



SMARTLINK

Alarm Messages Management and Notification





SmartLink uses its component SmartAlarm to manage alarm messages coming from Mindray's Hypervisor or PDS gateway.

SmartAlarm, using customer selectable thresholds and the available communication media, can notify doctors to take charge of the alarm messages.

SmartLink's Administrator can select the list of alarm messages to be managed and add each alarm to a different priority group.

For each group, the Administrator can define a notification strategy:

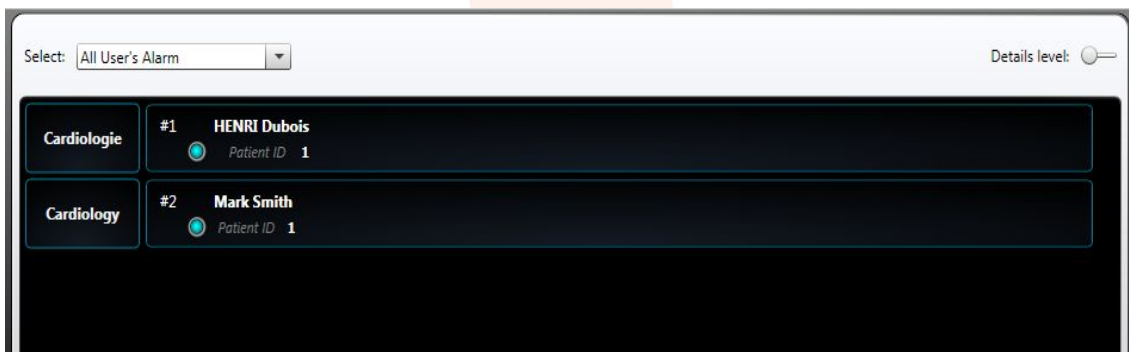
- selecting one or more media to be used for alarm notification,
- deciding, for each media, the list of recipients,
- deciding how to manage to list of recipients:
 - sending a broadcast message to the whole list,
 - sending a message to the first recipient and, after a configurable lapse of time without taking in charge, sending the same message to the second recipient, and so on, stopping sending messages after reached the end of the recipients list,
 - the same but, after reached the end of the recipients list, starting again from the first recipient.

The recipient, after receiving the alarm notification, can connect to SmartLink and take in charge the alarm, to stop the notification sequence.

SmartLink's Administrator can configure the system to make mandatory or not taking in charge of the alarm messages.

When an authorized user accesses SmartLink, he can display:

- his alarm notifications list,
- the whole alarm notifications list (all users),



Then the user can have more details for each alarm notification, selecting a line of the list.



Each line corresponds to an alarm notification and contains date and time and the number of notifications sent.

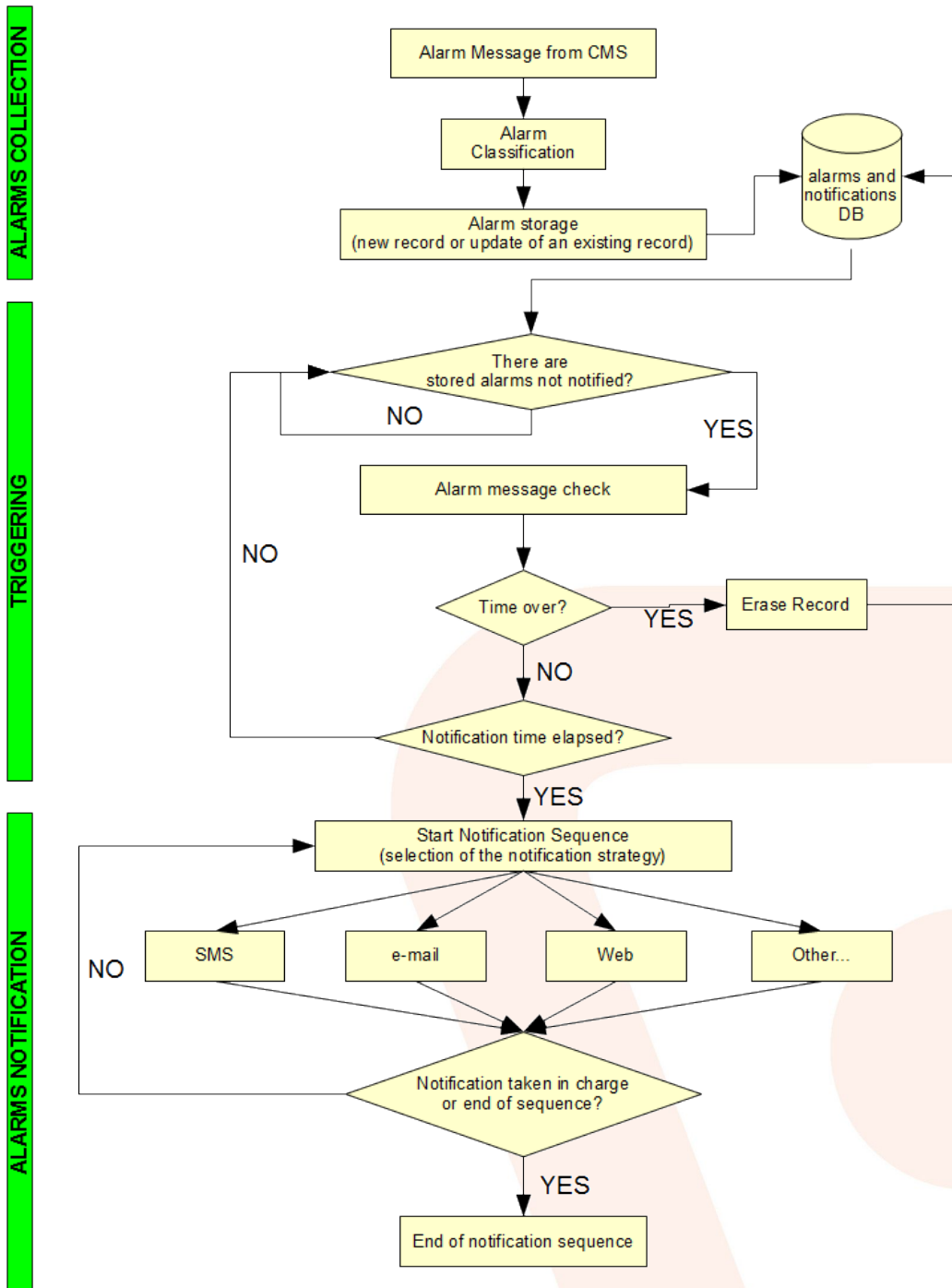
The colored dots to the right are the count of the notifications sent.

These dots appear only if the alarms notification is active.

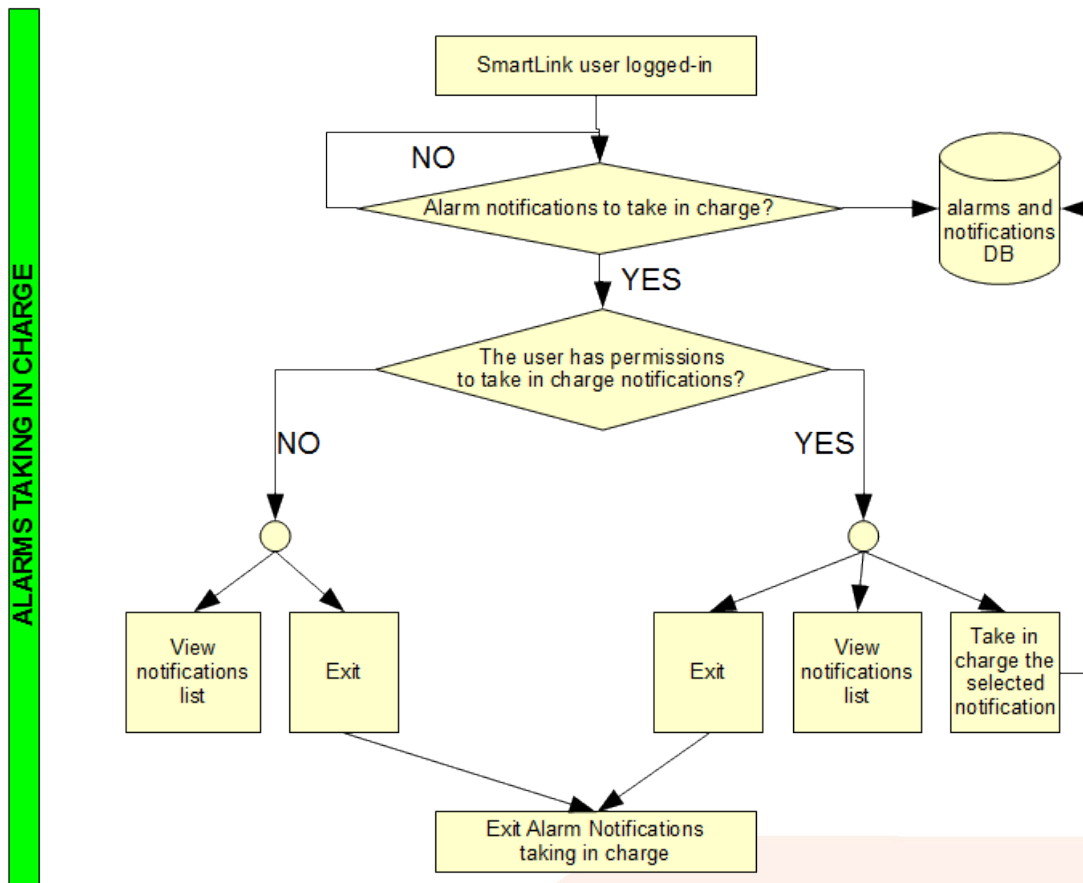
In this case each dot represents a notification step, such as an SMS or e-mail sent to the list of recipients.

Procedure Workflow

The graph in this page illustrates the operating work-flow followed by SmartAlarm to notify alarm messages.



The graph in this page illustrates the operating work-flow followed by SmartAlarm to take in charge the alarm messages.



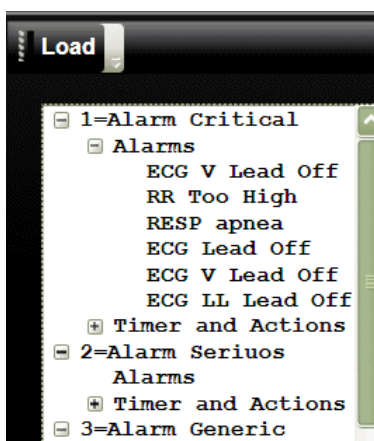
Software Configuration

SmartLink allows the user to configure the alarm notifications in an easy and quick way:

- Viewing the actual alarm management configuration.
- Selecting the level of the added alarm messages.
- Deciding the actions to be performed to notify the alarm messages.

Viewing Configuration

The current Alarm Configuration is shown in a “tree-view”:



(click [+] to open node in tree view)

Moving into the tree is possible to go through the entire alarms structure managed by SmartLink.

The structure can be modified adding, editing or deleting one or more alarms in the list.

Alarm levels and categories

Alarms are organized by category.

Each alarm message managed is assigned to one of the following categories:

Critical	Critical Alarm	red code
Serious	Serious Alarm	yellow code
Generic	Generic Alarm	orange code
Default	Alarms received from monitor and not associated to any category	
Not used	Alarms not used	

The screenshot shows a configuration window with a top navigation bar containing tabs: Critical (red), Serious (orange), Generic (yellow), Technical (blue), Default (green), and Not used (grey). The main area is divided into two sections: 'Physiological' and 'Technical'. The 'Physiological' section has a list with 'RESP apnea' and 'RR Too High'. The 'Technical' section has a list with 'ECG Lead Off', 'ECG LL Lead Off', 'ECG V Lead Off', and 'ECG V Lead Off'. To the right, there are fields for 'Code:' (value: 6), 'Description:' (value: ECG V Lead Off), 'Type:' (value: Technical), and 'Level:' with radio buttons for Critical (selected), Technical, and Default.

For each alarm is possible to view and edit the actual configuration and classification.

Using SmartLink is possible to decide to manage a subset of the alarm messages coming from the CMS, and classify them in a different way.

Once added or modified an alarm, changes can be saved:

The screenshot shows a configuration window with a 'Save' button in the top right corner. The fields are: 'Code:' (value: 6), 'Description:' (value: ECG V Lead Off), 'Type:' (value: Technical), and 'Level:' with radio buttons for Critical (selected), Serious, Generic, Technical, Not used, and Default.

If during a configuration session something has been changed, the “Restart” button allows to reload the changed configuration to be used immediately by SmartLink.

Actions to be performed

For each Alarms Category there are different selectable options. A notification strategy can apply one or more options at the same time.

SmartLink's Administrator, for each category, can select:

- **Action:** “Active” or “Not Active”
If Active, for this category at list one action is performed, otherwise no action will be performed for the alarms belonging to this category.
- **Time:** Seconds of alarm persistence
If an alarm is active for n seconds and n is configured as the time limit (persistence), the action to perform is executed (e.g. SMS sending);

If the alarm doesn't reach a n seconds period is removed without performing any action;

- **Web notification:**
 - Not used: No alarm notification messages will be sent to a computer and the alarm will not be displayed to SmartLink's users.
 - Not required: No alarm notification messages will be sent to a computer but the alarm will be displayed to SmartLink's users.
 - Required: The alarm notification messages are sent to a computer and the alarm will be displayed to SmartLink's users.

- **SMS:**
 - Not active: SMS messages will not be sent to notify alarms.
 - Active: SMS message will be sent to notify alarms, to a list of users.
 - Users: Enter the users' list (separated by commas)

- **Email:**
 - Not active: Email messages will not be sent to notify alarms.
 - Active: Email messages will be sent to notify alarms, to a list of users.
 - Users: Enter the users' list (separated by commas)

Contents of SMS messages, text and emails can be configured selecting the fields to be inserted in the message:

-	%bednumber:	bed number
-	%patientno	patient Id
-	%surname:	surname
-	%name:	name
-	%error:	error description
-	%codeerror	error code
-	%time	time alarm
-	%department	department
-	%sex	sex
-	%birthdate	birth date
-	%persistence	number persistence (1 to 6)
-	%level:	alarm level (1=critical, 2=serious; 3=generic 4=tecncal)
-	%desclevel	alarm description
-	%guid	patient guid
-	%typeerror	type error