



RFQ NATIFLife Services – Enclosure B

REQUIREMENT SPECIFICATION

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1 About This Document

1.1 Purpose

This document shall give the Tenderer an understanding of what Paragon Europe requires of requested Service.

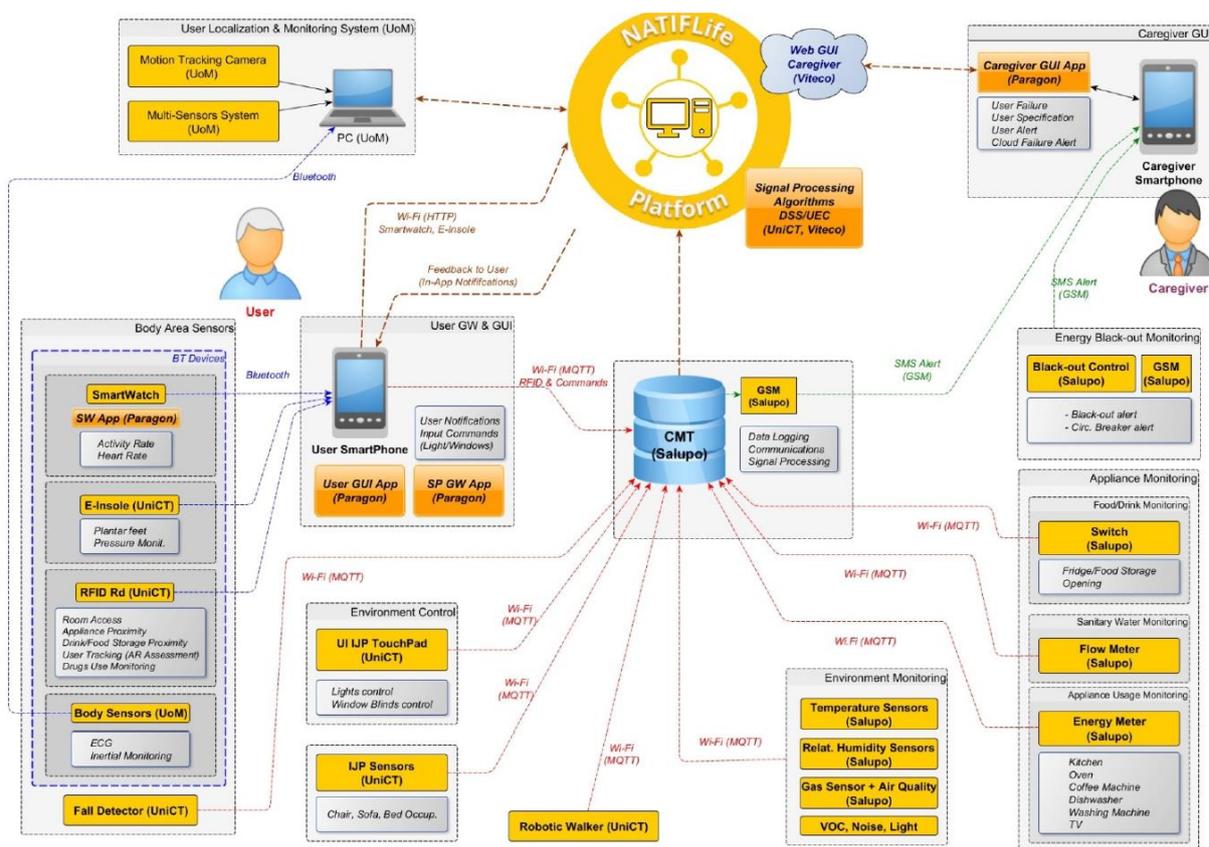
2 Tender requirements

The following requirements shall be met by any tenderer wishing to give a proposal.

- Sufficient technical resources to deliver the service
- Offices in an EU member country
- Company registration in EU member county
- Ability to travel onsite to Malta

3 High Level Solution Description

Following is a high-level solution architecture. The focus for this tender is only the Parts marked with Paragon.



The tenderer shall quote prices and submit tender documentation for the following parts of the NativLife solution (the tenderer can submit proposal for 1 or all of the bellow stated services):

- Caregiver GUI app
- SmartWatch SW app
- User GUI App (smartphone)

- SP GW App

4 Technical documentation

4.1 User configuration tables

Associates to each User (table entry), identified by the ID (ID_Usr) assigned during the user registration procedure, the IDs of RFID reader, of the Smartphone and the Smartwatch (if any) provided to the user at the beginning of the visit to the PDS. The table reports the user's data and characteristics and allows defining the threshold values for each of the quantities monitored by the system. Table's fields will be compiled during the user registration procedure through a dedicated interface (panel) of the platform.

The interface for the System Manager, must provide a means to reset the timers at the beginning of each trial session and to stop them and terminate the association between user, RFID reader, Smartphone and Smartwatch (if any) at the end of the session. For example, the interface may have Start / Stop buttons activated by the System Manager.

<i>Field Identifier</i>	<i>Field description</i>	<i>Field value</i>
ID_Usr	User unique identification code. It is <u>assigned</u> by the System Manager during the <u>registration procedure</u>	Code
ID_RFID	Identifier of the RFID reader provided to the user at the beginning of the trial session. It <u>must be updated every time a given user access the PDS</u> for a trial session, since a limited number of devices will be available for the trials.	Code
ID_Smartph	Identifier of the Smartphone provided to the user at the beginning of the trial session. It <u>must be updated every time a given user access the PDS</u> for a trial session, since a limited number of devices will be available for the trials.	Code
ID_SmartWtc	Identifier of the Smartwatch provided to the user at the beginning of the trial session. It <u>must be updated every time a given user access the PDS</u> for a trial session, since a limited number of devices will be available for the trials.	Code
ID_Site	Pilot Demo Site identifier (Catania / Malta).	CT / MT
Usr_Age	User age.	Number
Usr_Height	User height.	Number
Usr_Weight	User weight.	Number
Usr_Gnd	User gender identifier (Male / Female).	M / F
HR_thMax	Heart rate max value (threshold). Report default values if custom ones are not available or specified.	90 bpm
HR_thmin	Heart rate min value (threshold). Report default values if custom ones are not available or specified.	60 bpm
AR_thMax	Activity rate max value (threshold). <u>To be set carefully on the basis of the user's characteristics.</u>	

AR_thmin	Activity rate min value (threshold). <u>To be set carefully on the basis of the user's characteristics.</u>	
BSN (UoM)	Data provided by the Body Sensors Network used by UoM. <u>To be defined with UoM.</u>	
SWB_thmin	Sanitary water bathroom min utilization time (per day or per trial session). Custom or default value.	20 minutes
SWB_TO	Sanitary water bathroom TIMEOUT (max <u>continuous</u> utilization time). This threshold, if exceeded, can be an indicator that the user forgot to close the tap and, through a notification, the user and / or caregiver may be asked to check the status.	60 minutes
SWK_thmin	Sanitary water Kitchen min utilization time (per day or per trial session). Custom or default value.	20 minutes
SWK_TO	Sanitary water Kitchen TIMEOUT (max <u>continuous</u> utilization time). This threshold, if exceeded, can be an indicator that the user forgot to close the tap and, through a notification, the user and / or caregiver may be asked to check the status.	60 minutes
Room_#_TO	Room # (where # is a number identifying the room monitored) utilization TIMEOUT (max <u>continuous</u> utilization time). An entry for each room monitored must be foreseen in the data base table. The TIMEOUT value depends on the room (bedroom, bathroom, living room, kitchen, etc.).	
Apl_#_thmin	Appliance # (where # is a number identifying the appliance monitored) minimum utilization time (per day or per trial session). An entry for each appliance monitored must be foreseen in the data base table. The thmin value depends on the appliance (hoven, coffee machine, kitchen, TV).	
Apl_#_TO	Appliance # (where # is a number identifying the appliance monitored) utilization TIMEOUT (max <u>continuous</u> utilization time). An entry for each appliance monitored must be foreseen in the data base table. The TIMEOUT value depends on the appliance (hoven, coffee machine, kitchen, TV).	
FR_CNT_thmin	Fridge minimum utilization (openings) count, per day or per trial session.	5
FR_TO	Fridge utilization TIMEOUT (max <u>continuous</u> utilization time). This threshold, if exceeded, can be an indicator that the user forgot to close the fridge door and, through a notification, the user and / or caregiver may be asked to check the status.	15 minutes
FS_CNT_thmin	Food storage minimum utilization (openings) count, per day or per trial session.	5
WT_CNT_thmin	Drinking water minimum intake count (per day or per trial session). <u>To be set carefully on the basis of the user's characteristics.</u>	2 - 6
Bed_TO	Bed (monitored) TIMEOUT (max continuous utilization time). To be set carefully on the basis of the user's characteristics.	2 hrs
Bed_UT	Bed (monitored) total utilization time per day (or per trial session). To be set carefully on the basis of the user's characteristics.	

Drug #_sched	Drug # (where # is a number identifying the drug monitored) taking schedule (time).	
Chair_TO	Chair (monitored) TIMEOUT (max <u>continuous</u> utilization time). <u>To be set carefully on the basis of the user's characteristics.</u>	2 hrs
Chair_UT	Chair (monitored) total utilization time per day (or per trial session). <u>To be set carefully on the basis of the user's characteristics.</u>	
Sofa_TO	Sofa (monitored) TIMEOUT (max <u>continuous</u> utilization time). <u>To be set carefully on the basis of the user's characteristics.</u>	2 hrs
Sofa_UT	Sofa (monitored) total utilization time per day (or per trial session). <u>To be set carefully on the basis of the user's characteristics.</u>	

4.2 Environment Configuration Table (CLOUD)

Identifies the environments (e.g. rooms) in a given PDS and defines the threshold values for each environmental quantity.

<i>Field Identifier</i>	<i>Field description</i>	<i>Field value</i>
ID_Site	Pilot Demo Site identifier (Catania / Malta).	CT / MT
ID_Env	Environment (Room) identifier. It is associated with a specific RFID Tag that placed at the entrance of each room.	Code
Temp_min	Minimum room temperature threshold (default value can be modified depending on the season and/or specific user needs).	19 – 24 °C (winter/summer)
Temp_max	Maximum room temperature threshold (default value can be modified depending on the season and/or specific user needs).	22 – 26 °C (winter/summer)
RH_min	Minimum room Relative Humidity threshold (default value can be modified depending on the season and/or specific user needs).	40 – 50 % (winter/summer)
RH_max	Maximum room Relative Humidity threshold (default value can be modified depending on the season and/or specific user needs).	50 – 60 % (winter/summer)
Noise	Noise level measured. The system provides a semiquantitative feedback in terms of a range of three attributes: quiet, normal, noisy. “Normal” could be interpreted as a max threshold.	Normal
Light	Light intensity measured. The system provides a semiquantitative feedback in terms of a range of three attributes: dusky, normal, bright. “Normal” could be interpreted as a reference value. If Light intensity is smaller than “Normal”, then the environment could be too dark, while if greater, there may be excessive illumination.	Normal

Air_quality	Air quality (dust presence) measured. The system provides a semi-qualitative feedback in terms of a range of three attributes: good, moderate, unhealthy. “Good” could be interpreted as a minimum threshold.	Good
GAS	Gas (methane or LPG) presence detection	

4.3 User Database Table wearable devices (CLOUD)

Reports, for each user, the current values of the Output Data provided by devices (refer to “Data Flow Table” for Output Data specifications).

Time stamp	ID_Dev	Dev_val_1	Dev_val_2	Dev_val_3	Dev_val_4	Dev_val_5

ID_Dev is a unique identifier assigned to each device in the system and/or provided by the device itself. In case of the device in question is the Smartwatch, its value will be identical to ID_Smartwtc.

Dev_val_# are the value fields provided by each device (it is assumed that a given device can provide several values, up to 5, in this case). The number of valid fields and their contents depend on the specific device and is defined in the Mapping Table related to devices conveying data to the Cloud.

4.4 Mapping Table related to devices conveying data to the Cloud

This table describes each device that communicates directly with the Cloud, including the number and meaning of data fields provided.

ID_Dev	Dev. Category	Dev. Descrip.	Descr_D ev_val_1	Descr_D ev_val_2	Descr_D ev_val_3	Descr_D ev_val_4	Descr_D ev_val_5

4.5 Environmental Devices Database Table (CMT)

This table contains data provided by environmental devices, including the measure timestamp, the device identifier ID_Dev and the RFID reader and Tag identifiers, ID_RFID and ID_Tag, respectively.

This table is permanently synchronized with the database hosted in the cloud.

Time stamp	ID_RFID	ID_Tag	ID_Dev	Dev_val_1	Dev_val_2	Dev_val_3	Dev_val_4	Dev_val_5

ID_RFID: Identifier of the RFID reader provided to the user. ID_Tag: is a variable containing the code of the last RFID Tag read (is it safe?).

ID_Dev: is a unique identifier assigned to each device in the system and/or provided by the device itself.

Dev_val_#: are the value fields provided by each device (it is assumed that a given device can provide several values, up to 5, in this case). The number of valid fields and their contents depend on the specific device and is defined in the Mapping Table related to devices conveying data to the CMT.

A new row is added to the table when one of the following events occurs:

- RFID Tag reading (corresponding to room access, water bottle or drugs monitoring); for these events the ID_Dev and Dev_val_# fields will be empty.
- RFID Tag reading and event detected by an environmental device with the same (within a given range) timestamp.

In case a RFID Tag (not corresponding with the cases listed above) is read, but no events with the same timestamp are detected, the reading will be not recorded in the table (no new rows added).

Otherwise, in case an event is detected by one of the environmental devices, but no RFID tag is read at the same timestamp, one of the following options can be implemented:

- 1) The event will not be recorded (a new row will not be added);
- 2) If for system debugging purposes, it is necessary to create a new row, anyway the CMT does not transmit this row to the cloud;
- 3) The table contains all the records (even those not related to a user action) and the cloud filters only those of interest for post-processing purposes (alarm generation and data visualization).

4.6 Mapping Table related to devices conveying data to the CMT

This table describes each device that communicates with the CMT, including the number and meaning of data fields provided.

ID_Dev	Dev. Cateogy	Dev. Descrip.	Descr_D ev_val_1	Descr_D ev_val_2	Descr_D ev_val_3	Descr_D ev_val_4	Descr_D ev_val_5

4.7 Active Tags Table

This table correlates, for each user, ID_Tag read with the ID_RFID and the ID_Usr, if a tag is within the reading range of the RFID reader.

Timestamp	ID_Usr	ID_RFID	ID_Tag

4.8 Mapping Table related to RFID Tags deployed

This tables describes the association between each RFID Tag deployed and the environment, device or item monitored.

ID_Tag	Description

4.9 Data Flow Table

This table describe the flow of data, from the devices, to the communication channel/protocol, the elaboration performed, the information produced, and the action taken (notifications and alarms).

Fields legend:

- Quantity: the physical quantity or the event monitored;
- Device: the monitoring device;
- Data: an identifier of the data provided by the device;
- Com In: the communication channel (protocol) adopted by the device;
- To: the destination of data provided by the device;
- Elaboration type: a synthetic description of the elaborations performed on data at the platform (cloud) level;
- Alarm: a flag indicating those events that trigger an alarm;
- SMS: a flag indicating those alarms that are sent via SMS to the caregiver;
- Output Data: the information resulting from the elaboration on data, that will be stored in the data base;
- Output Data Destination: the final destination of information;
- Com Out: the communication channel(s) adopted to send information;
- GUI Cloud: the information shown on the GUI Cloud;
- ID_Msg: for those events that trigger notification or alarms, an identifier of the message that will be notified to the user and/or the caregiver.

WARNING: The audio and pop-up notifications to users, although possible, during the trial will not have to be sent to users. Instead they must be sent to the caregiver, who, if he deems it appropriate, will take care of involving the user in carrying out the recommended actions.

Therefore, it is necessary to provide the possibility to disable notifications in the user app.

Wearable COTS												
Quantity	Device	Data	Com In	To	Elaboration type	Alarm	SMS	Output Data (DataBase)	Output data destination	Com Out	GUI Cloud	ID_Msg
Hearth Rate	Smart Watch ¹	HR	Wi-Fi (HTTP)	Cloud (via SP ²)	if HR < HR_thmin then AL_Low_HR if HR > HR_thMax the AL_High_AR	X	X	HR (if out of range) HR_AL_High/Low	GUI Cloud Caregiver ³	IP	HR Log AL Log	MC_HR_Low MC_HR_High
Activity Rate	Smart Watch	AR	Wi-Fi (HTTP)	Cloud (via SP)	if AR < AR_thmin then AL_Low_HR if AR > AR_thMax the AL_High_AR	X		AR (if out of range) AR_AL_High/Low	GUI Cloud Caregiver User	IP App Notif	AR Log AL Log	MC_AR_Low MC_AR_High MU_AR_Low MU_AR_High
Fall	Fall detector	Fall_type	Wi-Fi (HTTP)	Cloud	If Fall_type = [1, 2, 3, 4] then AL_FALL	X	X	AL_FALL	GUI Cloud Caregiver	IP App Notif. GSM	AL Log	MC_FALL
Posture	Fall detector	Posture	Wi-Fi (HTTP)	Cloud	Posture			Posture	GUI Cloud	Ethernet	Postur e Log	

¹ The communication between Smartwatch and Smartphone will be managed by the User App (Paragon).

² The Smartwatch and the RFID reader communicate with the Smartphone via Bluetooth interface. The Smartphone will send data coming from the Smartwatch to the cloud, via WiFi on http protocol, while data coming from the RFID reader will be addressed to the CMT via WiFi on MQTT protocol (Paragon). RFID data (ID_RFID, ID_Tag) must be transmitted to the CMT only when a new Tag (ID_Tag) is detected (transmission redundancy should be adopted).

³ A Web GUI for the System Manager will be developed (Viteco). Information reported on the Web GUI, or the Web GUI itself, must be accessible from the Caregiver app (Paragon).

Environmental COTS												
Sanitary Water Bathroom	Flow meter RFID	SWB (boolean) ID_RFID ID_Tag	Wi-Fi (MQTT)	CMT	<p>If SWB 0 -> 1 AND ID_Tag = ID_SWB get T_open</p> <p>if SWB 1-> 0 AND ID_Tag = ID_SWB get T_close</p> <p>TU = T_close – T_open</p> <p>If TU < SWB_th_min Then AL_SWB_Low</p> <p>If TU > SWB_TO Then AL_SWB_TO</p>	X	X	Topen Tclose TU AL_SWB_Low AL_SWB_TO	GUI Cloud Caregiver User	IP App_Notif GSM	TU_Log AL_Log	MC_SWB_Low MC_SWB_TO MU_SWB_TO
Sanitary Water Kitchen	Flow meter RFID	SWK (boolean) ID_RFID ID_Tag	Wi-Fi (MQTT)	CMT	<p>If SWK 0 -> 1 AND ID_Tag = ID_SWK get T_open</p> <p>if SWB 1-> 0 AND ID_Tag = ID_SWK get T_close</p> <p>TU = T_close – T_open</p> <p>If TU < SWK_th_min Then AL_SWK_Low</p> <p>If TU > SWK_TO Then AL_SWK_TO</p>	X	X	Topen Tclose TU AL_SWK_Low AL_SWK_TO	GUI Cloud Caregiver User	IP App_Notif GSM	TU_Log AL_Log	MC_SWK_Low MC_SWK_TO MU_SWK_TO

Temperature	SONOFF SC	Temp	Wi-Fi (MQTT)	CMT	AVG (Temp) if Temp < Temp_min then AL_Temp_Low if Temp > Temp_max then AL_Temp_High	X		AVG(Temp) AL_Temp_High/Low	GUI Cloud Caregiver	IP App_Notif	Temp_Log AL_Log	MC_Temp_High MC_Temp_Low
Relative Humidity	SONOFF SC	RH	Wi-Fi (MQTT)	CMT	AVG (RH) if RH < RH_min then AL_RH_Low if RH > RH_max then AL_RH_High	X		AVG(RH) AL_RH_High/Low	GUI Cloud Caregiver	IP App_Notif	RH_Log AL_Log	MC_RH_High MC_RH_Low
Noise Level	SONOFF SC	NL	Wi-Fi (MQTT)	CMT	if NL > Normal then AL_NL_High	X		AL_NL_High	GUI Cloud Caregiver	IP App_Notif	AL_Log	MC_NL_High
Light Intensity	SONOFF SC	LI	Wi-Fi (MQTT)	CMT	if LI > Normal then AL_LI_High if LI < Normal then AL_LI_Low	X		AL_LI_High AL_LI_Low	GUI Cloud Caregiver	IP App_Notif	AL_Log	MC_LI_High MC_LI_Low
Air quality	SONOFF SC	AQ	Wi-Fi (MQTT)	CMT	if AQ < Good then AL_AQ_Low	X		AL_LI_Low	GUI Cloud Caregiver	IP App_Notif	AL_Log	MC_AQ_Low
GAS (Methane/LPG)	Gas sensor	Gas (Boolean)	Wi-Fi (MQTT)	CMT	If Gas =1 then AL_GAS	X	X	AL_GAS	GUI Cloud Caregiver	IP GSM	AL_Log	MC_GAS
Env Monitoring Malta												
Blackout	Blackout Detector GSM/GPRS module U>S	BKO (Boolean)	WIFI GSM			X	X	AL_BKO	GUI Cloud Caregiver	IP GSM	AL_Log	MC_BKO

Appliance Utilization	Energy meter RFID Smartphone	ID_RFID ID_Tag Status (on/off)	Wi-Fi (MQTT)	CMT	<p>if (ID_Tag=ID_Apl#) AND (status=off) then get(T_on) UT=Time-T_on If UT<Apl_#_thmin then AL_Apl_#_Low if UT>Apl_#_TO then AL_Apl_#_TO</p> <p>elseif (ID_Tag=ID_Apl#) AND (status=on) then get(T_off) UT=T_off-T_on</p>	X	X	T_on T_off UT AL_Apl_#_Low AL_Apl_#_TO	GUI Cloud Caregiver	IP GSM	UT_Log AL_Log	MC_Apl_Low MC_Apl_TO MU_Apl_TO
Chair occupancy	I/P Sensor RFID Smartphone	ID_RFID ID_Tag Status (on/off)	Wi-Fi (MQTT)	CMT	<p>if (ID_Tag=ID_Chair) AND (status=on) then get(T_on) UT=Time-T_on</p> <p>if UT>Chair_TO then AL_Chair_TO</p> <p>elseif (ID_Tag=ID_Chair) AND (status=off) then get(T_off) UT=T_off-T_on</p> <p>Chair_UT=UT</p>	X	X	T_on T_off UT Chair_UT AL_Chair_TO	GUI Cloud Caregiver	IP GSM	UT_Log AL_Log	MC_Chair_TO MU_Chair_TO

Sofa occupancy	IJP Sensor RFID Smartphone	ID_RFID ID_Tag Status (on/off)	Wi-Fi (MQTT)	CMT	<p>if (ID_Tag=ID_Sofa) AND (status=on) then get(T_on) UT=Time-T_on</p> <p>if UT>Sofa_TO then AL_Sofa_TO</p> <p>elseif (ID_Tag=ID_Sofa) AND (status=off) then get(T_off) UT=T_off-T_on</p> <p>Sofa_UT=UT</p>	X	X	T_on T_off UT Sofa_UT AL_Sofa_TO	GUI Cloud Caregiver	IP GSM	UT_Log AL_Log	MC_Sofa _TO MU_Sof a_TO
Bed occupancy	IJP Sensor RFID Smartphone	ID_RFID ID_Tag Status (on/off)	Wi-Fi (MQTT)	CMT	<p>if (ID_Tag=ID_Bed) AND (status=on) then get(T_on) UT=Time-T_on</p> <p>if UT>Bed_TO then AL_Bed_TO</p> <p>elseif (ID_Tag=ID_Bed) AND (status=off) then get(T_off) UT=T_off-T_on</p> <p>Bed_UT=UT</p>	X	X	T_on T_off UT Bed_UT AL_Bed_TO	GUI Cloud Caregiver	IP GSM	UT_Log AL_Log	MC_Bed _TO MU_Bed _TO

Fridge usage	Switch RFID Smartph	ID_RFID ID_Tag Status (on/off)	Wi-Fi (MQTT)	CMT	<p>If (ID_Tag=ID_Fridge) AND (status=on) then count++ get(T_open) UT=Time-T_open</p> <p>If count<FR_CNT_thmin then AL_FR_Low</p> <p>if UT>FR_TO then AL_FR_TO</p> <p>If (ID_Tag=ID_Fridge) AND (status=off) then get(T_close) UT=T_close-T_open</p>	X	X	T_open T_close UT AL_FR_Low AL_FR_TO	GUI Cloud Caregiver	IP GSM	UT_Log AL_Log	MC_FR_Low MC_FR_TO MU_FR_TO
Food storage usage	Switch RFID Smartph	ID_RFID ID_Tag Status (on/off)	Wi-Fi (MQTT)	CMT	<p>If (ID_Tag=ID_FS) AND (status=open) then count++</p> <p>If count<FS_CNT_thmin then AL_FS_Low</p>	X	X	count AL_FS_Low	GUI Cloud Caregiver	IP GSM	CNT_Log AL_Log	MC_FS_Low
Drinking Water Intake	RFID Smartph	ID_RFID ID_Tag	Wi-Fi (MQTT)	CMT	<p>If (ID_Tag=ID_WT) then count++</p> <p>if count<WT_CNT_thmin then AL_WT_Low</p>	X	X	count AL_WT_Low	GUI Cloud Caregiver	IP GSM	CNT_Log AL_Log	MC_WT_Low MU_WT_Low
Drugs taking	RFID Smartph	ID_RFID ID_Tag	Wi-Fi (MQTT)	CMT	<p>if (ID_Tag=ID_Drug) and (Time=T_sched) then count++</p> <p>if (ID_Tag=ID_Drug) and (Time<>T_sched) then AL_DRG_TIM</p>	X	X	ID_Drug Count AL_DRG_TIM AL_DRG_MIS	GUI Cloud Caregiver	IP GSM	CNT_Log AL_Log	MC_DRG_TIM MC_DRG_MIS MU_DRG_MIS

					if (ID_Tag<>ID_Drug) and (Time=T_sched) then AL_DRG_MIS								
Robotic Walker data	Robotic Walker	Timestamp, Coord., On-board sensors data	Wi-Fi (MQTT)	CMT									

NOTES

- Robotic Walker: Sends [Timestamp, Coordinates (localization), On-board Sensors Data] to the CMT via MQTT Protocol.
- Chair Occupancy Sensor: Transmits state (occupied/unoccupied) changes only to the CMT (with redundancy).

4.10 System Users Hierarchy and Privileges

- System Administrator
 - Has all the privileges;
- System Manager
 - Defines End-Users profiles;
 - Defines Caregiver profiles;
 - Defines the associations between end users and caregivers;
- Caregiver
 - Can install the App (User and Caregiver);
 - Receives, through the App, notifications of the events occurred to the end-users;
 - Can access the Web GUI, via the App, gaining access to user status and data history;
- End-User
 - Receives Pop-up and audio notifications on the App (user);
 - Can send requests to the caregiver and commands to the system via the app.

4.11 System Manager GUI Structure (Web-GUI)

- User configuration Panel
- Alarms Panels
- User activity tracking (graphical output)

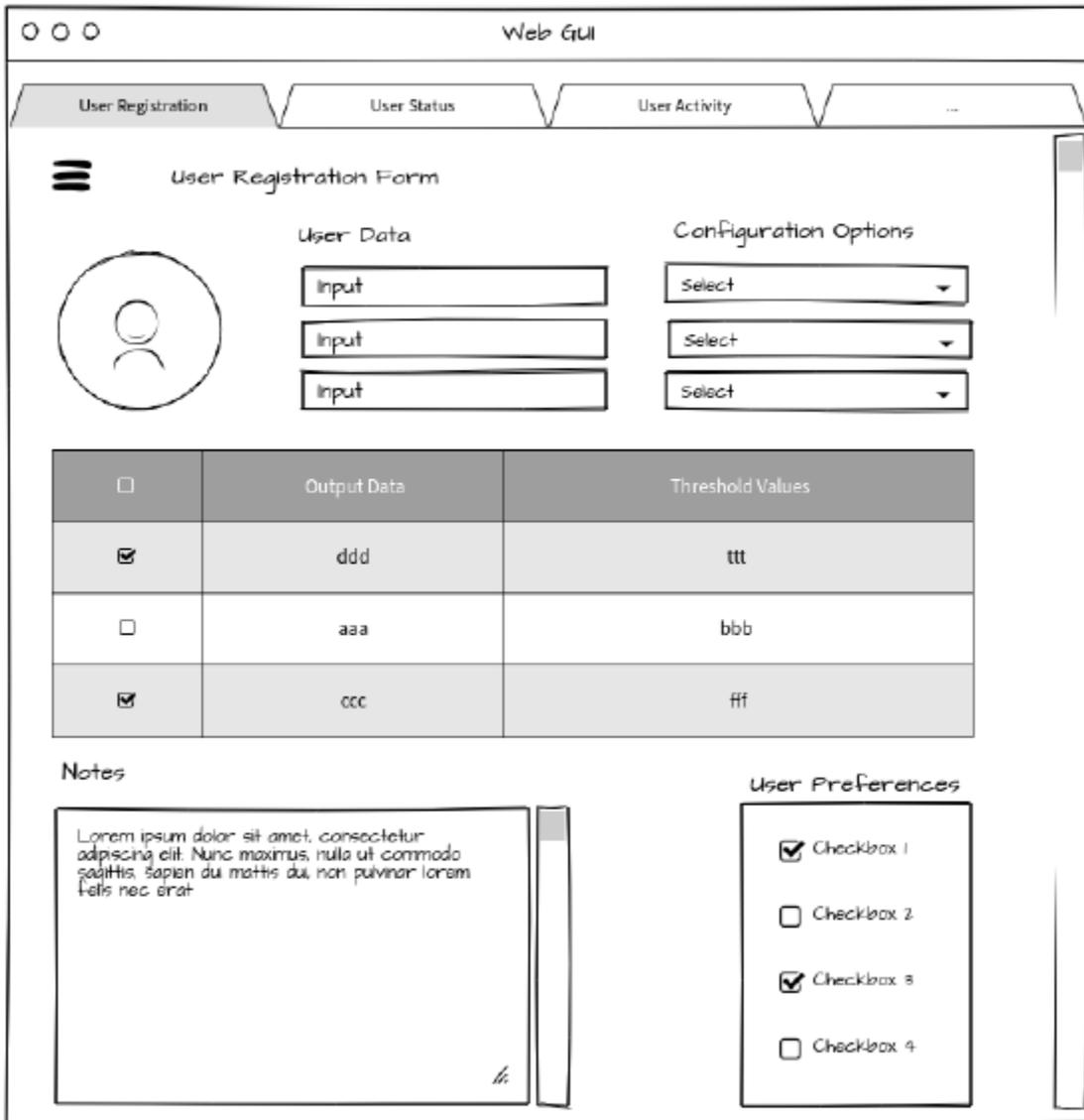


Figure 1 User configuration panel

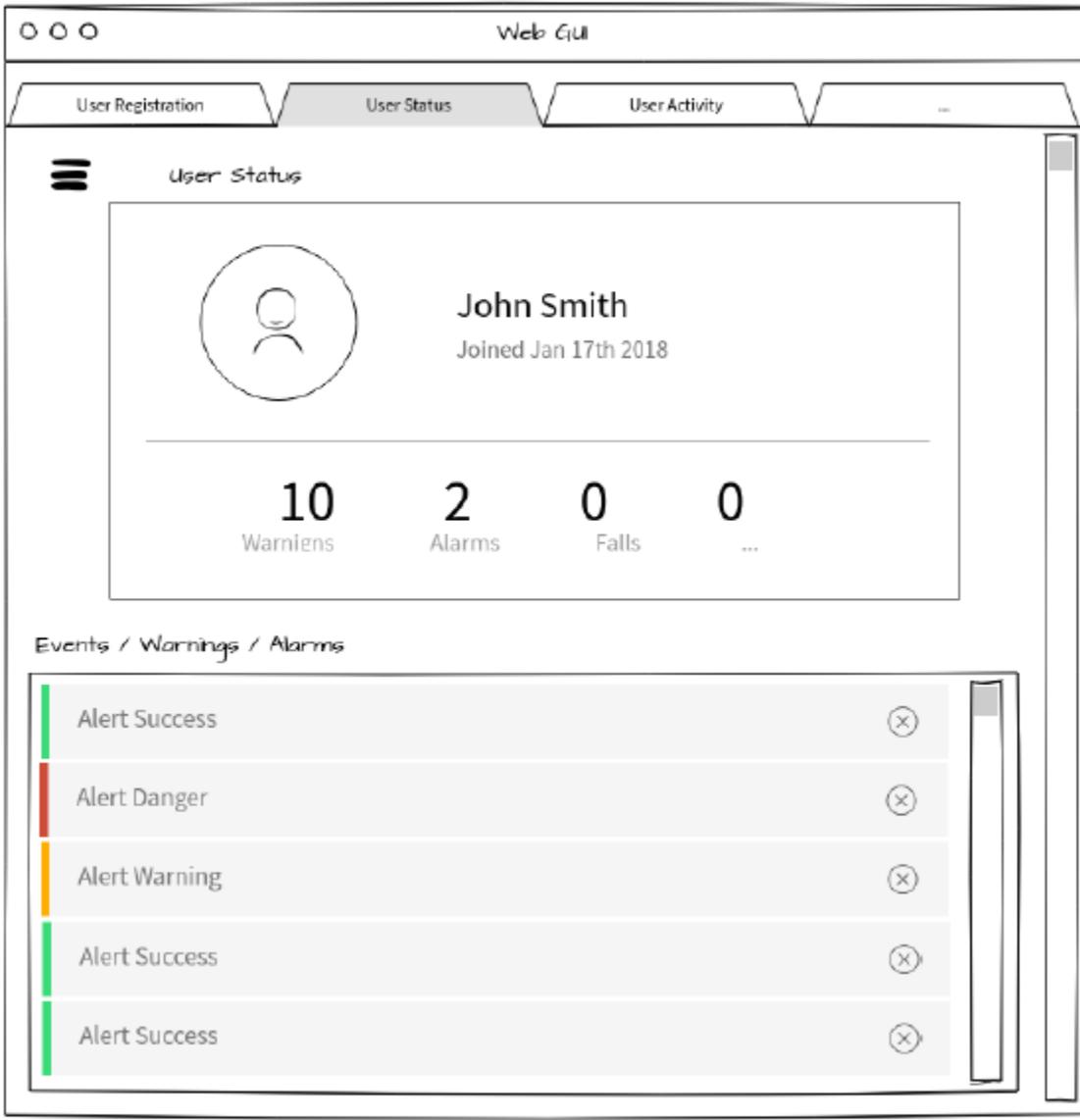
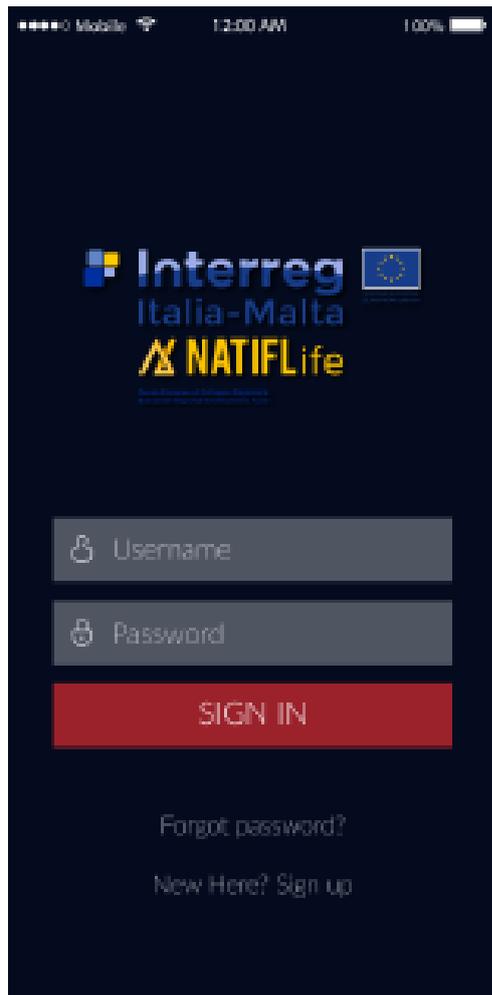


Figure 2 Alarms Panel

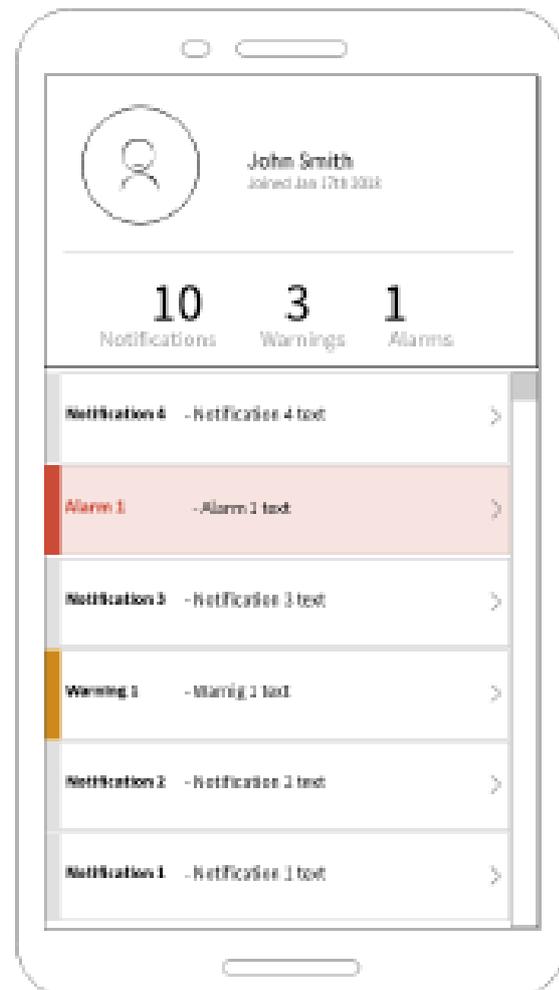


Figure 3 User Activity Tracking

4.12 Caregiver App



Login Screen

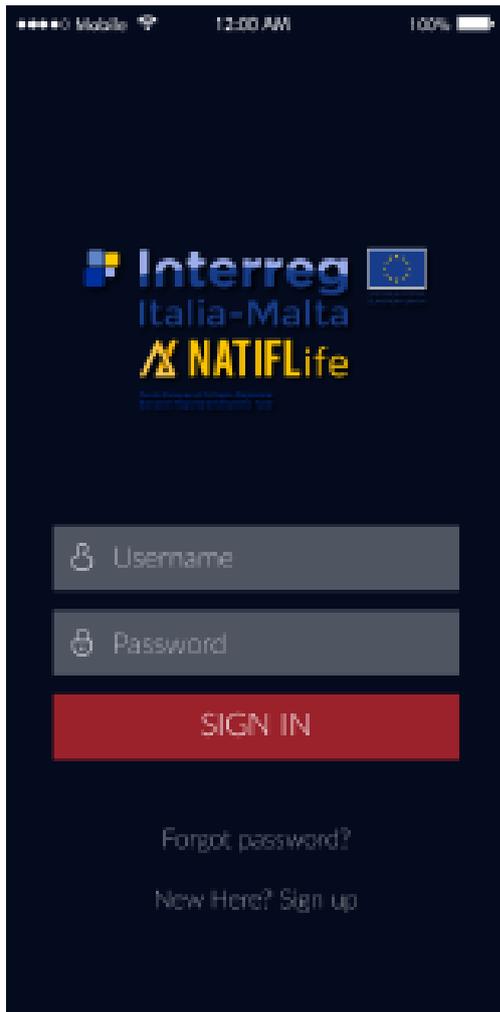


Alarms & Notifications panel

Notes

- Each caregiver may have many End-Users associated.
- Alarms and notifications relative to each associated user must be accessible via the app.
- The Web-GUI (or the complete information stored on it) must be accessible to caregiver via the App (a direct link to the web GUI or equivalent solutions).
- A “Settings” menu must be foreseen in the App, with access from the login screen (for example), in order to set configuration parameters (IP address, etc.).

4.13 User App



Login Screen



User Interface

Notes

- Access as End User via Login screen with the ID_User (the access procedure will be performed by the caregiver at the beginning of the trial session).
- ID_User will be transmitted to the Cloud/CMT together with data in order to associate data with user.
- Notifications to users via Pop-Up and Audio Messages;
- Eventually, the Audio notifications could be disabled (option) for skilled users;
- A single panel of buttons, including "Help" or "Panic" button.
- Use Icons to identify buttons/actions.
- Examples of buttons/actions to be implemented:
 - Light on/off;
 - Window blind open/close;
 - Help;
 - Customizable functions.

- Optional: a settings panel (not accessible to the end-user).
- Communications with other devices (Smartwatch, RFID Reader, CMT, Cloud, ...) implemented.
 - RFID data (ID_RFID, ID_Tag) and User Commands (buttons) must be sent to CMT on MQTT protocol;
 - Smartwatch and other wearable sensors (eventual) data will be sent directly to the Cloud.
- A “Setting” menu, not accessible to the users, must be foreseen in the App, in order to set up configuration parameters (IP address, enable/disable notifications, pairing with Bluetooth devices, etc). Access to this menu could be done from the login screen (for example).

4.14 GUI Messages Guidelines

The following tables report some suggestions and guidelines for the messages that will be delivered to the caregiver (MC prefix in the ID_Msg field) and to the end-users (MU prefix in the ID_Msg field).

End users will receive messages as In-App Notifications. Messages for users will be shown in a Pop-up and, on the same time, an audio message will be reproduced.

Caregivers will receive messages as in-app notifications and/or as a conventional SMS (where specified in the Data Flow Table).

WARNING 1: The audio and pop-up notifications to users MUST BE DISABLED during the trial sessions.

WARNING 2: User messages and notifications must be carefully defined

User App Messages

ID_Msg	Message
MU_AR_Low	Invite user to perform some activity or give a feedback
MU_SWB_TO	Invite user to check tap closure in the bathroom
MU_SWB_TO	Invite user to check tap closure in the kitchen
MU_Room_TO	Notify the user for prolonged stay / Invite to perform activity
MU_APL_TO	Invite user to check appliance status
MU_Chair_TO	Invite user to get up and do some activity
MU_Sofa_TO	Invite user to get up and do some activity
MU_Bed_TO	Invite user to get up and do some activity
MU_FR_TO	Invite user to check the fridge status
MU_WT_Low	Invite user to drink more water
MU_DR_MIS	Notify user forgotten drug taking

Caregiver App Messages

ID_Msg	Message
MC_HR_Low	Low heart rate: [HR], User: [ID_Usr, Name], at [Time], in [ID_Env]
MC_HR_High	High heart rate: [HR], User: [ID_Usr, Name], at [Time], in [ID_Env]

MC_AR_Low	Low activity rate, user: [ID_Usr, Name] at [Time] in [ID_Env]
MC_AR_High	High activity rate, user: [ID_Usr, Name] at [Time] in [ID_Env]
MC_FALL	Fall detected, user: [ID_Usr, Name] at [Time] in [ID_Env]
MC_SWB_Low	Low Sanitary Water Bathroom utilization, user: [ID_Usr, Name], at [Time]
MC_SWB_TO	Sanitary Water Bathroom left open by user: [ID_Usr, Name] at [Time]
MC_SWK_Low	Low Sanitary Water Kitchen utilization, user: [ID_Usr, Name], at [Time]
MC_SWK_TO	Sanitary Water Kitchen left open by user: [ID_Usr, Name] at [Time]
MC_Temp_High	High Temperature detected in [ID_Env] at [Time]
MC_Temp_Low	Low Temperature detected in [ID_Env] at [Time]
MC_RH_High	High Relative Humidity detected in [ID_Env] at [Time]
MC_RH_Low	Low Relative Humidity detected in [ID_Env] at [Time]
MC_NL_High	High Noise Level detected in [ID_Env] at [Time]
MC_LI_High	High Light Intensity detected in [ID_Env] at [Time]
MC_LI_Low	Low Light Intensity detected in [ID_Env] at [Time]
MC_AQ_Low	Low Air Quality detected in [ID_Env] at [Time]
MC_GAS	High gas concentration detected in [ID_Env] at [Time], users: [User_ID]
MC_BKO	Black-out detected in [ID_Env] at [Time], users: [ID_Usr]
MC_Room_TO	Prolonged stay user: [ID_Usr, Name], in [ID_Env] at [time]
MC_APL_Low	Low Appliance [ID_APL] Utilization by user [ID_Usr]
MC_APL_TO	Appliance left ON [ID_APL]
MC_Chair_TO	Prolonged stay of user [ID_Usr] in chair, [Time]
MC_Sofa_TO	Prolonged stay of user [ID_Usr] in sofa, [Time]
MC_Bed_TO	Prolonged stay of user [ID_Usr] in bed, [Time]
MC_FR_Low	Low fridge [ID_fridge] utilization by user [ID_Usr, Name], [Time]
MC_FR_TO	Fridge [ID_fridge] left open
MC_FS_Low	Low food storage [ID_food] utilization by user [ID_Usr, Name], [Time]
MC_WT_low	Low water intake by user [ID_Usr, Name], [count], [Time]
MC_DRG_TIM	Wrong drugs assumption by user: [ID_Usr, Name], [ID_Drug], [Time]
MC_DRG_MIS	Drug intake forgot by user: [ID_Usr, Name], [ID_Drug], [Time]