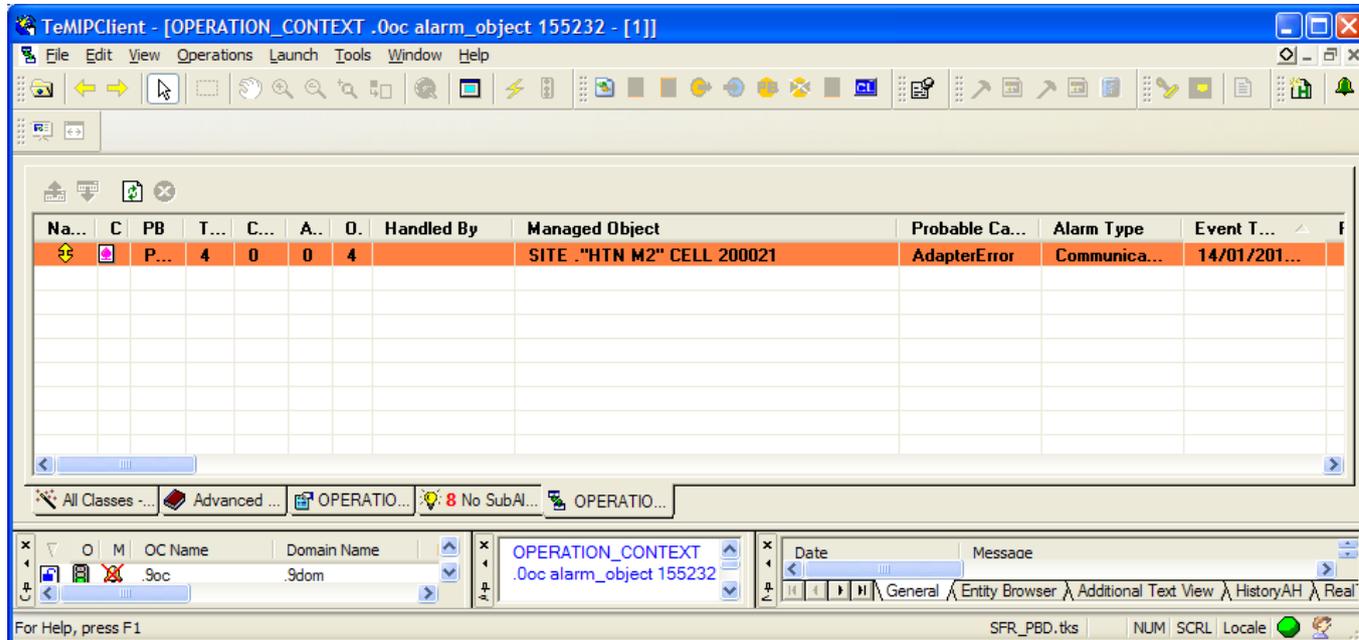
Figure 16: TheProblemSubAlarm is displayed by the drill up button

This ProblemSubAlarm, above is in turn a sub-alarm and thus a drill up (2) can be applied

again on it to reach its parent by pressing the button . The corresponding top parent is displayed in the same History-like window.

Figure 17: The top ProblemAlarm is displayed by the drill up button

Chapter 6

"similarity" navigation is compatible

In case the automatic similarity is activated for some OCs (reduction mode = Automatic), you may have group of alarms generated by PBD at the same time as groups of similar alarms generated by the automatic similarity.

In the TeMIP Client, when a parent alarm_object (AO) has multiple child similar_alarms (SAs), you just need to double-click on it to open a window listing its similar_alarms.

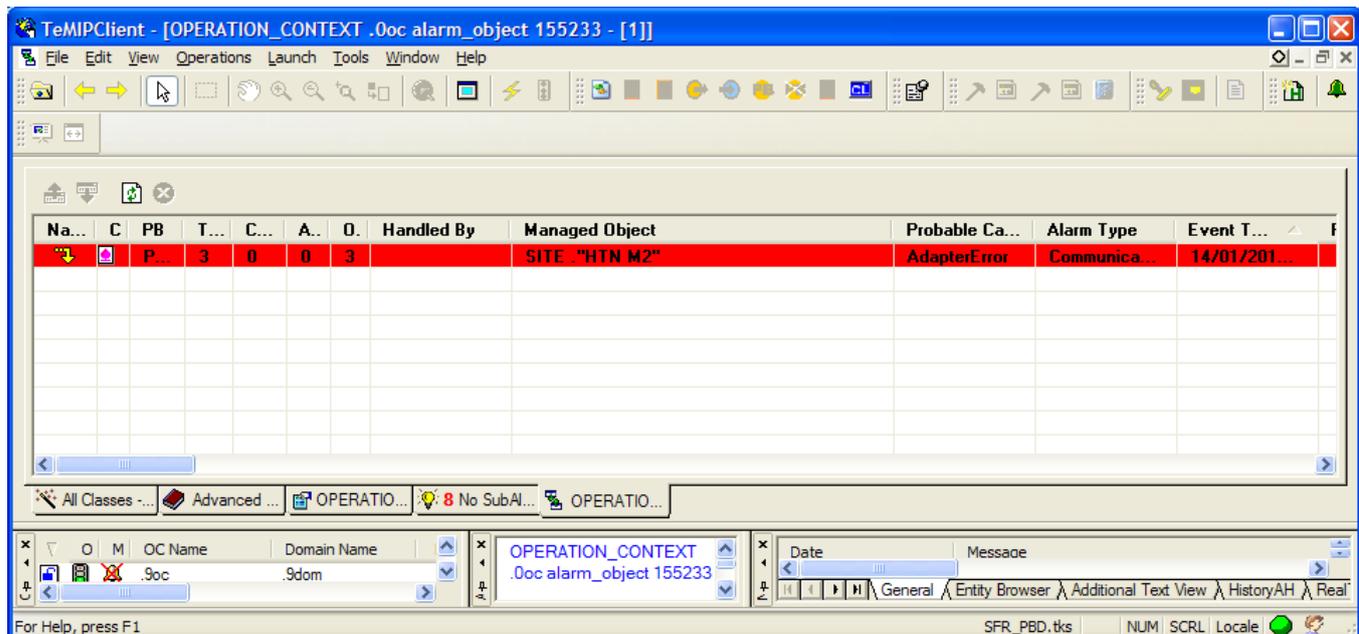This TeMIP Client similarity navigation mode is fully compatible with the 2 PBD navigation modes described in Chapter 4-Alarm navigation (Real-time) and in Chapter 5-Alarm navigation (History-like).

That means any alarm (AO) whatever the PBD category (ProblemAlarm vs. ProblemSubAlarm vs. SubAlarm…) might have at the same time "similar" alarms (SAs). The 2 types of grouping do not overlap and can work in parallel.

Real-time navigation:

You could have the following real-time navigation path:

AO (ProblemAlarm) in RT view→[   ]→AO (ProblemSubAlarms) in RT view →[   ]→AO (SubAlarms) in RT view →[double-click]→SAs in similarity window

For instance starting from the point illustrated in Figure 7 (2-level navigation), double clicking on the minor alarm (AO) with similar alarms (SAs) will list them in a separate window (Figure 18) which at ends come down to a 3-level navigation:
ProblemAlarm(AO)→ProblemSubAlarms(AOs)→ SubAlarms(AOs)→similar alarms(SAs)

History-like navigation:

You can have the following history-like navigation path:

AO (ProblemAlarm) in RT view→[double-click]→AO (ProblemSubAlarms) in RT view →[double-click]→AO (SubAlarms) in RT view →[double-click]→SAs in similarity window

For instance starting from the point illustrated in Figure 15 (2-level navigation), double clicking on the minor alarm (AO) with similar alarms (SAs) will list them in a separate window (Figure 18) which at ends come down to a 3-level navigation:
ProblemAlarm(AO)→ProblemSubAlarms(AOs)→ SubAlarms(AOs)→similar alarms(SAs)

In case a ProblemAlarm has at the same time sub-alarms and similar alarms, double-clicking triggers in priority the similarity navigation. [*MB3→Navigate Children Alarms…*] will have to be used instead for history-like drilling down.

Behaviour when double-clicking on an alarm:

Double-clicking on an alarm in the RT Alarm View or in the History-like View (Chapter 5):

1. Displays the similar alarms if any

2. Else displays the sub-alarms (PBD) if any

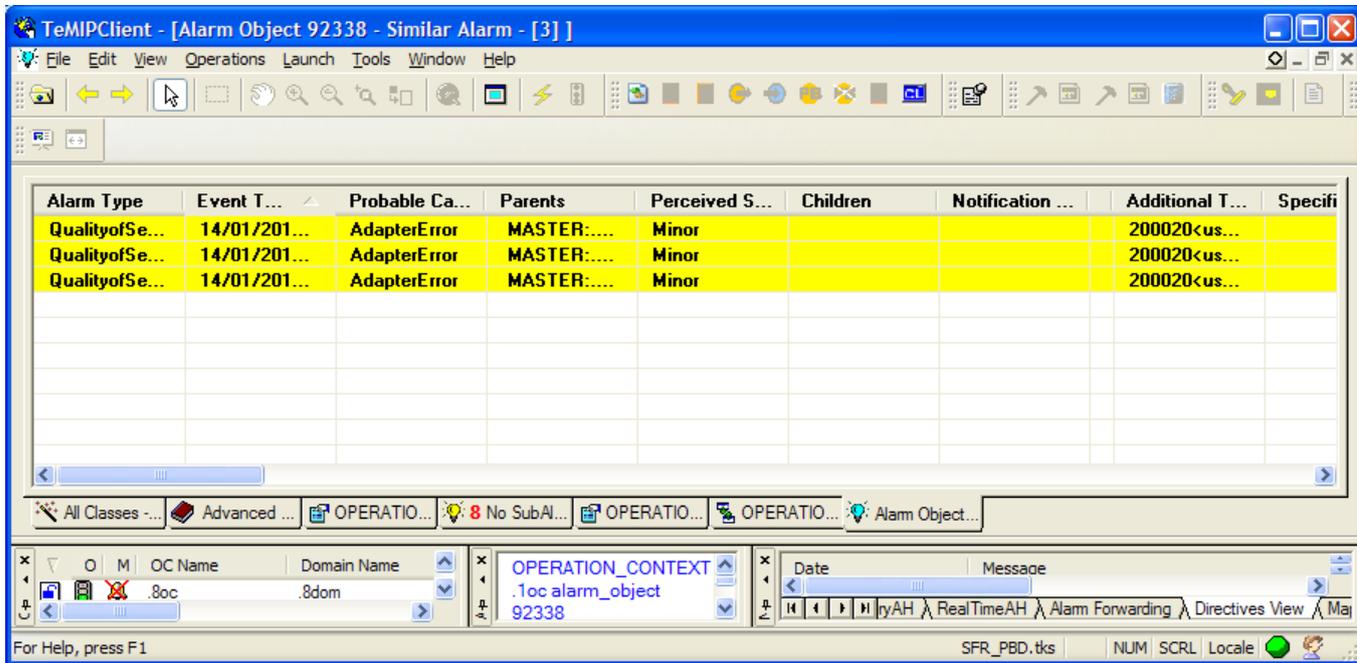3. Else open a Management View on the selected alarm

Figure 18: Display similar alarms of a sub-alarm

Appendix A

Problem Detection Principles

This chapter gives an overview of the of Problem Detection (PBD) principles.

A.1 Overview

When a type of failure (problem) occurs in the network on some resource R at some time T, equipment in R's neighborhood generally generate several alarms in a time window around T.

Problem Detection aims to:

- Detect such a set of symptom alarms,
- Generate a Problem Alarm that best summarizes the problem,
- Group symptom alarms (sub-alarms) under it.

Such a Problem Alarm aggregates:

- Alarms related to the same resource in R's neighborhood (same Managed Object, entity hierarchy, or network location)
- Alarms generally in a same time window around T

This Problem Alarm is the main alarm handled by operators and it manages its sub-alarms life cycle:

- State policy (acknowledgement, termination),
- Clearance policy,
- Severity.

Associated Trouble Ticket generation can be automated to have one single TT for the Problem Alarm and its sub-alarms.

To achieve these goals in handling Problem Alarms, Problem Detection relies on the following TeMIP software products:

- TeMIP Expert that implements the intelligent detection and automation processing,
- TeMIP Client to display Problem Alarms and offer drill down to sub-alarms.

A.2 Introductory examples

Let's get started by deploying some typical customer use cases and see the corresponding Problem Alarms generated by Problem Detection.

A.2.1 GSM Ericsson

Cell Down Problem:

If there's a failure at any level on a transceiver named *TRX1* of a cell named *Cell1*, this *TRX1* transceiver emits "RADIO X-CEIVER ADMINISTRATION MOF-BTS INTERNAL" alarms.

Some minutes later, the BSC controlling the cell site will emit "CELL LOGICAL CHANNEL AVAILABILITY SUPERVISION" alarms.

Problem Detection detects such types of alarms, checks that they are related to the same site *Site1* and cell *Cell1* within a common time window. Then it creates a synthetic Problem Alarm on the cell *Cell1* of the site *Site1* itself (i.e. "Site Site1 Cell Cell1" TeMIP entity).

This problem is depicted in Figure 19.
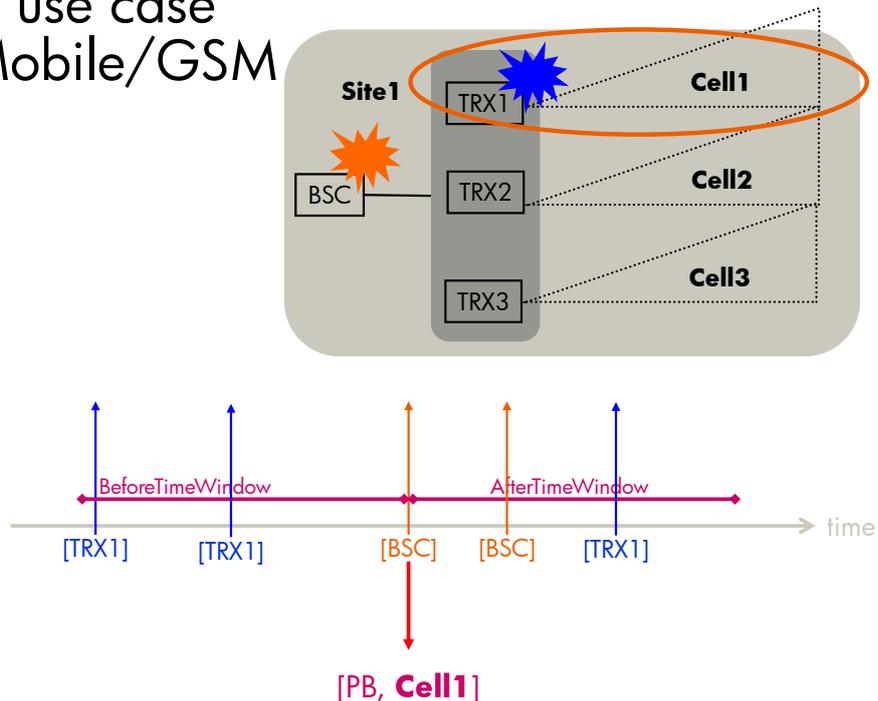
Figure 19: GSM Ericsson problem: Cell Down

The result of the Problem Alarm generation in the TeMIP Client Real-Time Alarm Handling view is presented in

Figure 20.

Figure 20: GSM Ericsson Cell Down Problem Alarm display

Problem *Site Down*:

This is the continuation of the problem *Cell Down* described in A.2.1. This extension problem detects that all 3 cells *Cell1*, *Cell2*, *Cell3* of a same site *Site1* are impacted through the *Cell Down* problem described in A.2.1.

Problem Detection can then deduce that the site itself is failing and create a *Site Down* Problem Alarm on this site *Site1*.

There are now 2 levels of problems:

- One *Site Down* Problem Alarm on *Site1* composed of 3 *Cell Down* problems on its cells *Cell1*, *Cell2*, *Cell3*

- Each *Cell Down* problem on each cell aggregates (as in problem A.2.1) network cells logical alarms and BTS internal alarms.

This problem is depicted in

Figure 21**.**

A use case
Mobile/GSM

Site1

TRX1   Cell1

BSC   TRX2   Cell2

TRX3   Cell3

AfterTimeWindow

time

[PB, **Cell1**]   [PB, **Cell3**]   [PB, **Cell2**]

[PB, **Site1**]

20 November
13   2008
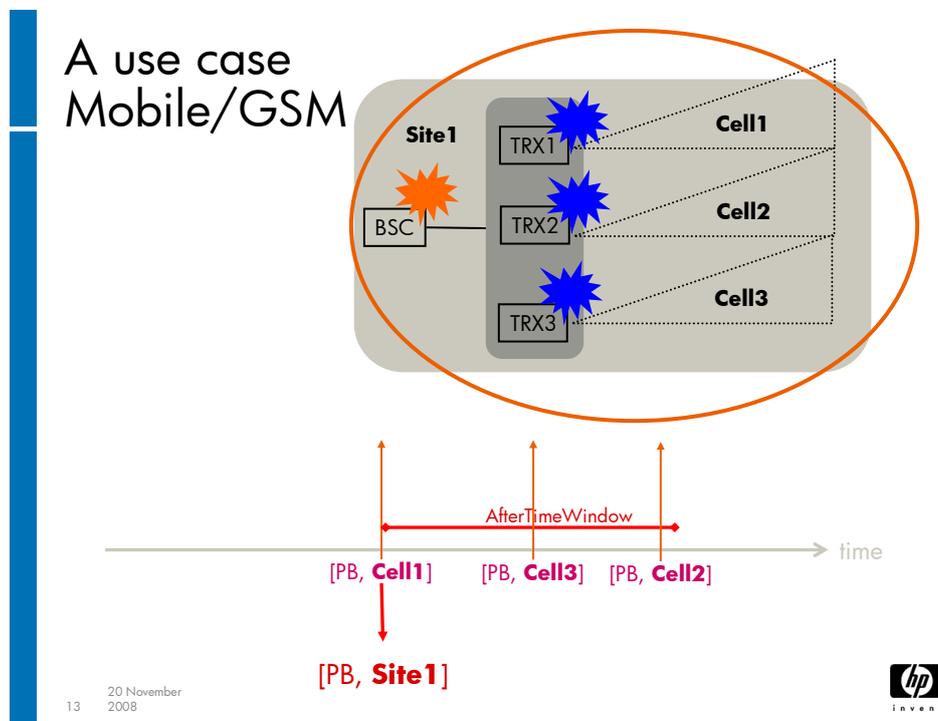
Figure 21: GSM Ericsson problem: Site Down

The result of the *Site Down* Problem Alarm generation in the TeMIP Client Real-Time Alarm Handling view is presented in
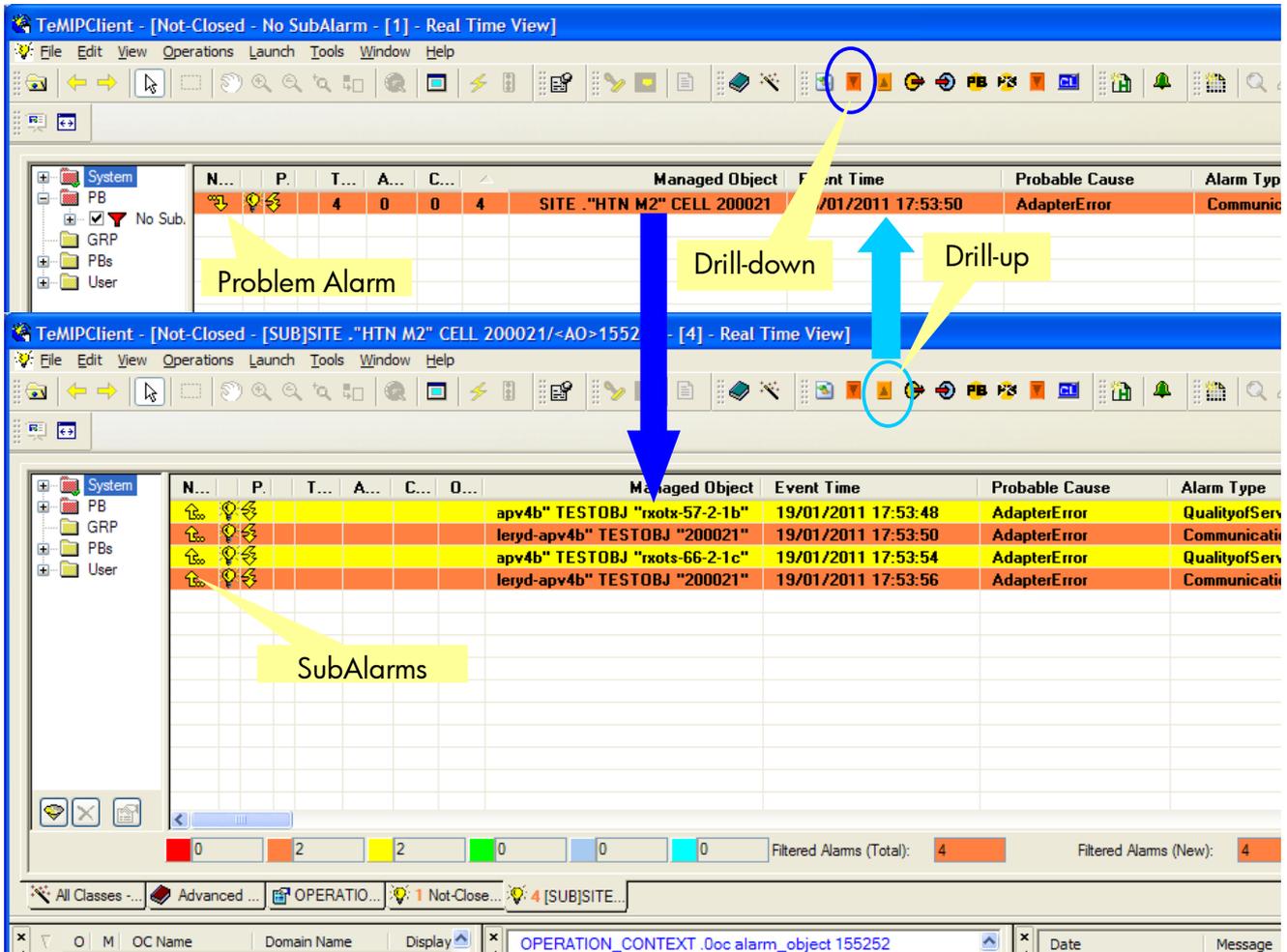
Figure 22.
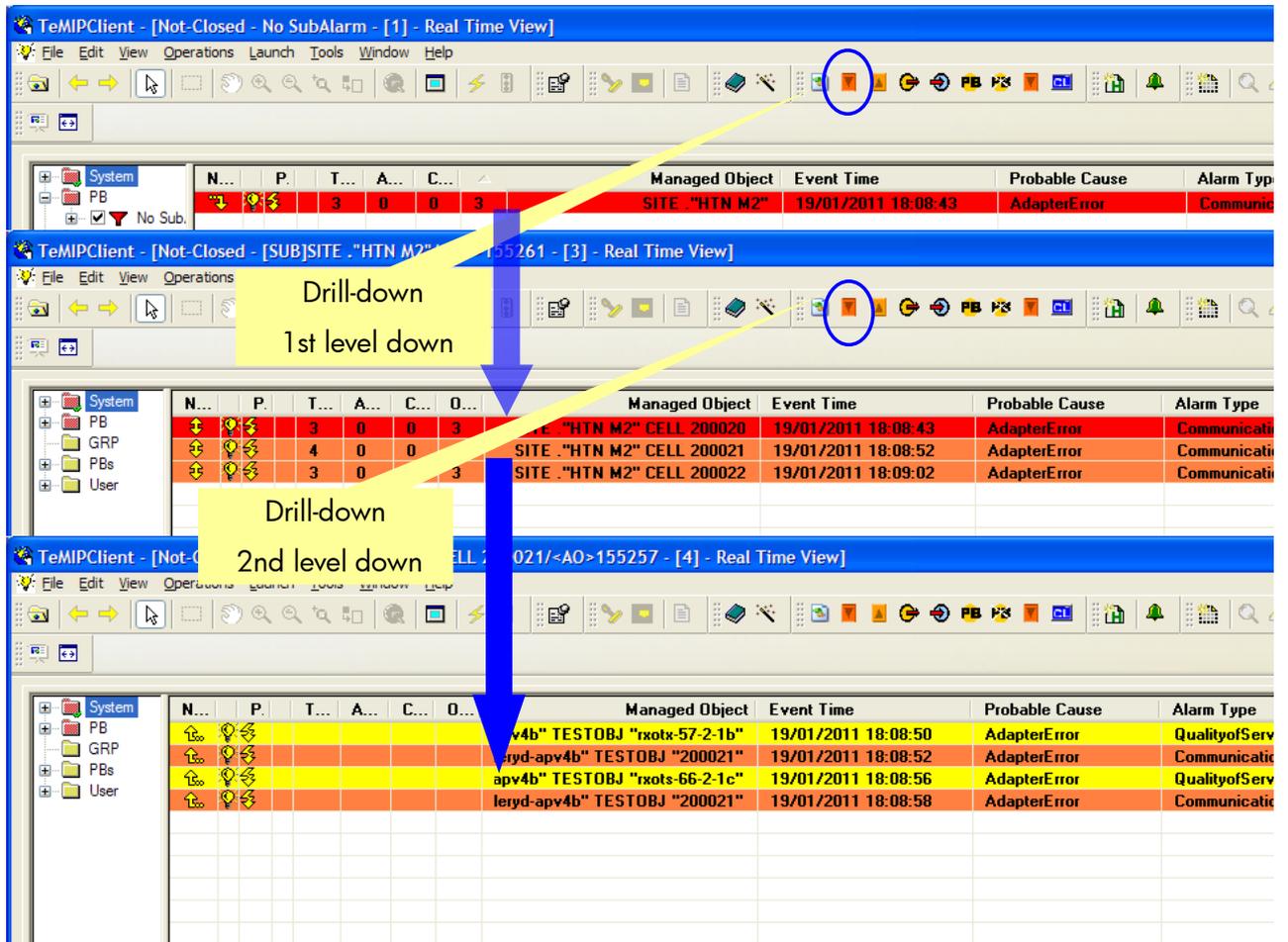
Figure 22: GSM Ericsson Site Down Problem Alarm display

A.2.2 Mains break

A very common problem is the "mains break" problem that represents a power failure in the network that impacts the network neighborhood.

Problem Detection, when detecting such as "mains break", is able to gather all network alarms in the network neighborhood (same cell site) so that the end-operators only monitor a single alarm instead of possibly tens of alarms.

A.3 Architecture

Figure 23 represents the Problem Detection architecture.
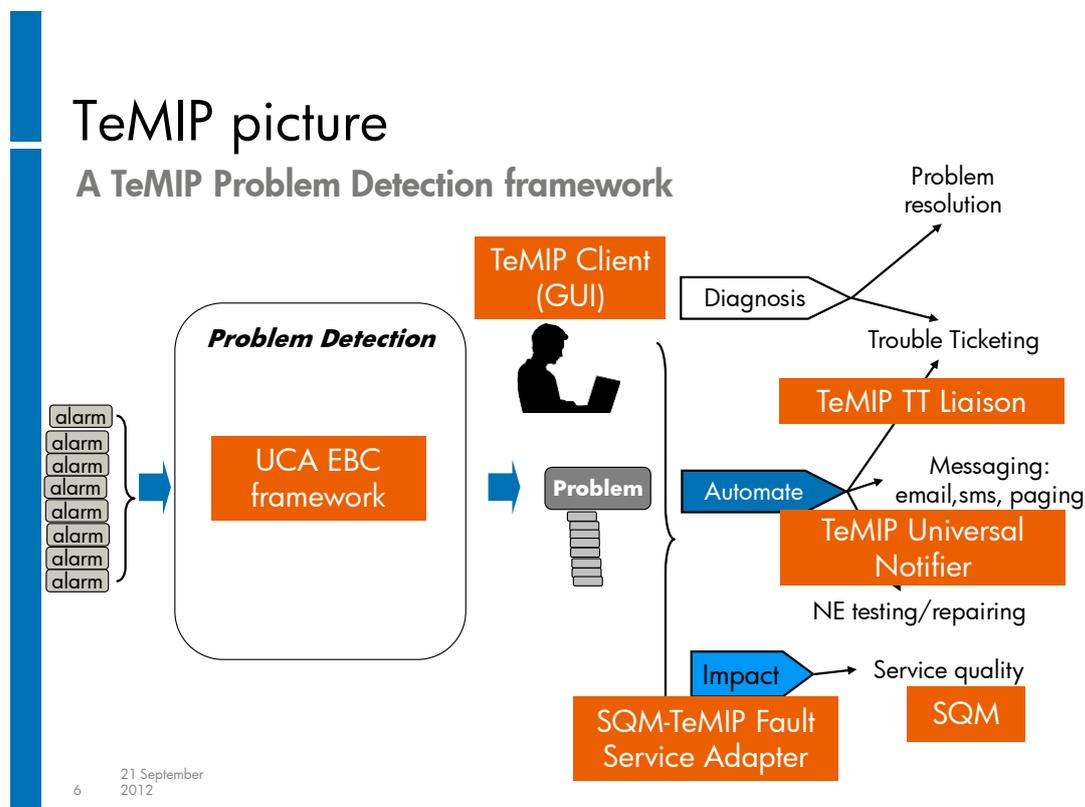
Figure 23: Problem Detection architecture

The TeMIP Expert product is used for:
- Detecting and grouping alarms,
- Creating the Problem Alarm,
- Handling the global Problem Alarm life cycle (state, clearance, severity),
- Automating Trouble Ticket creation and scripts execution

The TeMIP Client is customized (using the TeMIP Client plug-in toolkit) to provide specific enhancements for the Problem Detection that allows an operator using the extra TeMIP Client buttons/menus to:
- Drill down from a Problem Alarm to sub-alarms (several drill down levels possible),
- Drill up from a sub-alarm to its Problem Alarm,
- Manually add alarms in a group of alarms,
- Manually remove alarms from a group of alarms,
- Manually create a group of alarms,
- Manually break a group of alarms.

A.4 General capabilities

A.4.1 Alarm grouping

With Problem Detection, several nested levels of alarm grouping are possible. For instance, a Problem Alarm can itself be a sub-alarm (ProblemSubAlarm). Such nesting of alarms is not possible with the standard TeMIP Alarm Handling similar_alarm objects.

An alarm within Problem Detection can belong to several groups of alarms (such multiple grouping of alarms is also not possible with the standard TeMIP Alarm Handling similar_alarm object).

Unlike similar_alarm objects, the Problem Detection sub-alarms keep their state and clearance values.

In the context of Problem Detection, an alarm can have several possible categories (set in the PB alarm attribute):

- Candidate: is likely to be involved in a Problem but the current conditions (some alarms missing) are not yet sufficient to create a Problem Alarm and thus become a SubAlarm,

- SubAlarm: the Problem is created and involved symptom alarms become subalarms,

- ProblemAlarm: the alarm describes the root cause of the problem,

- ProblemSubAlarm: this is a Problem Alarm which itself is a sub alarm,

- Alarm: either a "Candidate" alarm or a "SubAlarm" that has been promoted because there was no problem alarm created or the Problem Alarm has been eliminated in some way.

- None: a network alarm not involved in Problem Detection

Only ProblemAlarms are displayed to end operators.

These alarm grouping features are summarized in

Figure **24**

Alarm Grouping flexibility

- Several level of grouping
- One alarm can belong to several groups
- Alarm categories:
  - *Candidate*: if problem not yet created
  - *SubAlarm*: if problem created
  - *ProblemAlarm*: the Problem
  - *ProblemSubAlarm*: a Problem that is a SubAlarm
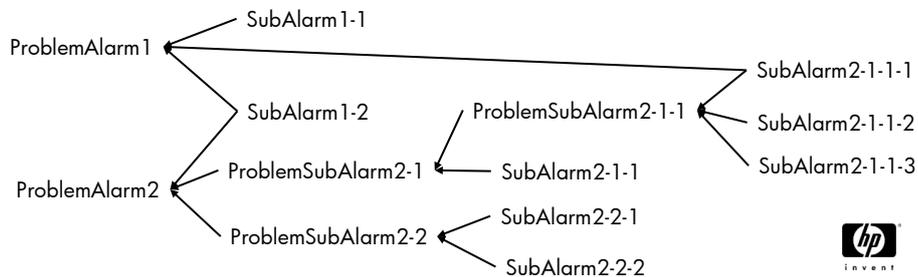 - *Alarm*: a SubAlarm or Candidate that has been promoted

Figure 24: Alarm grouping features

A.4.2 Life cycle

In Problem Detection, the alarm state, problem status, clearance and severity policies can be set for each correlation problem.

However predefined policies are provided.

The following life cycle policies are available within Problem Detection:

- State policy: to control in real-time, the evolution of the SubAlarm objects' states from the Problem Alarm's state and conversely. It is in this policy that you can specify what to do when a Problem Alarm or sub-alarm is acknowledged, unacknowledged, terminated or unterminated.

- Problem status policy: to control in real-time and along the time window, the SubAlarm objects' problem status from the Problem Alarm's problem status, especially through TeMIP Trouble Ticket Liaisons:

  - Fully automated TT

  - Semi-automated TT: operator creates the TT for the Problem Alarm and then automatic TT propagation to its sub-alarms.

- Clearance policy: to control in real-time, the evolution of the Problem Alarm's clearance from the SubAlarm objects' clearance

- Severity policy: to control in real-time, the evolution of the ProblemAlarm's severity from the SubAlarm objects' severity.

A.4.3 Counters

Problem Detection provides 4 counters for the Problem Alarm objects:

- Number of Total Alarms

  - Either the total number of active subalarms

  - Or the total number of subalarms that have been associated to the Problem Alarm at some point in the time whatever their current state or existence.

- Number of Cleared Alarms

- Number of Acknowledged Alarms

- Number of Outstanding Alarms

A.4.4 Trouble Ticketing

Problem Detection offers a framework for Trouble Ticketing requests to provide an off the shelf efficient solution to the following issues usually encountered when manipulating trouble tickets from TeMIP Expert:

- TT requests cannot be performed synchronously else they slow down TeMIP Expert processing.

- The number of TT requests must be controlled to avoid too many threads on the system and overload the TT server.

This is why Problem Detection controls:

- The time limit for a TT request to start its execution,

- The time limit for a TT request to complete its execution in order not to block the pending TT requests.

A.4.5 Other capabilities

Problem Detection offers also the following features to easily define correlation problems:

- Time windows can be specified per problem.

- Problem context: Problem Detection handles a context of alarms per group so that you can explore the group context contents if needed at any time during correlation processing.

- Problem pre-conditions: the problem context allows for the application of preconditions on the group context before deciding to create the problem or not.

- Problem Alarm:

  - For user-friendliness, it can be created on any entity (even if this entity does not exist, however the corresponding entity class must be present in the TeMIP dictionary). This can be used for instance, to report a Problem Alarm on a site.

  - Or the Problem Alarm can be selected from among existing network alarms.