SKYRESPONSE

White Paper

Creating Efficient Workflows for Your Alarm Handling

1 Introduction

Skyresponse:system is an exceptionally flexible, cloud based platform for handling of alarms and events in security, personal care and industrial applications. However, the flexibility also places requirements on stringent configuration of the various system entities to best fit the workflows of the target applications. This white paper therefore details a number of example workflows which directly can be set up by Skyresponse:system and improve your alarm handling.

2 An Application Example

Let us start with a real application, in this case a nursing home with patients located throughout rooms in a larger building and being attended to by nurses and doctors. When a patient calls for a nurse or a sensor gives a signal, how should that alarm best reach the respondent, e.g. the nurse? Should the alarm be sent directly to the mobile phone belonging to a particular nurse who takes it and attends to the patient? Or should the alarm be sent to a group of nurses on duty? Or maybe shown on a corridor display for anyone in the corridor to act on? And how should the nurse respond to the alarm, deactivate it and register his/her presence at the patient? Should a nurse be able to transfer the alarm to a colleague for action? What about supervisors and notifications of excessive number of alarms?

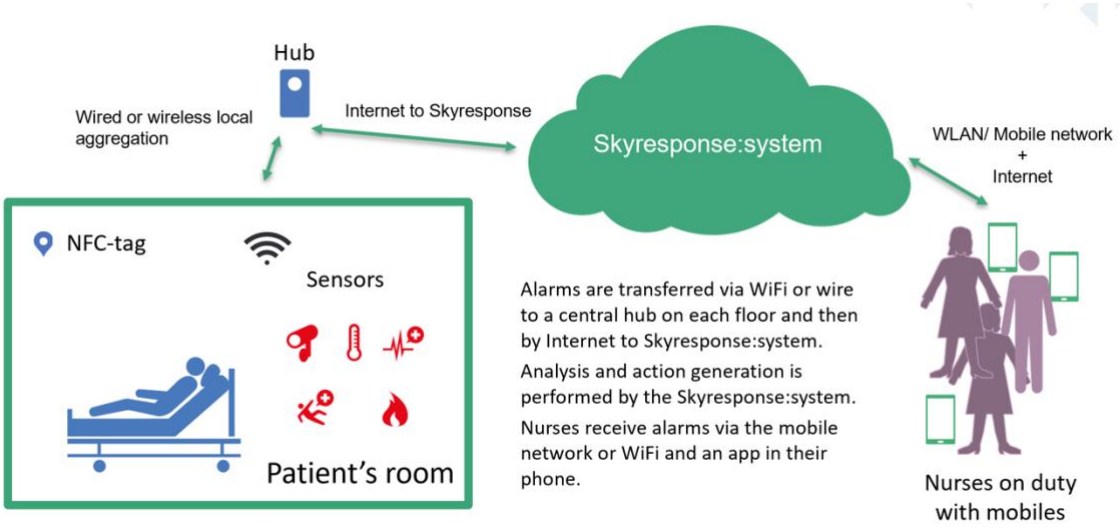

Figure 1. Alarm handling in a nursing home

It is obvious that even this rather straight forward application raises several workflow questions that must be analysed and decided upon before an automatic alarm handling system can be introduced. The same is true when analysing the workflow in e.g. a facility management application where alarms are to initiate the call out of a repairman. Luckily, Skyresponse:system supports all the above cases and many more, but as with any advanced machine, the system has to be configured correctly to provide you with the optimal experience.

3 This is Skyresponse:system

Skyresponse:system – the unique alarm and event handling system from Skyresponse – forwards alarms from analogue and digital products to respondents/response centres using a decentralized, cloud based, IT platform. The system ensures that all connected units will forward their alarms and the related information, following flexible rules, to the most appropriate receiver at any time.

Skyresponse:system includes a web based administrative system (*Skyresponse:admin*) for the services offered, the *Skyresponse:central* web-based response centre, the *Skyresponse:mobile* alarm reception apps, the *Skyresponse:alarm* apps for generation of alarms, and various accessories.

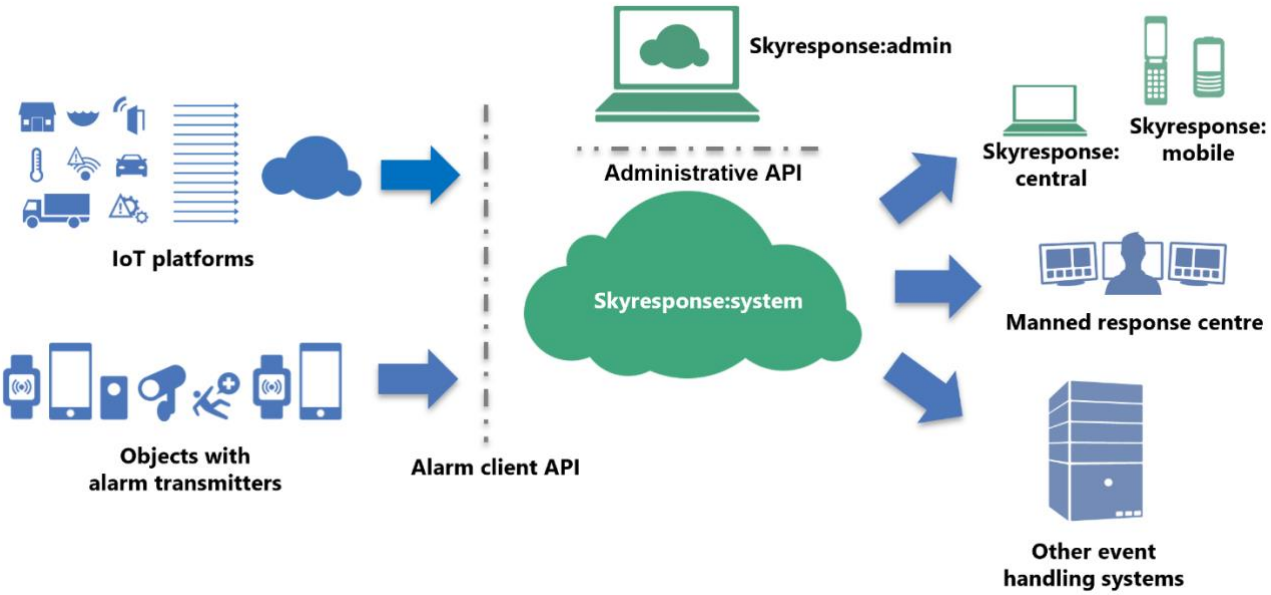

Figure 2. Skyresponse:system – a complete, cloud based, alarm and event handling system

From the beginning on Skyresponse:system has been designed to leverage two major trends in IT systems design: Ubiquitous connectivity over the Internet and cloud computing using a multitenant architecture. With the central logic of the platform implemented as a cloud service reachable over fixed and mobile broadband, the alarm service becomes independent of any specific computer hardware. Execution of the logic is shared between several, geographically separated, clusters of servers, and wherever the user has Internet connectivity, he/she can both raise an alarm and act as a respondent to alarms.

4 Basic Concepts and the Skyresponse Terminology

To correctly understand how various workflows can be set up with Skyresponse:system and what they can achieve, we need a common framework and consistent terminology. The following diagram illustrates the most basic entities used in alarm handling by Skyresponse:system and the base terminology used by Skyresponse. Your application may use another language or alternative terms, but those terms will then always be translations of the Skyresponse base terminology.

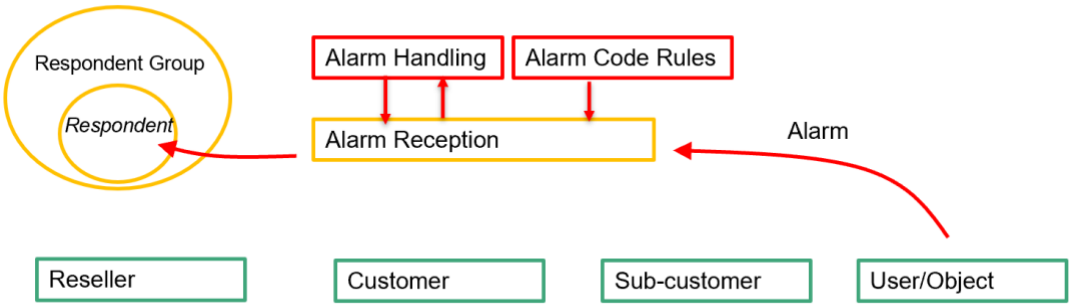

Figure 3. Basic entities and terminology

The two most fundamental entities in Skyresponse:system are the *user* and the *alarm*. The alarms are generated by the users (in some applications referred to as *objects*) and passed to an *alarm reception.* The alarm reception has several *respondents*, which are grouped in *respondent groups*. The alarm reception also has a set of *alarm code rules* which define actions based on the type of alarm – the *alarm code.* Additionally, a set of *alarm handling rules* defines e.g. to which respondent group an alarm from a specific user shall be sent.

Respondents log in to their respondent groups either as response centre operators using the web-based *Skyresponse:central* interface or by using the *Skyresponse:mobile* app.

A *contact* is a person or organization that someone receiving an alarm (i.e. the respondent) may want to contact when an alarm arrives from a specific object/user. There are two types of contacts: *Private contacts* that are associated with one single object/user and *common contacts* that are common for several objects/users registered at one specific customer.

A *resource* is a person that can be called out to help a user or to fix a problem with an object. A resource is always associated with a specific customer and can then be called out at alarms from all the objects/users registered with this customer. The actual call-out is made by the respondent from the web based Skyresponse:central portal and the alarm page for the incoming alarm.

All users belong to a hierarchy of "owners". At the highest level, a *reseller* manages a set of *customers* and their users. At the next level a customer, which also may manage several *sub-customers*, manages his users and user related entities. An alarm reception in Skyresponse:system may belong to just one single customer and is then called a *private alarm reception*, or it may be defined to serve several customers, then being called a *public alarm reception*.

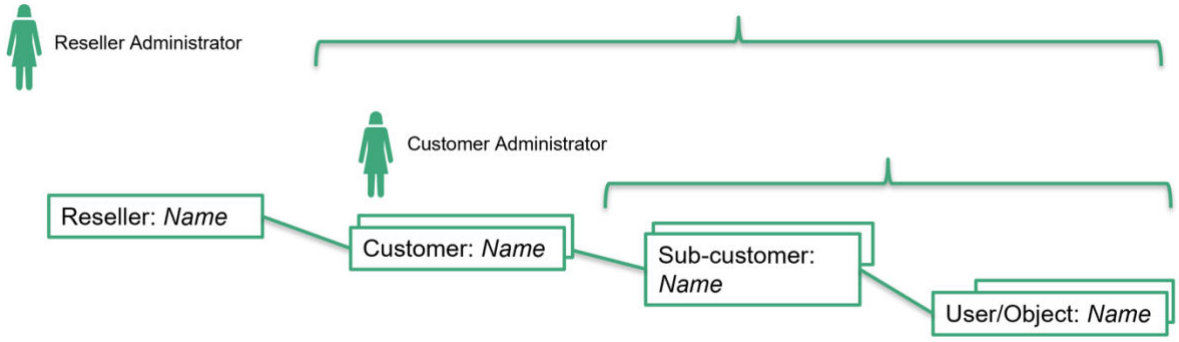

Figure 4. The administrative hierarchy

Entities in Skyresponse:system are managed by *administrators* given log in credentials to the administrative web portal *Skyresponse:admin.* If the log in credentials identifies a *reseller administrator*, this person will be allowed to manage all customers and users belonging to this reseller. If the credential identifies a *customer administrator*, this person will only be allowed to manage sub-customers and users belonging to this customer.

The alarm receptions, which corresponds to the physical response centres (ARC), their respondents, alarm handling rules etc. are normally administered by a dedicated *ARC administrator* also logging in via Skyresponse:admin. However, nothing excludes a reseller or customer administrator to also take on the role as the ARC administrator.

5 Centralized or Decentralized Alarm Handling?

A fundamental parameter when designing an efficient workflow is to decide if the alarms should first be routed to a manned response centre or if they should be sent directly to the field staff. In the first, centralized, case the response centre operator receives the alarm, maybe talks to the alarming person in a voice conversation, and then decides what resources to assign for dealing with the alarm. This gives a filtering effect, and only those alarm deemed sufficiently severe are assigned field staff resources. We call such workflows *response centre centric* and they are described in more detail in the following chapter.

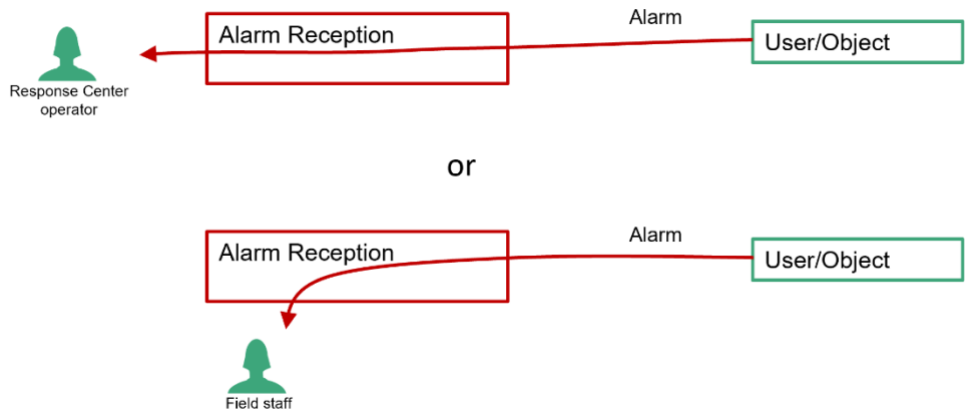

Figure 5. Centralized alarm handling via a response center operator and distributed alarm handling directly by the field staff.

In the second, distributed case the alarms are sent directly to groups of field staff, which may have a manned response centre as back-up if no one in the group acts on an alarm. We refer to these workflows as *field staff centric* and they are further described in chapter 7 of this document.

It should be noted that the workflows described in chapter 6 and 7 of this white paper are just general examples and that many more variations of these are possible with Skyresponse:system. For detailed information on how to do the actual configuring of Skyresponse:system for the various workflows, refer to the Skyresponse:admin user manual.

6 Response Centre Centric Workflows

6.1 Assigning an Alarm to Field Staff Registered as Resources

Alarm handling with Skyresponse:system in a basic, response centre centric workflow, where operators assigns resources, i.e. field staff, to a task is illustrated in the diagram below.

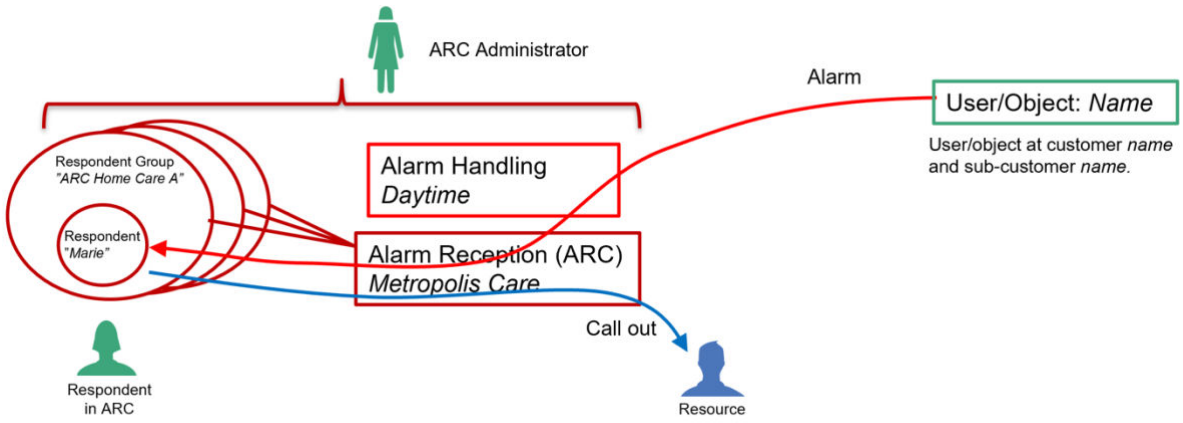

Figure 6. The response centre operator assigns a resource for each alarm.

This set up has the following main characteristics:

Alarm Reception and Respondents

- The alarm reception *(Metropolis Care)* is a private alarm reception if all users belong to a single customer. The reception is a public alarm reception if the users belong to multiple customers. Both cases are equally possible, depending on if the organization runs its own response centre, or if the organization runs a response centre serving multiple customers. There are no practical limitations on the number of customers, sub-customers, or users in this set up.
- The alarm reception has multiple respondent groups, for example groups per geographical district, and/or per specialty (nurses, technicians etc.).
- Respondents (i.e. response centre operators, technicians etc.) log in to the Skyresponse:central web portal and are forced to or can select to participate in one or more respondent groups. Groups can be completely hidden for log in for individual respondents.
- Optionally, respondents, e.g. field technicians, may log in to their respondent groups via the Skyresponse:mobile app and handle alarms in the same way as when using Skyresponse:central.

Handling of Alarms

- Alarms can be raised by objects/users that have digital alarm transmitters or other types of alarms transmitters.
- Alarms are sent from the object/user, acted upon by the system according to the relevant alarm code rule, and then forwarded according to the rules defined in the alarm handling

defined for this particular object/user. The alarm may for example be sent to a primary respondent group comprising the respondents that normally attends to this type of alarms. The alarm handling rules may also include additional criteria for handing over the alarm to a secondary and tertiary respondent group *in the same alarm reception*, for example if the alarm is not taken by any respondent in the primary group.

- The alarm is then taken by a respondent in the selected respondent group from an alarm que displayed in Skyresponse:central or Skyresponse:mobile. The respondent will see additional information about the alarm and the alarming object/user on the alarm page shown and can also see a history of earlier alarms from the same user.

- Voice communication between the operator and the alarming user can be established, either by an outgoing call from the alarm reception or by a command to the alarm transmitter to call back to the alarm reception, given that the alarm transmitter has voice communication capabilities. Optional voice communication functions, such as three-party conference and voice recording are also possible; see also section 9 for more information about telephony and voice communication.

- A special type of alarm – an *attention alarm* – can be raised by anyone calling a predefined telephone number associated with the alarm reception. The alarm is indicated as coming from an unknown user if the phone number cannot be identified as a registered user, and the alarm is placed as any other alarm in the incoming alarm queue for relevant respondent groups.

Call Out of Field Staff

- The field staff (e.g. a team of home care workers) are registered as *resources* in Skyresponse:system. A resource is a common entity *associated with a customer or sub-customer* and available to call upon for all alarms coming from users belonging to the same customer or sub-customer. Resources can be called from Skyresponse:system either by an SMS or by a push message to the Skyresponse:mobile app.

- The alarm page for the alarm shown to the response centre operator (the ARC respondent) includes an area labelled “Call resource”. This area contains a list of the resources relevant for this alarm, and a possibility to set up a voice call to the resource as well as to send an inquiry to the resource if he/she is willing to act on the alarm. *Note that the responsibility for the alarm, including its deactivation, stays with the original respondent*, and it is normally this respondent that monitors the progress of the event, before deactivating the alarm.

- The resource may either have just an ordinary mobile phone capable of receiving and sending SMS, or alternatively use the smartphone app Skyresponse:mobile. If using the app he/she will get a push message with additional information about the alarm and predefined alternatives for declining or accepting the call out request. Note that the resource is registered as belonging to a customer or sub-customer and normally does not have any choices to log in as a respondent in a respondent group.

Administration

- An administrator logging in with *customer credentials* (customer administrator) can manage all sub-customers, users and resources belonging to the specific customer.

- An administrator logging in with *reseller credentials* (reseller administrator) can manage all customers belonging to the reseller, including creation of new administrators with customer credentials, as well as manage all sub-customers, users and resources for all his customers. The reseller can also create new *private* alarm receptions for his customers.

- An administrator logging in with *ARC credentials* (ARC administrator) can manage public and private alarm receptions, including their respondents, respondent groups, alarm handlings, alarm code rules etc.
- *Public* alarm receptions can only be created by Skyresponse.
- The administrative portal of Skyresponse:system – *Skyresponse:admin* – provides a standard set of reporting tools for tracking number of alarms per user, types of alarms per user and general data about the users and the alarm reception.

6.2 Assigning an Alarm to Field Staff registered as Respondents

An alternative, response centre centric, workflow is to let the response centre operator (ARC respondent) assign an incoming alarm to a *group* of field staff and let the participants in the group decide who will answer and take the transferred alarm. In this case the full responsibility for the continued handling of the alarm is also *transferred* to the group of field staff workers, c.f. the workflow described in section 6.1 above where the alarm responsibility stays with the original respondent.

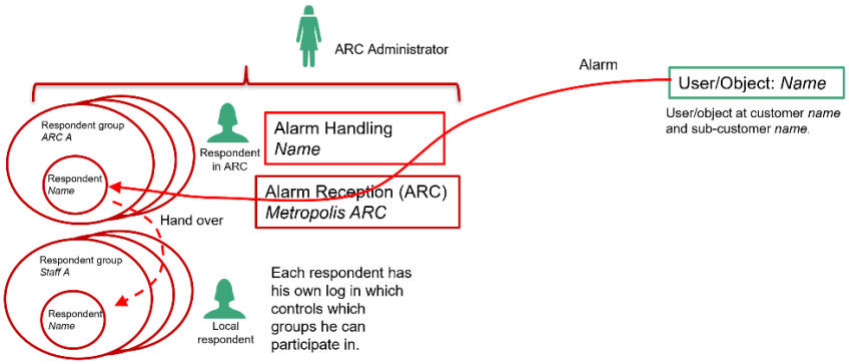

Figure 7. The response centre operator transfers alarms to field staff in respondent groups.

Handling of alarms and administration is in this case performed exactly as described in section 6.1, but the call out off field staff is done differently.

Call Out of Field Staff

- The field staff (e.g. a team of home care workers) are registered as respondents at the alarm reception "Metropolis ARC" but belonging to one or more field staff unique respondent groups.
- A field staff person uses the Skyresponse:mobile app and logs in as a respondent in one of the field staff unique respondent groups.
- When an alarm arrives, it is taken by one of the ARC respondents. The alarm page for the alarm shown to the ARC respondent includes a set of transfer buttons, one for each field staff unique respondent group.
- If deemed necessary for local action, the ARC respondent may transfer the alarm to one of the field staff respondent groups. *Note that the responsibility for the continued handling of the alarm now resides with local staff respondent*, who will monitor the progress of the event and deactivate the alarm from his/her Skyresponse:mobile app. The original ARC respondent has no further access to the transferred alarm.
- If no local action by any field staff is necessary, the ARC respondent handles and deactivates the alarm.

6.3 Getting Alarm Actions Approved by a Manager

The workflows described in sections 6.1 and 6.2 above may be further extended by adding an external approval sequence, before any local field staff is assigned to a task. This can for example be useful if the alarming object is a machine, and there is a local manager present at the site where the machine is installed. In this workflow it is just the handling of alarms that is slightly different.

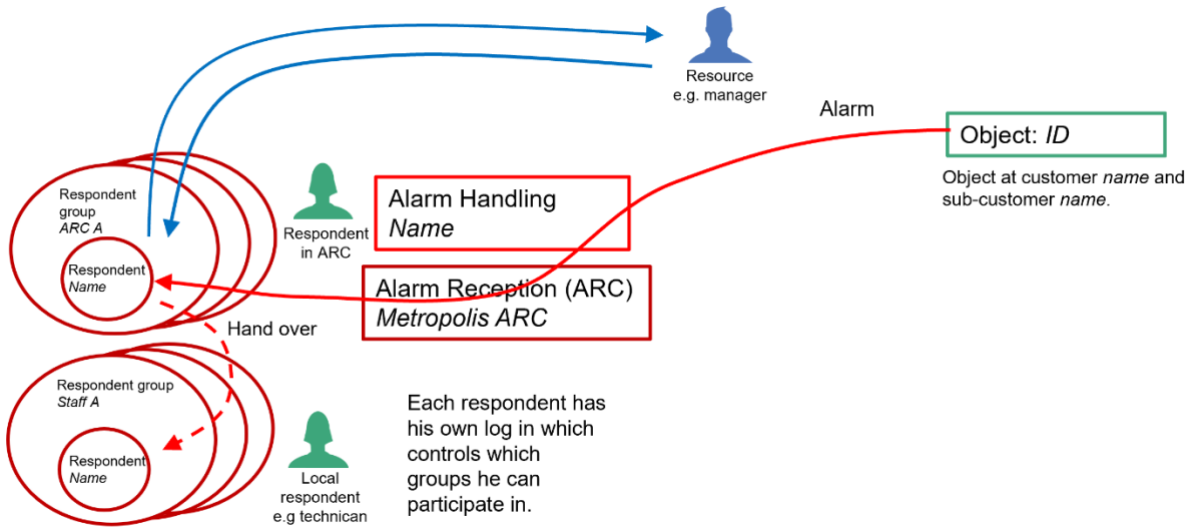

Figure 8. Verifying alarm actions with an external resource, e.g. a manager

Handling of Alarms

- As in sections 6.1 and 6.2 alarms are sent from the object/user, acted upon by the system according to the relevant alarm code rule, and then forwarded according to the rules defined in the alarm handling defined for this particular object/user. The alarm may for example be sent to a primary respondent group comprising the respondents that normally attends to this type of alarms.
- The alarm is then taken by a respondent in the selected respondent group from an alarm que displayed in Skyresponse:central or Skyresponse:mobile. The respondent will see additional information about the alarm and the alarming object/user on the alarm page shown and can also see a history of earlier alarms from the same user.
- The alarm page shown to the respondent contains a “manager list” of resources that can be called upon for approval of alarm actions. The ARC respondent selects the appropriate manager and sends a call for approval to him/her.
- The manager may either have just an ordinary mobile phone capable of receiving and sending SMS, or alternatively use the smartphone app Skyresponse:mobile. In either case the manager/resource will get a message asking for action approval which he/she can answer with either a Yes or a No.
- The answer from the manager/resource is returned to the ARC respondent who will then continue the handling of the alarm as described in sections 6.1 and 6.2.

6.4 Overflow of Alarms to a Back-up Response Centre

An optional feature of all three workflows described above is to re-route alarms from one response centre to another response centre also using Skyresponse:system. This feature can be used e.g. if two response centres are co-operating and the second response centre takes alarms that have not been answered by the first within a predefined time.

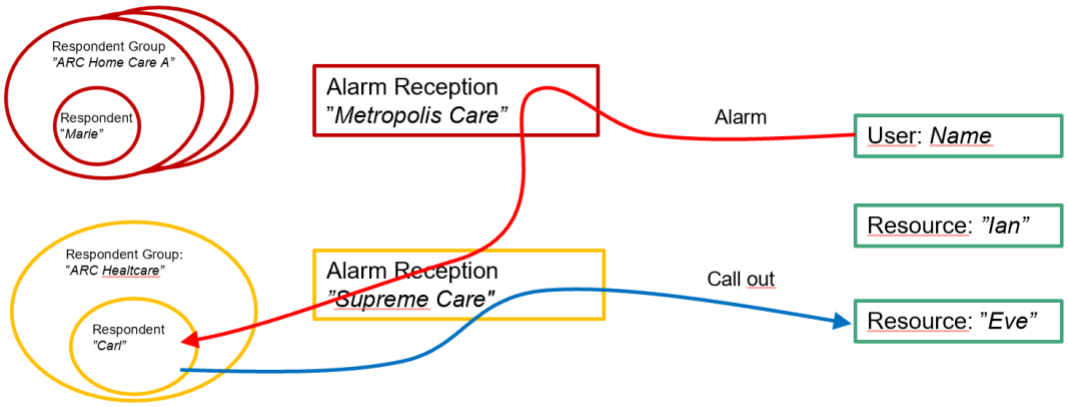

Figure 9. Overflow of alarms to an alternative public alarm reception

This set up has the following additional characteristics:

- Normally, alarm handlings can only be configured to cater for overflow of alarms between respondent groups *in the same alarm reception*. With this feature it is possible to create alarm handling rules that allows overflow of alarms to respondent groups belonging to other alarm receptions.
- The alarm receptions involved may be private or public receptions.
- The voice communication channel is also re-routed from the original alarm reception to the back-up reception and calls are then handled by the respondents in this alarm reception.
- The alarm is completely transferred to the back-up alarm reception. All details of the alarm are available to the respondent in the back-up alarm reception, including alarm history and resources to call out. A respondent in the original alarm reception may see the alarm log for the alarm, but only containing log items up till the time the alarm was transferred. Respondents in the original alarm reception cannot “reclaim” an alarm that has been transferred in this way.

6.5 Combining a Public Alarm Reception with Several Subordinate Private Alarm Receptions

The workflow described in section 6.2 described the transfer of alarms to field staff registered as respondents in respondent groups belonging to the *same* alarm reception as the ARC respondents.

To simplify the administration of the log in credentials and phone numbers for the field staff and to separate it from the administration of the central response centre, a second level using private

alarm receptions is often introduced, one per customer served by the public alarm reception. Each such customer can then have a local customer administrator responsible for managing both his object/user related data and the field staff (respondent) data at the customer location.

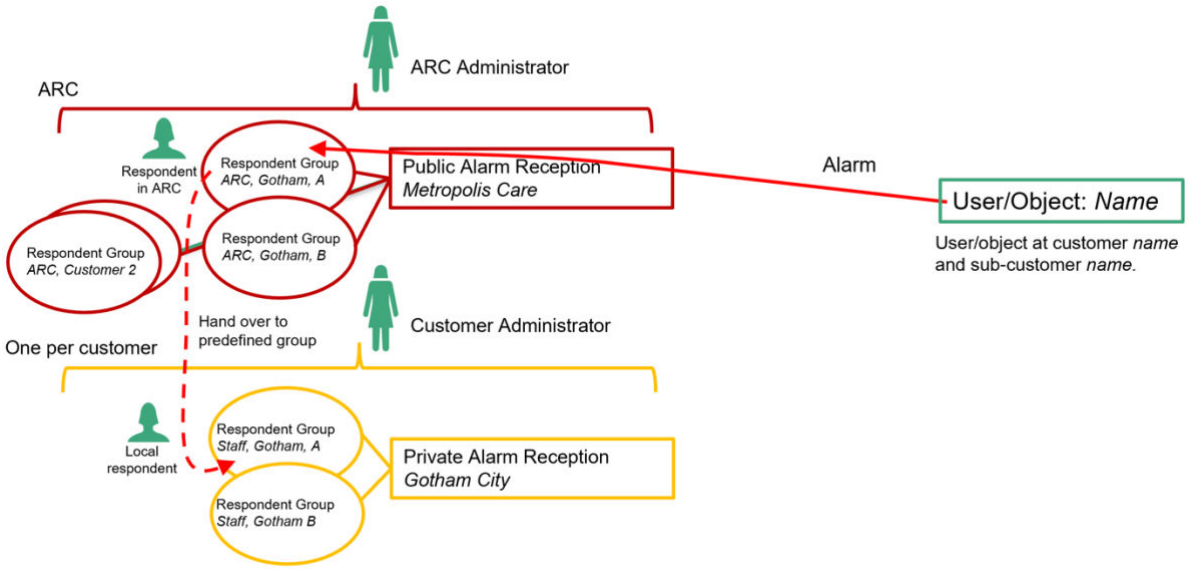

Figure 10. Assigning an alarm to a group of field staff workers registered in another alarm reception

Alarm Receptions and Respondents

- The central alarm reception *(Metropolis Care)* is a public alarm reception serving alarms from objects/users belonging to multiple customers. There are no practical limitations on the number of customers, sub-customers or objects/users in this set up.
- The public alarm reception *(Metropolis Care)* has multiple respondent groups, for example groups per geographical district, and/or per specialty (nurses, technicians etc.). Specifically, it has one respondent group per team of field staff to be called out at each customer site.
- Every customer has its own private alarm reception (e.g *"Gotham City"*) with *respondent groups for each team of field staff workers*. This alarm reception does not receive alarms directly from any objects/users, and principally serves as the "home" for the field staff teams' respondent groups.
- Respondents at the public alarm reception (i.e. response centre operators, technicians etc.) log in to the Skyresponse:central web portal and are forced to or can select to participate in one or more respondent groups. Groups can be completely hidden from log in for individual respondents.
- Respondents at the private alarm receptions (i.e. the field staff) log in to their respondent groups via the Skyresponse:mobile app and can then handle alarms in the same way as when using Skyresponse:central. Groups can be completely hidden for log in for individual respondents.

Handling of Alarms by Operators in the Public Alarm Reception

- Alarms can be raised by objects/users that have digital alarm transmitters or other types of alarms transmitters.

- Alarms are sent from the object/user, acted upon by the system according to the relevant alarm code rule, and sent to one primary respondent group *in the public alarm reception*, governed by the alarm handling rule for alarms from this particular user. The alarm handling rule may include additional criteria for handing over the alarm to a secondary and tertiary respondent group in the public alarm reception, for example if the alarm is not taken by any respondent in the primary group.

- The alarm is then taken by an ARC respondent belonging to the selected respondent group in the public alarm reception from an alarm que displayed in Skyresponse:central. The respondent will see additional information about the alarm and the alarming object/user on the alarm page shown and can also see a history of earlier alarms from the same user.

- Voice communication between the operator and the alarming user can be established, either by an outgoing call from the alarm reception or by a command to the alarm transmitter to call back to the alarm reception, given that the alarm transmitter has voice communication capabilities. Optional voice communication functions, such as three-party conference and voice recording are possible; see section 0 for more information about telephony and voice communication.

- A special type of alarm – an attention alarm – can be raised by anyone calling a predefined telephone number associated with the alarm reception. The alarm is indicated as coming from an unknown user if the phone number cannot be identified as a registered user, and the alarm is placed as any other alarm in the incoming alarm queue for relevant respondent groups.

- If deemed relevant, the public alarm reception respondent transfers the alarm from the current respondent group in the public alarm reception to an equivalent respondent group in the private alarm reception. Transfer can only be done *to one predefined group* in the private alarm reception and is activated by a button on the alarm page. An alarm transferred in this way cannot be "reclaimed" later by the public alarm reception respondents.

Handling of Alarms by the Field Staff

- The field staff workers are registered as *respondents* in respondent groups belonging to the private alarm receptions of the respective customers, one group per team of field staff.

- Transferred alarms can be viewed by the respondents as they are shown in the alarm que displayed by the app Skyresponse:mobile. The respondents will see additional information about the alarm and the alarming user.

- One of the respondents will take the alarm and then becomes responsible for its continued handling, including its deactivation. The alarm includes the telephone number of the user, which enables the respondent to call the alarming user from his mobile phone.

Administration

- An administrator logging in with *customer credentials* (customer administrator) can manage all sub-customers, users, the private alarm reception, and its respondent groups with respondents, belonging to the specific customer.

- An administrator logging in with *reseller credentials* (reseller administrator) can manage all customers belonging to the reseller, including creation of new administrators with

customer credentials, as well as manage all sub-customers, users and private alarm receptions for all his customers. The reseller can also create new *private* alarm receptions for his customers and manage e.g. their respondents.

- An administrator logging in with *ARC credentials* (ARC administrator) can manage the public alarm reception, including its respondents, respondent groups, alarm handlings, alarm code rules etc.
- *Public* alarm receptions in Skyresponse:system can only be created by Skyresponse.
- The administrative portal of Skyresponse:system – *Skyresponse:admin* – provides a standard set of reporting tools for tracking number of alarms per user, types of alarms per user and general data about the users and each alarm reception.

7 Field Staff Centric Workflows

Alarms may also be sent from the objects/users directly to the teams of field staff, creating a field staff centric workflow. Such a set up can also include an "overflow" to an external response centre if alarms are not taken by any of the field staff workers within time.

The main advantage of this configuration is that alarms go directly to the field staff, which may give shorter response times and less costs for response centre personnel. A disadvantage is that the field staff may be overloaded by less relevant alarms, hence this configuration is likely to work best with a limited number of objects/users that can send alarm to a particular respondent group.

7.1 Assigning Alarms Directly to Groups of Field Staff Workers

The basic workflow with Skyresponse:system for a field staff centric alarm handling is shown in the diagram below.

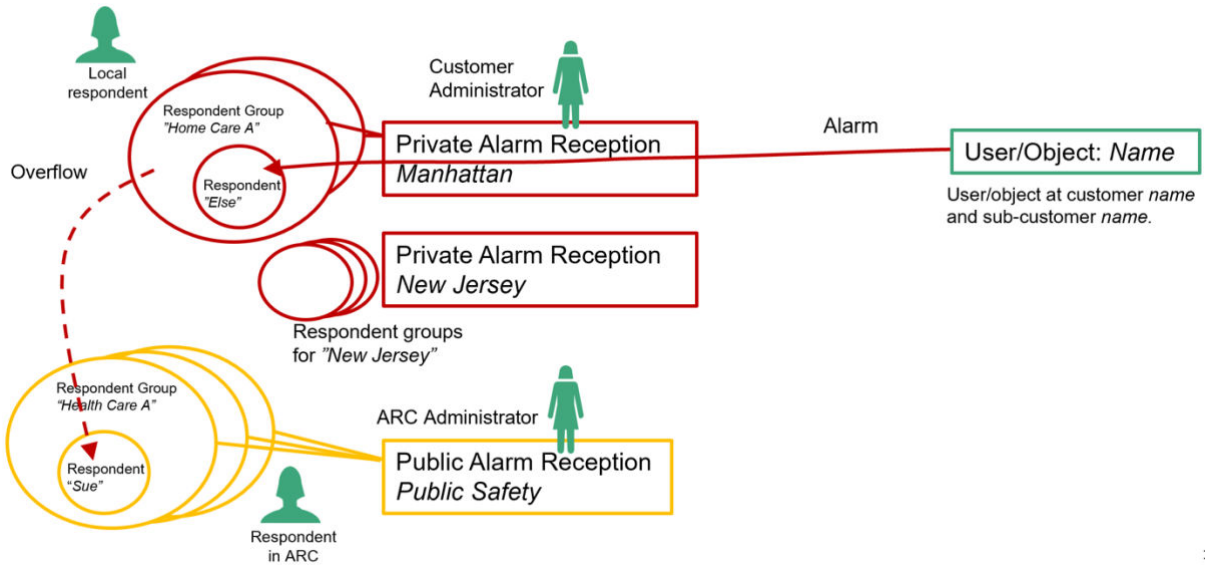

Figure 11. Assigning alarms directly to field staff workers

Alarm Reception and Respondents

- The alarm reception *(Manhattan)* is a private alarm reception belonging to one customer. Other private alarm receptions (e.g. *New Jersey*) may be set up for the same customer. There are no practical limitations on the number of objects/users, sub-customers or private alarm receptions in this set up. Note that the alarm reception in this case is a pure logical entity within Skyresponse:system and does not correspond to any physical response centre with operators.

- The private alarm receptions have multiple respondent groups, for example groups per geographical district and field staff team.

- Respondents at the private alarm receptions (i.e. the field staff workers) log in to their respondent groups via the Skyresponse:mobile app and can then handle incoming alarms. Groups can be completely hidden from log in for individual respondents and only shown to authorized persons.

Handling of Alarms

- Alarms can be raised by objects/users that have digital alarm transmitters or other types of alarms transmitters.

- Alarms are sent from the object/user, acted upon by the system according to the relevant alarm code rule, and sent to one primary respondent group, governed by the alarm handling rule for alarms from this particular user. The alarm handling rule may include additional criteria for handing over the alarm to a secondary and tertiary respondent group *in the same alarm reception*, for example if the alarm is not taken by any respondent in the primary group.

- The alarms can be viewed by the respondents when shown in the alarm que displayed by the Smartphone app Skyresponse:mobile. The respondents will see additional information about the alarm and the alarming user.

- One of the respondents will take the alarm and then becomes responsible for its continued handling, including its deactivation. The alarm includes the telephone number of the user, which enables the respondent to call the alarming user from his mobile phone.

- The respondent registers the alarm cause and actions for the alarm in the Skyresponse:mobile app, before manually deactivating the alarm, after having performed the relevant tasks.

Overflow of Alarms to a Back-up Response Center

An optional feature of the wotkflow described above is to re-route alarms from the private alarm reception to another manned alarm reception also using Skyresponse:system. This alarm reception can be either a private alarm reception or a public alarm reception serving multiple customers. The manned alarm reception can then act as a back-up for the field staff teams and take alarms that have not been answered by anyone in the respondent groups of field staff workers.

This set up has the following additional characteristics:

- Normally, alarm handlings can only be configured to cater for overflow of alarms between respondent groups *in the same alarm reception*. With this feature it is possible to create alarm handling rules that allow overflow of alarms to respondent groups belonging to other alarm receptions.

- The alarm receptions involved may be private or public.
- The voice communication channel is also re-routed from the original alarm reception to the back-up reception and calls are then handled by the respondents in this alarm reception.
- The alarm is completely transferred to the back-up alarm reception. All details of the alarm are available to the respondent in the back-up alarm reception, including alarm history and resources to call out. A respondent in the original alarm reception may see the alarm log for the alarm, but only containing log items up till the time the alarm was transferred. Respondents in the original alarm reception cannot "reclaim" an alarm that has been transferred in this way.

Administration

- An administrator logging in with *customer credentials* (customer administrator) can manage all sub-customers, users, the private alarm reception and its respondent groups with respondents, belonging to the specific customer.
- An administrator logging in with *reseller credentials* (reseller administrator) can manage all customers belonging to the reseller, including creation of new administrators with customer credentials, as well as manage all sub-customers, users and private alarm receptions for all his customers. The reseller can also create new *private* alarm receptions for his customers.
- An administrator logging in with *ARC credentials* (ARC administrator) can manage the back-up alarm reception, including its respondents, respondent groups, alarm handlings, alarm code rules etc.
- *Public* alarm receptions can only be created by Skyresponse.
- The administrative portal of Skyresponse:system – *Skyresponse:admin* – provides a standard set of reporting tools for tracking number of alarms per user, types of alarms per user and general data about the users and each alarm reception.

7.2 Workflow for e.g. Nursing Homes

In smaller geographical areas, for example in a nursing home, an alternative field staff centric workflow may be employed.

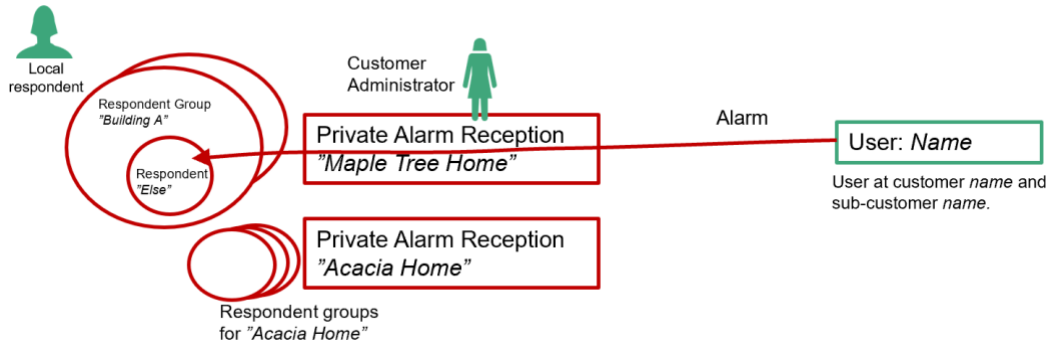

Figure 12. Configuration for nursing homes

Alarm Reception and Respondents

- The alarm reception *(Maple Tree Home)* is a private alarm reception belonging to one customer. Other private alarm receptions (e.g. *Acacia Home*) may be set up for the same customer. There are no practical limitations on the number of users or private alarm receptions in this set up.
- The private alarm receptions have multiple respondent groups, for example groups per building and per nursing team.
- Respondents at the private alarm receptions (i.e. the nurses) log in to their respondent groups via the Skyresponse:mobile Smartphone app and can then handle incoming alarms. Groups can be completely hidden from log in for individual respondents.
- "Virtual" respondents being corridor displays may be defined to show the alarm queues to persons in e.g. a meeting room or a hospital corridor.

Handling of Alarms

- Alarms can be raised by users that have digital alarm transmitters or other types of alarms transmitters. In this set-up it may be convenient to register the individual nursing rooms rather than the patients as users.
- Alarms are sent from the user, acted upon by the system according to the relevant alarm code rule, and sent to one primary respondent group, governed by the alarm handling rule for alarms from this particular user. The alarm handling rule may include additional criteria for handing over the alarm to a secondary and tertiary respondent group *in the same alarm reception*, for example if the alarm is not taken by any respondent in the primary group.
- The alarms can be viewed by the respondents as they are shown in the alarm que displayed by the Smartphone app Skyresponse:mobile. The respondents will see additional information about the alarm and the alarming user.
- Alarms can also be listed on common corridor displays for any respondent having the appropriate authorization to take the alarm.
- One of the respondents will take the alarm and then becomes responsible for its continued handling, including its deactivation. The alarm may include a telephone number of the user, which enables the respondent to call the alarming user from his mobile phone.
- The respondent registers alarm cause and actions for the alarm in the Skyresponse:mobile app
- The respondent visits the user and scans an NFC tag in the room to report his presence, which automatically deactivates the alarm.

7.3 Distributed Alarm Reception with Overflow to another Respondent Group

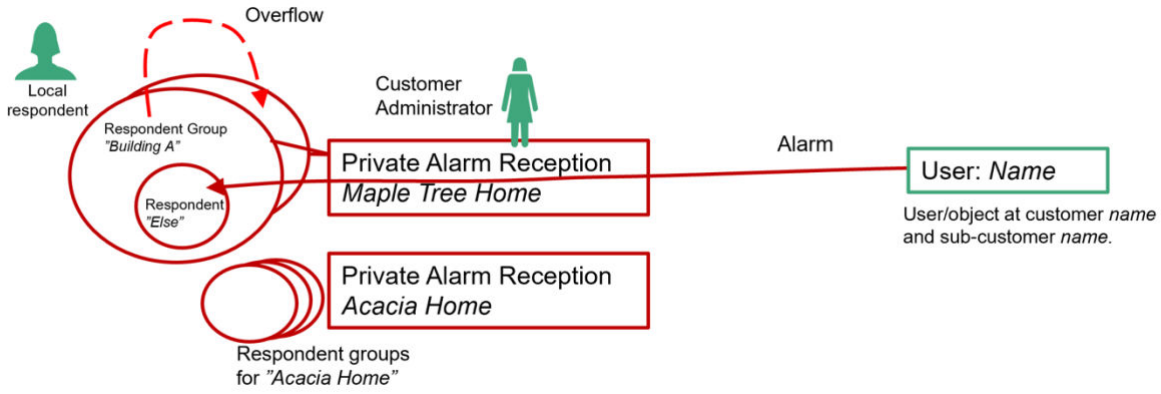

Figure 13. Distributed alarm reception with overflow to other respondent groups

As a variation of the workflow described in section 7.2, the alarm handling rules may be set up so that if no respondent in the primary respondent group takes the alarm, it is automatically forwarded to a secondary and then tertiary respondent group for action. Forwarding may also be defined to be done to the respondent groups of a manned response centre, if an alarm is not acted upon in time by a local respondent group, c.f. section 6.4.

8 Forwarding of Alarms to an External Response Centre

Skyresponse:system may also be set up as a "front end" to an existing, manned response centre already having its own alarm presentation software or trouble ticketing system. In this workflow alarms may either just be handed over to the external response centre, alternatively, the alarm handling in Skyresponse:system may be controlled by the external system.

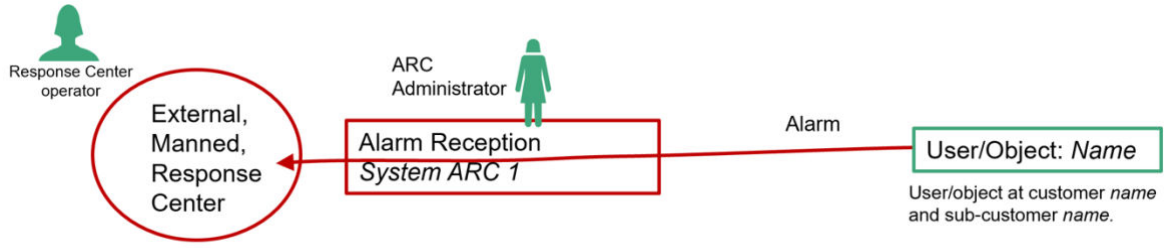

Figure 14. Direct forwarding of alarms to an external, manned, response centre

8.1 Handover of Alarms to an External Response Centre

Alarm Receptions

- The alarm reception *(System ARC 1)* is a private alarm reception in Skyresponse:system belonging to one customer, typically the same customer that is operating the external

response centre. Other private alarm receptions may be set up for the same customer. There are no practical limitations on the number of objects/users, sub-customers or private alarm receptions in this set up.

Handling of Alarms

- Alarms can be raised by objects/users that have digital alarm transmitters or other types of alarms transmitters.
- Alarms are sent from the object/user, acted upon by Skyresponse:system according to the relevant alarm code rule, and then forwarded as an incoming alarm to the alarm presentation system of the external response centre.
- Voice communication from the operator to the alarming user may be enabled, e.g. by a direct call from the operator to the user on a number displayed by the alarm presentation system of the external response centre.

Administration

- An administrator logging in with *customer credentials* (customer administrator) can manage all sub-customers, users, the private alarm reception, and its respondent groups with respondents, belonging to the specific customer.
- An administrator logging in with *reseller credentials* (reseller administrator) can manage all customers belonging to the reseller, including creation of new administrators with customer credentials, as well as manage all sub-customers, users and private alarm receptions for all his customers. The reseller can also create new *private* alarm receptions for his customers.

8.2 Handling of Alarms in Skyresponse:system by an External System

It is possible integrate the alarm presentation of Skyresponse:central with external alarm presentation systems. In its simplest form this is done by just having an extra window displaying Skyresponse:central together with other, legacy, alarm presentation systems. More advanced integrations are also possible, contact sales@skyresponse.com for additional information.

Depending on integration level, all or a subset of the workflows described in the sections above may be supported.

9 Voice Communication and Telephony

Voice communication with the alarming users plays an important role in many workflows, especially in personal care applications. Skyresponse:system includes several advanced functions for telephony and voice integration with the alarm handling - functions that can be configured in various ways to suit the desired workflow and the technical capabilities of the customer's alarm units and existing telephony solution.

Voice integration with alarm system provides an integrated experience where alarm meta data is associated with an ongoing call as well as an improved call handling where alarm information provides contact information to where to forward calls. Voice calls and other alarm related activities are also logged together, improving analysis of alarm events. This drives efficiency and quality in the overall alarm handling. Selecting the correct voice communication configuration may also reduce the total costs for telephony for the customer.

As shown in the illustration below, voice calls originating from an alarm unit may enter Skyresponse:system as SIP calls or as ordinary GSM/PSTN calls. The calls may be terminated in

- The Skyresponse:central web interface for response centre operators
- An existing desk phone behind an on-premises customer PBX
- A Smartphone running the Skyresponse:mobile app

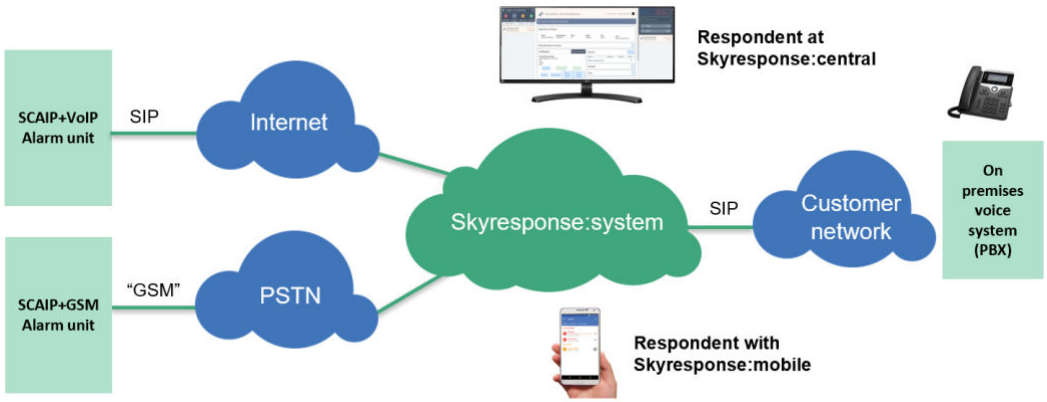

Figure 15. Voice integrations in Skyresponse:system

9.1 Voice Integration alternatives

Skyresponse:system offers the following standard voice integration alternatives:

Standard alarm unit integrations	
Certified SCAIP+GSM unit	For alarm units certified by Skyresponse AB
Certified SCAIP+VoIP unit	For alarm units certified by Skyresponse AB
Inbound call+Other protocol	Only after certification by Skyresponse AB

Standard respondent integrations	
Skyresponse:central	Calls are handled from within the Skyresponse:central web application
Skyresponse:mobile	Calls are forwarded to a mobile phone number provided by customer

Certified on premise system	Calls are forwarded to a certified on-premises system via a secure SIP trunk

9.2 Qualification Scheme for Selection of Voice Integration Solution

The following scheme depicts the important decisions to make when selecting the best voice integration solution with Skyresponse:system.

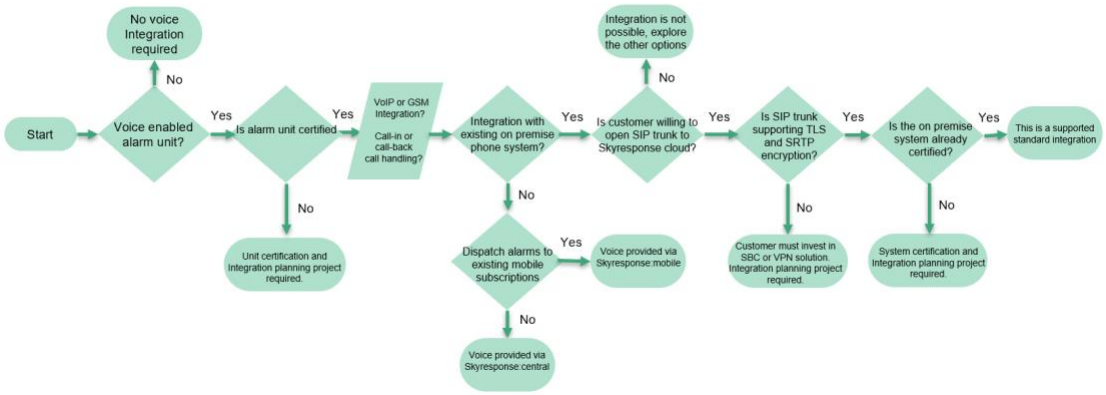

Figure 16. Voice integration qualification scheme

10 Summary

This white paper shows examples of some of the very diverse workflows that are supported by Skyresponse:system. Basically any alarm handling workflow for care, security or facility management can easily be configured by Skyresponse:system. Do not hesitate to discuss your alarm handling needs with Skyresponse – we have the solutions to your requirements!

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