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Deliverable D7.1

Pilot area

installation methodology & planning

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15.	Municipality of Pilea-Hortiatis	MPH	Greece

[1] ***Deliverable Type:***
R: Document, report (excluding the periodic and final reports)
DEM: Demonstrator, pilot, prototype, plan designs
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Executive Summary

The present document is the deliverable D7.1 “Pilot Installation Planning final version”. This deliverable presents a top-level view of the installation plans of each pilot site, which define the activities that have to take place regarding installation and a timeline for the activities which will fulfil the requirements of MS8 ‘Pilot Installations Completed’ in Month 39 (March 2019), which leaves time for evaluation of use cases by the end of the project in M48.

The deliverable further aims to ensure that all pilot sites will have a feasible plan for their use case, so that the evaluation period will be sustainable.

In this deliverable, a common methodology and plan for each demonstration pilot site is set out. The common methodology for each pilot describes: the key benefit per use case, the infrastructure, the stakeholders, the installation requirements and the hardware and software that will be used. The methodology includes three main phases; Pre Installation, Installation and Post Installation which is described and detailed for each pilot site. The specific plans show the conditions at the pilot sites and provides details of the installation of the infrastructure needed for its use case. The Value Added Services, for the pilot sites, are defined in D.5.1 and are implemented in software according to the requirements of the pilot site.

There are four pilot sites which aim to demonstrate VICINITY different use cases. The two pilot sites in Norway, will be used to demonstrate VICINITY in Assisted Living, Building Monitoring, Energy Flexibility, Smart Neighbourhood and Intelligent Transportation/Parking domains. The Portuguese pilot site will demonstrate VICINITY in Neighbourhood Grid Ecosystem and will focus on Smart Buildings. The Greek pilot site will demonstrate VICINITY in the eHealth domain including assisted living and fitness and preventive medicine.

Personal data will be collected in the pilot in the Greek Pilot site. Plans are in place for this data to be handled according to the GDPR. These include the VICINITY architecture, which does not store data content, and the creation of a Value-Added Service to manage private data for the Greek pilot according to GDPR requirements.

Having four different pilot sites with different approaches and domains will demonstrate that the VICINITY Platform can give value to a wide range of scenarios. The use case scenarios were driven by the stakeholder needs and include equipment and services that need to be integrated and installed according to a detailed plan.

All the pilot partners have been involved in VICINITY from the beginning of the project. The cooperation with the stakeholders has been already a part of their activities, while they have good knowledge of the functionality and architecture of VICINITY. This has helped in creating a detailed installation plan, since pilots are familiar with both stakeholders needs and VICINITY technical aspects which will be integrated in the pilot site.

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List of Definitions and Abbreviations

Abbreviation	Definition
API	Application Programming Interface
CPV	Concentrator Photovoltaic
DER	Distributed Energy Resources
EC	European Commission
EHS	Environment, Health and Safety
IEQ	Indoor Environment Quality
IoT	Internet of Things
KIC	Knowledge Innovation Community
KPI	Key Performance Indicators
KNX	Abbreviation of Konnex, an Open standard for Building Automation
LoRaWAN	Low-Range Wide Area Network (5G)
MWp	Megawatt Peak
NBIoT	Narrow Band Internet of Things (5G)
O&M	Operation and Maintenance
P2P	Peer to Peer
PIR	Passive Infrared Sensor
R&I	Research and Innovation
RES	Renewable Energy Sources
RF	Radio Frequency
SDP	Solar Demo Platform
SME	Small and Medium Enterprises
Z-wave	Wireless communications protocol used primarily for home automation
ZigBee	Energy-efficient communication protocol for wireless personal networks
VAS	Value-Added Service
WP	Work Package

1. Introduction

The aim of this report is to present a common methodology and plan for each of the demonstration site installations, as well as specific plans for each site to capture individual installation requirements.

Milestones are set for each site which differ in the detail needed to meet the overall project milestone for installation, Month 39 (March 2019).

The goals of the implementation are to install: physical IoT devices (hardware) and their connection to the VICINITY platform; and Value-Added Services (VAS) that will be enabled through software and the VICINITY platform. VAS enable data to be shared and analysed at a community-scale, by VICINITY partners.

The work has been divided in three phases, each with different focus and workload. The Pre-installation phase will focus on preparation for personnel and devices needed to be installed.
Installation phase will focus on the actual installation activities and how to manage devises and infrastructure to be installed.

The Post-Installation phase will focus on continuously upgrades and testing. The stakeholder will play a big part in this phase by being the responsible for benefits and feedback to the Value-Added Services installed at the Pilot Site.

1.1. Context within VICINITY

Describing a common methodology and making common plans will help the pilot sites to install and deliver their solution as described in Work Packages 7 and tested in environment which includes stakeholders such as operators and users.

Four pilot sites will be connected to the VICINITY platform to demonstrate benefits to users in terms of new functionality, benefits and efficiencies. The presence of real-life stakeholders greatly enhances the chances of further exploitation both locally and through worldwide dissemination of results.

The common methodology and plans will help the pilot sites install and deliver their technologies which are described in Work Packages 7, tasks 7.2 to 7.5.

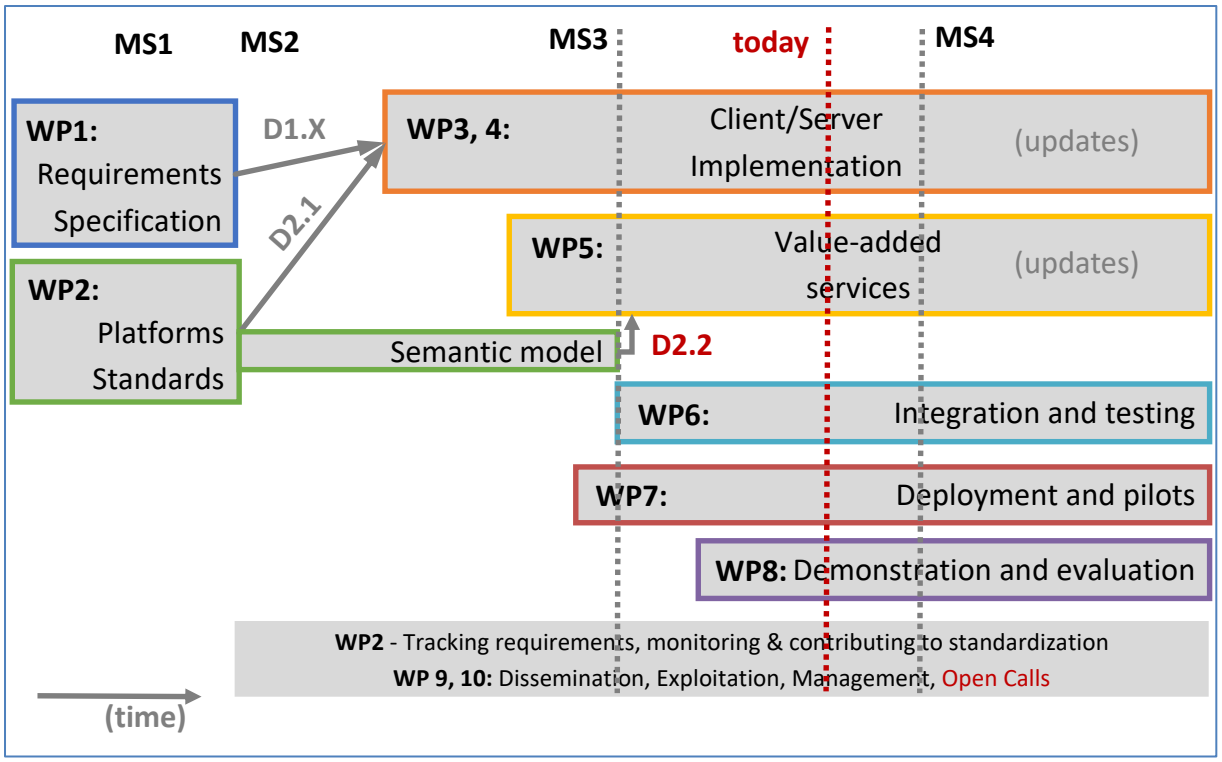


Figure 1 Overall diagram showing the links between the different Work Packages

Work Packages 1, 2, 3 and 4 are developing and establishing the VICINITY platform. Work Package 5 is developing and implementing the Value-Added Services for each pilot site. In Task 7.1 the common and detailed planning is described and gives the pilot sites the necessary framework to install their hardware for pilot sites in tasks 7.2 – 7.5.

The objective as described in Grant Agreement is cited below.

Table 1 Objectives

Work Package/Task	Description
WP7	- To get input from WP6 (Integration & Lab testing) and provide the detailed planning for pilot installations on a larger scale at real world demonstration pilot sites, for evaluation and demonstration of the VICINITY framework - To perform the actual installation and integration of the identified IoT devices per Use Case to the VICINITY platform and to deploy the Value-Added Services, implemented in WP5. To establish the pilot test and evaluation infrastructures required for the most effective evaluation in WP8
D 7.1	The deliverable will set the detailed plan for integration at selected pilot areas addressing the particular role each site will play for the evaluation of the VICINITY integrated and deployed prototypes.

1.2. Structure of the document

The rest of the document is organised as follows:

- Chapter 2 provides a brief description of each pilot site

- Chapter 3 gives an overview of the high-level architecture that the installations build upon.
- Chapter 4 gives a short description of the methodology and structure of how to plan the work of each pilot site.
- Chapter 5 provides a snapshot of the risk register, including risks that have been identified throughout the project.
- Chapter 6 provides an overall plan and timeline for the four demonstration sites.
- Chapters 7 through 10 describe each pilot site in succession. These chapters describe and document specific plans and requirements for each site. The installation is divided in phases: pre-installation, installation and post-installation. These chapters provide requirement templates and Gantt charts to describe the activities of each demonstration site in detail.

2. Brief description of the Vicinity Platform and pilot sites

The VICINITY platform is an ecosystem which enables decentralised interoperability of IoT infrastructures called a 'Virtual Neighbourhood', where users can share the access to their smart objects without losing the control over them. More information about this is in Section 3.

Each Pilot Site connects to the platform and introduces an IoT network of different: domains, equipment types and end-users.

Each pilot site will implement the necessary adapter for equipment installed. Adapters are developed and tested and updated in Work Package 4; Client Infrastructure Implementation.

2.1. Pilot Use Case 1a - Oslo (NO)

This VICINITY use-case focuses on improving resource management, resource consumption and enables predictive operations in buildings, so further improving efficiency.

Using wireless door sensors, as well as wireless electricity- and water meters, the two Value-Added Services will inform and send alarm messages to the management team about non-typical situations. The information and alarms will enable them to target their cleaning efforts, shed electricity loads, discover water leaks and track their resource consumption in real time, thus saving time and money.

The Oslo pilot site is at the building "M:6 Verket" owned by Höegh Eiendom and rented and organised by Coworking International (Coworking International Coworking International who see business benefits in participating in the VICINITY project, and an opportunity to gain considerable insight into the IoT landscape and future IoT developments.

The wireless infrastructure allows flexibility for valuable additions to existing systems, as well as back-up or replacement of existing cabled solutions. The new wireless overlay allows data to be gathered in areas that would otherwise be too costly or impractical to monitor.

2.2. Pilot Use Case 1b - Tromsø (NO)

The use-case will demonstrate how transport information, building data and assistive living can be integrated through agreements with vehicle space owners and parking space users to enable essential visitors such as welfare staff to have parking available when needed and be aware of it on the move.

The Tromsø pilot site is at the building "Teaterkvarteret". The site includes three 6-storey buildings with a total of 38 apartments. Of these, 8 apartments are either owned or assigned to residents that are either elderly or disabled. One apartment is owned by Tromsø municipality and has the role as Care Centre and training for residents.

The underground garage facility has 32 parking spaces, of which, 7 are allocated to larger vehicles, and 2 have electrical charger ports.

Stakeholders are the municipality Welfare Technology section, the local care centre staff and their clients. The number of clients may vary in time due to their personal circumstances and contracts.

The VICINITY use-case will focus on using IoT technologies for sharing parking spaces. Support for the assisted living aspect will be provided by activity sensors in apartments and smart appliances (fridge and oven).

2.3. Pilot Use Case 2 - Martim Longo (PT)

ENERC has developed and operates a Solar Demonstration Platform (SDP) with 4 MWp (Megawatt-peak) of photovoltaic modules of Concentrator PhotoVoltaic (CPV) technology and also operates SolarLab facility which is equipped with several high-precision sensors for measuring climate data and solar radiation. The SDP is located about 1km from the Village of Martim Longo, where there is a cluster of Municipal Buildings located in the same area that will serve as a pilot site for this project for the different VAS, described below.

The VICINITY use cases include three categories of Value-Added Services:

- **Municipal IEQ Energy Services** – Dynamic Audits, Flexibility and Smart School, which allows the users, the building manager and the maintenance operators to know at any time the current state of the Internal Environment Quality of the building, resources consumption and use of the facility;
- **Services for Citizens** – UV for Citizens; which will provide useful information to the students, senior citizens and citizens in general about the UV level advisory for behaviour, outing planning and additional measures; The service is a model for the equipment usage and leverage for secondary use beyond primary function;
- **Distributed Energy assets management** – Platform Services, DER RES production optimisation of operations and maintenance. The scope of the Value-Added Services is to help the operation and maintenance of the production plant to plan cleaning services of the concentrated photovoltaic modules at the Platform to increase energy production, reduce costs and plan the resources preparation and usage.

2.1. Pilot Use Case 3 Pilea-Hortiatis (GR)

This VICINITY pilot site comprises two use cases to facilitate a) eHealth and Assisted Living for elderly people at home and b) Health improvement for the middle-aged people.

The first use case aims to use IoT equipment from both health and building domains, plus smart appliances, in order to assist the life of elder citizens living alone in the Municipality of Pilea-Hortiatis (MPH) premises. It will take advantage of some existing equipment from previous health programs and add to this with new equipment and services.

The second use case aims to use IoT equipment of health domain in order to promote a healthier lifestyle for middle-aged citizens of the municipality. For this use case, the citizens will be provided with medical equipment and with new sensor installations in the premises of MPH.

3. High Level Architecture

The objective of the VICINITY architecture is to facilitate interoperability between different IoT infrastructures' devices and to software-enable Value-Added Services through a peer-to-peer (P2P) network of VICINITY Client Nodes. Each VICINITY Client Node/VICINITY Node provides access to IoT infrastructure and/or Value-Added Service(s). Once the IoT infrastructure is integrated into the VICINITY neighbourhood through the VICINITY Client Node/VICINITY Node, devices connected to the infrastructure become accessible through the VICINITY Neighbourhood Manager in the VICINITY Cloud. The IoT infrastructure owner can then define access rules of devices and services (i.e. he has direct control over his or her devices). Based on these rules, he or she creates a social network of devices and service called the "Virtual Neighbourhood".

Each Pilot site will implement necessary adapters for devices necessary for the different use cases. All Pilot sites will develop and install its own infrastructure containing Vicinity Node with adapters and gateways.

The VICINITY Client Nodes thus create a controlled VICINITY Peer-to-peer (P2P) Network whereby VICINITY Client Nodes/VICINITY Node can exchange user data directly between each other without the need for it to pass through a common interface or server. Moreover, the VICINITY Client Node /VICINITY Node provides security services (such as data integrity, availability, confidentiality) to ensure security and privacy of exchanged user data.

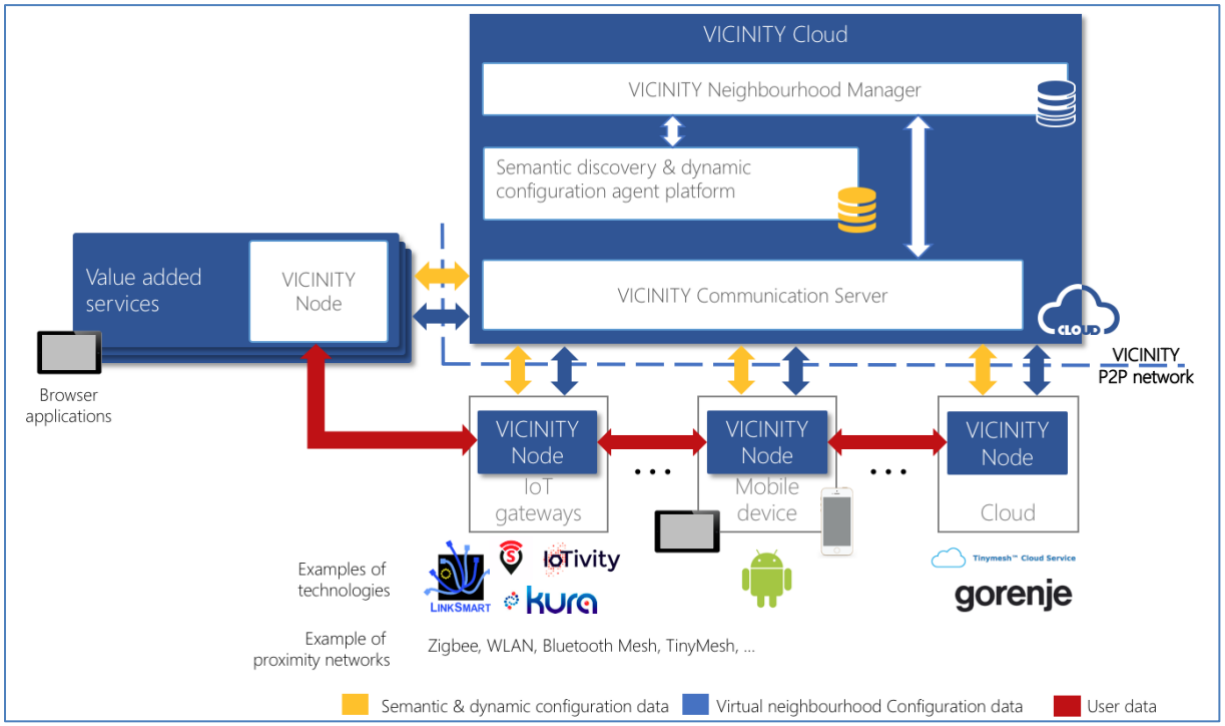


Figure 2 High-level architecture of the VICINITY

The VICINITY Cloud provides semantic interoperability features to facilitate exchange of user data between IoT devices and Value-Added Services to overcome technology differences of connected IoT ecosystems.

4. Methodology

This chapter presents the common methodology and preconditions for the pilot installations and provides a common outline for the four demonstration sites. This common plan shall ensure that each of the partners undertakes the necessary installation activities, achieves common milestones and meets the common deadlines. They can devise their own activities, milestones and equipment choices to fulfil their work is in alignment with VICINITY overall goals, the Work Package aims, and meet requirements established in earlier Work Packages. The Work Package leader (TINYM) will communicate with and follow up on individual sites via telephone conferences, project meetings and through continuous e-mail correspondence. A group of activity identifiers is established to manage and ensure that these requirements are met.

The pilot site installation is divided into three phases; Pre-installation, installation and post-installation.

4.1. Phase 1: Pre-installation

The partner in charge of a demonstration site shall provide an inventory and an indicative location map of the equipment needed to fulfil their use case(s) and Value-Added Service(s). The type and number of devices needed at each location will vary significantly according to their domain and application. The inventory for each pilot site lists: the number of devices of each type to go into the installation; what they will accomplish; and which use cases and Value-Added Services the devices relate to. Moreover, if any integration is to be made with existing equipment, systems or web services at the demonstration site, these are identified in an additional table.

Then the physical installation shall be planned in necessary detail in a Gantt chart that identifies activities for the installation and places them on a timeline. Partners will make their own specific tasks, milestones and timeline, as the activities will differ between sites because of differences in equipment and scope. The individual deadlines shall correspond to the overall timeline. If specialised personnel, such as doctors, nurses, electricians or plumbers are needed for the installation, their involvement should be indicated in the chart.

4.2. Phase 2: Installation

The completed physical installation of units shall be indicated by a milestone for each category of devices (e.g. gateway unit, communication infrastructure, metering device). The exact placement of each device should be documented as the partner sees fit, e.g. in a building floor plan or a list of rooms. The latter documentation is provided a non-public annex as necessary. The implementation of the Value-Added Services is addressed in Task 5.2 and the different pilot sites will implement and test accordingly.

4.3. Phase 3: Post-installation

When all the equipment is installed, it is up to each partner to continually verify that it works, and to fix or replace non-functional units as needed. The post-installation phase should last until the project ends. The activities should follow the common Gantt chart , see table 4 and be elaborated as needed (in the preliminary site-specific documents). In this phase, activities such as: collaboration with end-users, acceptance of deliverables, continuous upgrades and specific pilot site activities will be handled. Activities in Tasks 7.2 to 7.5 will also address updates and refinement.

5. Risks

The VICINITY project – managed by UNIKL has updated the risk register continuously during the project.

Table 2 Updated version of the Risk Table for the project

ID	type	WP	Risk event	Impact	origin	Prob' lity	Cons q'ces	Risk	Mitigation Action Plan	Owner	Feasi-bility	Status	Risk after	Delta Risk
U3	Man	WP7, WP8	SME e.g. SER in financial issues	Oslo demonstrator not feasible	UNIKL	2	4	2,8	Change of Pilot Site has been done. New Site will be implementes 1st. October	Christoph Grimm	2	Reduced by january 2018	0,0	**0,0**

To minimise risks at the pilot site and to exploit synergies with TINYM, the Oslo pilot site was moved from Oslo Science Park to another building in Oslo-region. With agreement of the Project Officer, this is now located in the city of Moss. The benefits of changing buildings are as follows:

- More engagement from building managers and operators.
- Larger organisations are involved with a bigger team to follow-up and get involved in the VICINITY efforts
- TINYM is planning a forthcoming relocation to a Coworking Space at the new site, M:6 Verket. This provides business opportunities involving other SMEs and start-ups at the premises, e.g. services and products based upon VICINITY results and demonstration efforts.
- As part of the local community, TINYM and the Project may receive additional goodwill and interest from managers, operators and tenants. TINYM will be able to have daily interaction with feedback from stakeholders, as well as tenants at the premises.
- Networking effects and close TINYM presence will provide excellent project visibility and dissemination opportunities, both at planned events and in "around the water cooler" conversations on the premises.

6. Plan

This plan presents a timeline and a Gantt chart with common milestones for the pilot sites.

Each Pilot site will present their plan in chapters 7 to 10 and each Pilot site will have its own Gantt chart installation plan with their own milestones as needed.

Individual timelines presented in these later chapters should correspond with the overall timeline shown below.

6.1. Demonstration site overall timeline

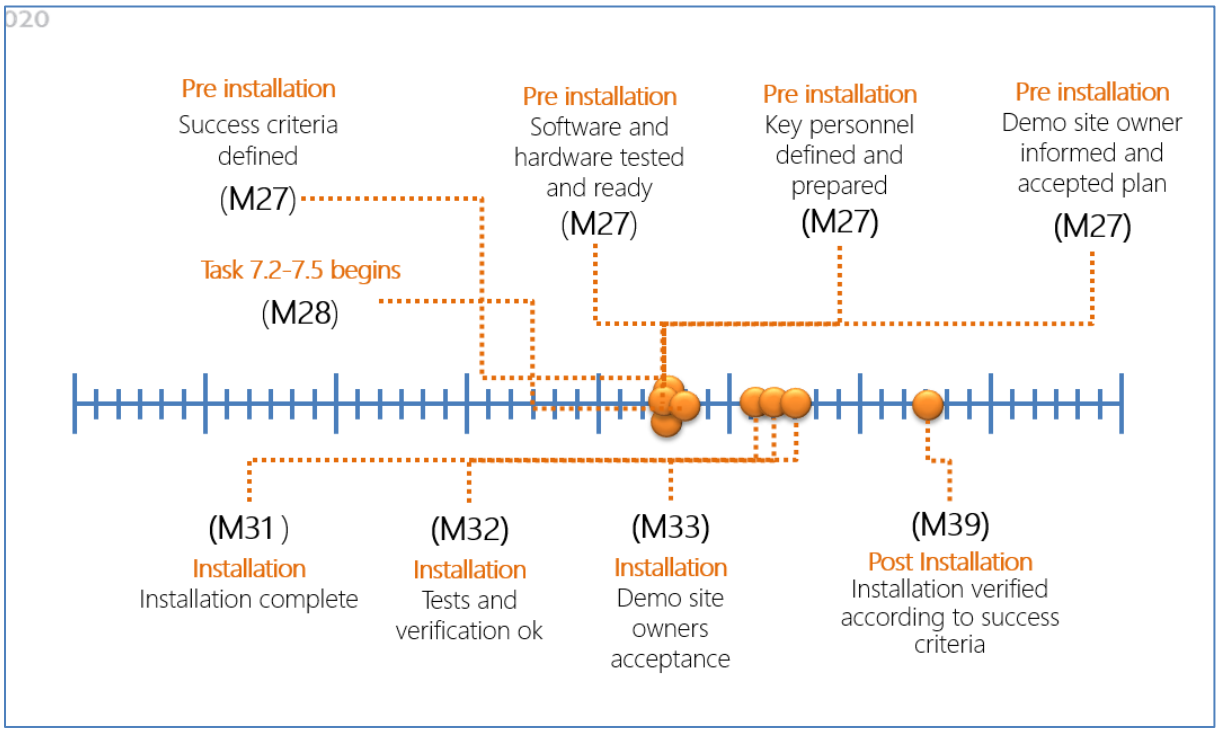


Figure 3 Overall timeline and the Milestones which influence this plan

All pilot sites are free to timetable their activities according to their own plan. The main focus is that all the pilot sites need to be installed and running their first implementation by October 2018 to be able to have enough data to evaluate their pilot sites mid-term and towards the end. The installation of the software will be different for each pilot site due to their specific architectures and plans. All software development and testing will be a part of Work Packages 3, 4 and 5.

Table 3 Milestones (M) for the pilot sites.

		October	November	December	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April
1																				
2	Month	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
3	**Pre installation**																			
4	Workshops with stakeholders and tech. team. Sucess criterias and report template																			
5	**Success criteras defined**						M													
6	Identify need for equipment and integrations																			
7	Equipment placement planning																			
8	Equipment development																			
9	**Hardware acquired**							M												
10	**Integration possibilities identified**							M												
11	Hardware definitions and set up																			
12	**Hardware set up, tested and ready for installation**									M										
13	Identify key installation personnel																			
14	Training installation personnel																			
15	**Key installation personell defined and prepared**									M										
16	Integration of external systems																			
17	**External systems integrated**													M						
18	**Installation**																			
19	Install hardware																			
20	**Installation complete**												M							
21	Test and verify installation																			
22	**Tests and verification ok**													M						
23	**Demosite owners accepted impact on site**														M					
24	**Post-Installation**																			
25	Report and verification work																			
26	**Technical verification ok**																	M		
27	**Report finalized**																		M	
28	Continous follow-up (replace, monitor, iterate) until project end in December 2019																			

Note: Demonstration site owners' acceptance means acceptance in the sense that they accept the impact on the site and the personnel, not that they necessarily should be involved in the verification.

7. Installation plan Pilot Use Case 1a - Oslo (NO)

This chapter introduces the details for pilot site in Oslo see chapter 2.1 Pilot Use case Oslo (NO)

7.1. Infrastructure

IoT Infrastructure involved	• Door sensors from TINYM • Existing water and electricity meters • Iwmac Interface and Infrastructure • RF routers and gateways as needed to route and receive data • Tinymesh Cloud • Tinymesh API • VICINITY Client Node • Value-Added Service

The Infrastructure involved is shown below to identify the layers of integration platforms and devices involved.

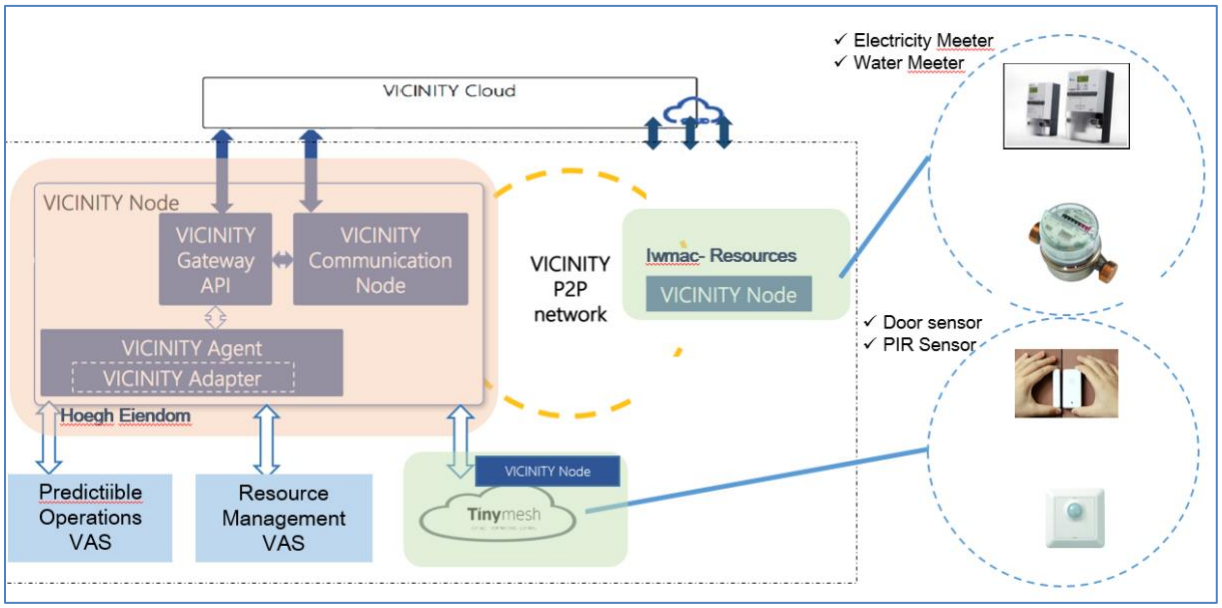


Figure 4 Infrastructure at the Oslo pilot site, integrated with VICINITY

7.2. Stakeholders

Several stakeholders have been identified by TINYM collaborating on the pilot site.

1. Hoegh Eiendom is the owner of the building and will benefit from new technology installed by more efficiency maintenances of the building, M:6 Verket. Höegh Eiendom manages a real estate portfolio of 350.000 square meters, and strives to be among the most energy efficient and environmentally concerned actors in the Norwegian real estate sector. They have taken interest in the VICINITY project as part of their involvement in Smart Cities and Smart Buildings.
2. Coworking International is a company renting the premises at M:6 Verket from Höegh Eiendom to provide a Coworking Space for SMEs and start-ups. In their own words, they provide “a professional business community where creatives and entrepreneurs can meet, grow, socialize and share expertise in modern office spaces that stimulate innovation and

business synergies between providers of different products and services. Coworking International is currently growing in Scandinavia and Europe".

3. AS is a technology group based in Trondheim (NO) and Stockholm (SE). The company develop, monitor and control technical installations, mainly within heating, ventilation, cooling and freezer facilities. Iwmac AS strive to be innovative and ambitious in pioneering in their industry sector and would like to integrate VICINITY technologies to expand their reach and enable additional data sharing and utilization opportunities. Their aim is to deliver an adapter for VICINITY to communicate and deliver data to the Value-Added Services developed by TINYM.

7.3. Installation requirements

A set of identifiers has been established to make it easier to categorise and manage requirements across the pilot sites. These are shown below in Table 2 below and are elaborated in the following pages for the Oslo site.

Table 4 Installation requirement Identifiers for Oslo pilot site

Requirement category	Requirement identifier
Supplier requirements	VICINITY-IR-SUP0XX
Personnel requirements	VICINITY-IR-PER0YY
Device requirements	VICINITY-IR-DEV0ZZ

VICINITY-IR-SUP0010	Legal and organisation
Suppliers shall be legally registered companies and shall comply with local EHS requirements to ensure worker wage and safety.	
Considered requirements: TINYM is a legally registered company and complies with local EHS requirements to ensure worker wage and safety. They provide their own hardware and staff for installing the devices in the building.	

VICINITY-IR-SUP0020	Economic/financial conditions
Suppliers shall be creditworthy.	
Considered requirements: Suppliers are creditworthy. All suppliers are checked with the official tax register in Norway and by using the national Business Register (Brønnøysund) online service, the financial status of the supplier may be found.	

VICINITY-IR-SUP0030	Wage and work conditions
The supplier shall comply with local tariffs and regulations	
Considered requirements: Suppliers comply. All installation of the Tinymesh sensors will be performed by TINYM employees. The installation work will not need any special training, tools or have any risks regarding heights or electricity risks.	

VICINITY-IR-SUP0040	Technical knowledge
The supplier shall have necessary technical knowledge to deliver the hardware or services (such as plumbing, electrician work etc.)	
Considered requirements: Water and electricity meters are installed by certified professionals. All the electricity and water meters are installed by the entrepreneur responsible for M6.. TINYM will use existing meters in the pilot site.	

VICINITY-IR-PER0010	Management personnel
Internal personnel are needed to specify the solutions needed for each use case, as well as making and following up the plan for the demonstration site installation.	
Considered requirements: Internal personnel are available and have the necessary competencies. TINYM will be responsible for following up and training of the personnel who will use the services.	

VICINITY-IR-PER0020	Technical personnel
Personnel are needed to assemble and configure the necessary devices for the installation, as well as to perform the physical installation. The personnel involved must be sufficiently trained in device operation to confirm that the devices are operational and that they are installed successfully.	
Considered requirements: Water and electricity meters will be installed by certified professionals from the company responsible for HVAC system. TINYM personnel have intimate knowledge of the Tinymesh devices and their installation.	

VICINITY-IR-PER0030	Demo site personnel
Personnel representing the demonstration site owner must be identified and available to provide access to the facilities, oversee the installation if necessary	
Considered requirements: Höegh Eiendom and Coworking International are available. Iwmac AS will have personnel ready to assist during the implementation and test period. TINYM will coordinate with these stakeholders to make sure that necessary tests and result will be provided.	

VICINITY-IR-PER0040	Specialist personnel
For some use cases, special competencies are required. For example, installing a new water meter in a building will require a certified plumber, and energy meters may require certified electricians. The qualifications and availability of these key resources must be identified to ensure a successful installation.	
Considered requirements: Water and electricity meters will be installed by certified professionals.	

VICINITY-IR-DEV0010	Functional variable identification
The device shall be able to identify the variable it is intended to measure, e.g. people moving in and out of a room, the water consumption, the temperature of a room, the pulse of a person or some other variable specific to use case.	
Considered requirements: The installed devices will be tested for functionality. Before installation of Tiny Mesh sensors, all sensors will be tested in an environment controlled by TINYM.	

VICINITY-IR-DEV0020	Local environmental impact
The device shall have a size and form that does not interfere with the daily operation of the demonstration site. Interference could, for example, be physical or aesthetical damage to property or inconvenience to patients and users. Possible examples include: *a) No light or sound from devices when in operation* *b) Minimalistic design and size* *c) Not in conflict with other installations* *d) Not disturbing patients, users and personnel*	
Considered requirements: The devices are designed such that they have minimal impact on their environment, personnel or end-users, like cleaning staff or building manager staff.	

VICINITY-IR-DEV0030	Power source
The devices will need a power source, and this should be considered when selecting devices. Battery powered devices may be required in some cases for ease of installation and low impact. In other cases, the device may require grid connection.	
Considered requirements: The devices will primarily use grid power but can be easily adapted for battery operation if needed. The decision of using grid power or battery will be taken together with the stakeholders and building management.	

VICINITY-IR-DEV0040	Variable identification and accuracy
The device shall be able to identify the variable it is intended to measure, e.g. people moving in and out of a room, the water consumption, the temperature of a room, the pulse of a person or some other variable specific to the use case. The measurements should be sufficiently precise and accurate, and applicable in the use cases and Value-Added Services defined in previous Work Package 5.	
Considered requirements: The installed devices will be tested for variable identification, data and accuracy before being installed at the pilot site.	

VICINITY-IR-DEV0060	Encryption
The devices shall provide encrypted data streams for security and privacy purposes.	
Considered requirements: No personal or sensitive data will be collected. Nevertheless, Tiny Mesh devices can provide encrypted communication. The sensors are not connected with any other data in the building site where personal data are collected.	

VICINITY-IR-DEV0070	Communication
The devices shall be able to communicate with the internet, either directly or via a gateway unit. If the communication is wireless, the devices should have sufficient radio range and/or mesh capabilities to avoid problems with data loss in the installation environment.	
Considered requirements: The gateway unit design is tested and working. TINYM will test all sensors in their own premises before installing at the pilot site and linking it to the gateway.	

7.4. Hardware and integrations catalogue

This section describes the hardware and integrations that will be implemented at the pilot site and give a brief overview of the purpose of the various devices, as well as to connect them to a "related use case". All related use cases mentioned are described in detail in Deliverable D 5.1 'VICINITY value-added services definition, requirements and architectural design'

Table 5 - Hardware catalogue for Oslo pilot site

Device type and vendor	*Number of units*	*Functionality*	*Communication*	*Related Use Case*	*Location*
Door leaf sensor *Model # TINYM*	*8-10*	*Trigger if status change (open/close door)*	*TinyMesh 868 MHz*	*UC 1.a*	*Toilet stall doors*
PIR sensor *Model # TINYM*	*3-5*	*Trigger if movement within sensor range*	*TinyMesh 868 MHz*	*UC 1.a*	*Toilet "common area"*
Gateway *FXT009 Sierra Wireless*	*1-2*	*Connect TinyMesh sensors to internet*	*TinyMesh 868 MHz to GPRS/EDGE (2G)*	*UC 1.a UC 1.a*	*Server/IT room or other secure location*
RF Router *Model # TINYM*	*3-5*	*Route/forward messages from TinyMesh sensors to gateway. Improve network strength and reliability.*	*TinyMesh 868 MHz*	*UC 1.a UC 1.a*	*Spread throughout building*
Gorenje refrigerator *Model # Gorenje*	*1*	*Controllable load, refrigeration*	*WiFi*	*UC 1.a*	*Kitchen area*

Table 6 - Integration catalogue

Integration	*Functionality*	*Communication*	*Related Use Case*
IWMAC	*Top system/ monitoring system for heat, ventilation, cooling and resource consumption in building. Data harvest for use cases. Electricity and water meter data to be extracted via Iwmac AS*	*API to VICINITY adapter, or integration to the Iwmac AS Top system.*	*UC 1.a*

7.5. Value-Added Services to be implemented

In Deliverable D5.1; 'VICINITY_D5.1 Value added services definition requirements and architectural design', the Value-Added Services to be implemented are described. The table beneath gives a short overview of Value-Added Services to be installed.

Table 7 Value-Added Service for Oslo pilot site

Ref.	VAS Name	Goal
VAS 1a.1.2	Cleaning and waste removal notification service and warning	Save time and efforts from the cleaning personnel, and thus offer a better or equally good service at a lower cost. Integrate with weather data from YR to improve accuracy. YR is a joint service by the Norwegian Meteorological Institute and the Norwegian Broadcasting Corporation.
VAS 1a.2.1	Resource consumption and alarm service	Process water and electricity consumption data streams to distinguish typical from non-typical consumption situations and trigger alarms. Detect water leaks. Control smart appliances to demonstrate peak load harmonization.

The premises at M:6 Verket is a coworking environment for about 500 people, where Coworking International cater to a range of start-ups and SMEs, providing flexible or fixed work spaces, meeting rooms, offices, office landscapes, parking facilities and cafeterias.

7.6. Phase 1: Pre-installation

In the pre-installation phase, all details regarding sensors, developments, resources and preparation activities will be achieved. TINYM is responsible for developing the door sensors and PIR sensors that will be used in the Pilot – and is therefore not depending on any other supplier.

Regarding the Electricity and water meters – TINYM will use already installed equipment at the pilot site. TINYM will work closely with Iwmac AS and provide them with all help needed to have an integrated solution with VICINITY. By integrating their data to VICINITY, TINYM will be able to provide Value-added Services to the building manager.

Table 8 Gantt chart: Pre-installation

		2017			2018												2019	
	Responsible	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December	January	February
Month		22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
Pre installation																		
Workshops with stakeholders and technical team defining sucess criterias and end report template. Stakeholders; Iwmac, Hoegh Eiendom, CWI																		
Milestone: sucess criterias and end report template defiend..	**TINYM**						**M**											
Identify need for equipment and integrations																		
Milestone: NDA signed with top system supplier for integration (IWMAC)	**TINYM**						**M**											
Equipment placement planning																		
Equipment development																		
Hardware acquired	**TINYM and IWMAC**							**M**										
Hardware definitions and set up. This will be done in paralel with the test in Aaulborg, and tests preormed in TINYM location																		
Hardware set up, tested and ready for installation	**TINYM**									**M**								
Identify key installation personnel, will be done together with the personell responsible for resource management at the premisises.																		
Training installation personnel will be done by TINYM																		
All personell prepared	**TINYM**									**M**								

7.7. Phase 2: Installation

TINYM will install their own equipment and devices in collaboration with the building owner. The decision on which rooms shall be used in the Pilot, will be done in the pre-installation phase together with Coworking International and Hoegh Eiendom.

All necessary equipment will be tested in the pre-installation phase to seek a smooth and easy installation at the pilot site. TINYM will do the installation at hours when the pilot site is less in use (weekends or after normal working hours).

Table 9 Gantt chart: Installation

		2017			2018													2019		
	Responsible	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March
Month		22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Installation																			
Install refrigerator																			
Install gateway unit(s)																			
Install door sensors																			
Install PIR sensors																			
Hardware installation complete	**TINYM**												M						
Integration of IWMAC' possibility																			
IWMAC integrated - possibility	**IWMAC**													M					
Test and verify installation																			
Tests and verification														M					
Demosite owners accepted	**TINYM**														M				

7.8. Phase 3: Post-installation

TINYM will have offices at the pilot site and will easily be able to follow up and correct any errors or do supplementary work on the solution.

By being able to communicate directly with the end-users, TINYM have a possibility to monitor the solution on a daily basis. There will be continuously upgrades of the solution if needed.

Table 10 Gantt chart: Post-installation

		2017			2018													2019			
	Responsible	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April
Month		22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Post-Installation																				
Report and verification work - last report/documentation aboutthe installation and pilot case																				
Technical verification	**TINYM**																	M		
Report finalized	**TINYM**																		M	
Continous follow-up (replace, monitor, iterate) until end of project																				

8. Installation plan - Pilot Use Case 1b - Tromsø (NO)

8.1. Infrastructure

IoT Infrastructure involved	• Door sensor, smart plug and movement sensor from Fibaro • Raspberry pie for KNX/Z-wave from Sensio • Wireless router from Telenor • Parking sensors from PlacePOD delivered by UNITRONICS • RF router and gateway (for LoRaWAN) • Fridge and smart oven from Gorenje • Vicinity Client Node • Value-Added Services

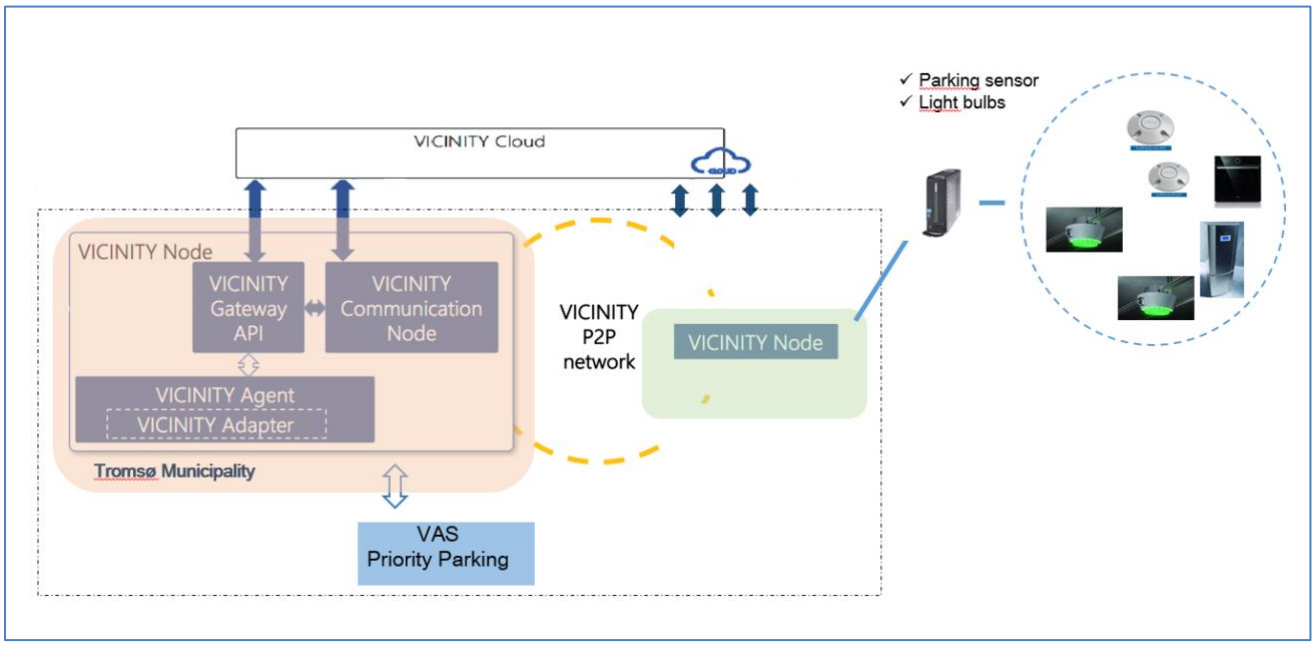


Figure 5 Infrastructure at the Tromsø pilot site, integrated with VICINITY

8.2. Stakeholders

The care centre in Teaterkvarteret is operated by Tromsø municipality, which supports similar services in other parts of the city. The care centre also operates parking spaces on behalf of their clients. These vary between two and eight parking spaces. The building residents are also part of the stakeholder group for this pilot site. Tromsø Parkering is an independent parking company owned by Tromsø municipality are also among the stakeholders in order to make more parking spaces available when there is a high demand for parking. The main end-users of the solution will be care centre personnel having need for parking close to their clients.

8.3. Installation requirements

This chapter lists the installation requirements for the demo sites. The requirements are fetched from D5.1 for the demo site. The different group of identifiers are established to easier manage and identify requirements.

Table 11 Requirements for Tromsø pilot site

Requirement group	Requirement identifier
Supplier requirements	VICINITY-IR-SUP0XX
Personnel requirements	VICINITY-IR-PER0YY
Device requirements	VICINITY-IR-DEV0YY

VICINITY-IR-SUP0010	Legal and organisation
Suppliers shall be legally registered companies and shall comply with local EHS requirements to ensure worker wage and safety.	
Considered requirements: The HITS team complies with EHS requirements	

VICINITY-IR-SUP0020	Economic/financial conditions
Suppliers shall be creditworthy.	
Considered requirements: The HITS team is creditworthy	

VICINITY-IR-SUP0030	Wage and work conditions
The supplier shall comply with local tariffs and regulations	
Considered requirements: The HITS team complies with local tariffs and regulations	

VICINITY-IR-SUP0040	Technical knowledge
The supplier shall have necessary technical knowledge to deliver the hardware or services (such as plumbing, electrician work etc.).	
Considered requirements: The HITS team has necessary technical knowledge to establish the Value-Added Services	

VICINITY-IR-PER0010	Management personnel
Internal personnel are needed to specify the solutions needed for each use case, as well as making and following up the plan for the demonstration site installation.	
Considered requirements: The HITS team cooperates with municipality care centre personnel and tenants for each use case	

VICINITY-IR-PER0020	Technical personnel
Personnel are needed to assemble and configure the necessary devices for the installation, as well as to perform the physical installation. The personnel involved must be sufficiently trained in device operation to confirm that the devices are operational and that they are installed successfully.	
Considered requirements: The HITS team has necessary knowledge to perform the physical installation. The healthcare personnel are sufficient trained to confirm that the devices are operational and that they are installed successfully. A janitor may be necessary in order to get access to the closets where the RF-gateways are placed.	

VICINITY-IR-PER0030	Demo site personnel
Personnel representing the demonstration site owner must be identified and available to provide access to the facilities, as well input up during the installation if necessary.	
Considered requirements: The HITS team is identified and provide access to the facility when healthcare personnel are available or upon request	

VICINITY-IR-PER0040	Specialist personnel

For some use cases, special competencies are required. For example, installing a new water meter in a building will require a certified plumber, and energy meters may require certified electricians. The qualifications and availability of these key resources must be identified to ensure a successful installation.

Considered requirements: Only regular personnel from HITS team is needed to install the parking sensors in the public parking area. However, smart light may demand that authorized electricians are handling the wiring of cables to adhere to national regulations.

VICINITY-IR-DEV0010	Functional variable identification

The device shall be able to identify the variable it is intended to measure, e.g. people moving in and out of a room, the water consumption, the temperature of a room, the pulse of a person or some other variable specific to use case.

Considered requirements: The devices will measure any movement and door open/closed in the assisted living apartment responding indoor light on/off. The device in parking area will sense if a vehicle is placed upon the sensor and responding with events used for business logic that generate smart lightning information and provide information to mobile apps and management solutions.

VICINITY-IR-DEV0020	Local environmental impact

The aim is to avoid having negative impact on the daily operation of the demonstration site. Negative interference could for example be physical or aesthetical damage to property or inconvenience to patients and users.

a) No light or sound from devices when in operation
b) Minimalistic design and size
c) Not in conflict with other installations
d) Not disturbing patients, users and personnel

Considered requirements: These aspects have been taken into consideration.

VICINITY-IR-DEV0030	Power source

The devices will need a power source, and this should be considered when selecting devices. Battery powered devices may be required in some cases for ease of installation and low impact. In other cases, the device may require grid connection.

Considered requirements: The sensors are equipped by batteries. AC power is also available in the parking site

VICINITY-IR-DEV0040	Variable identification and accuracy

The device shall be able to identify the variable it is intended to measure, e.g. people moving in and out of a room, the water consumption, the temperature of a room, the pulse of a person or some other variable specific to the use case. The measurements should be sufficiently precise and accurate, and applicable in the use cases and Value-Added Services defined in previous Work Packages.

Considered requirements: The device can identify if a vehicle is covering the sensor or not. The device also needs to identify unique objects and not report duplicate values. The same applies to when moving and recalibrating the sensors.

VICINITY-IR-DEV0050	Functional variable identification

The device shall be able to identify the variable it is intended to measure, e.g. people moving in and out of a room, the water consumption, the temperature of a room, the pulse of a person or some other variable specific to use case.

Considered requirements: The device measures patient/care personnel movement in apartment and vehicle movements in garage

VICINITY-IR-DEV0060	Encryption
The devices shall provide encrypted data streams for security and privacy purposes.	
Considered requirements: Encryption of data streams is not needed for these use cases as access to parking spaces is open.	

VICINITY-IR-DEV0070	Communication
The devices shall be able to communicate with the internet, either directly or via a gateway unit. If the communication is wireless, the devices should have sufficient radio range and/or mesh capabilities to avoid problems with data loss in the installation environment.	
Considered requirements: The devices communicate locally wireless with the gateway unit and is not dependant on a direct connection to the internet. However, for remote assistance, the internet must be available. The gateway unit supports WPS secure protocol used by Gorenje equipment	

8.4. Hardware and integrations catalogue

This chapter describes the hardware and Value-Added Services integrations that will be implemented at the pilot site and gives a brief overview of the purpose of the various devices, as well as to connect them to a "related use case".

All related use cases mentioned are described in detail in D 5.1 Definition of Value-Added-Services per use Case.

Table 12 Hardware catalogue for Tromsø pilot site

Device type and vendor	***Functionality***	***Number of units***	***Communication***	***Related Use Case***	***Location***
Type *Model # Vendor*	*Trigger if …*		*BLE, WM-BUS, WiFi etc.*	*UC …*	
Router, Telenor/D-link	*Wireless internet*	*1*	*4G*	*UC1b.1*	*Teaterkvarteret apartment 105*
Raspberry pie Z-wave-controller	*Gateway*	*1*	*WiFi*		*Teaterkvarteret apartment 105*
Fibaro Z-wave movement sensor	*Temperature, light, vibration*	*1*	*WiFi*		*Teaterkvarteret apartment 105*
Fibaro Z-wave remote switch	*Energy measurement*	*1*	*WiFi*		*Teaterkvarteret apartment 105*
Sensative Strips Z-wave door magnet contact	*Temperature sensor*	*1*	*WiFi*		*Teaterkvarteret apartment 105*
MultiTech Multi-connect Conduit	*Wireless programmable gateway*	*1*	*RF*	*UC1b.1*	*Teaterkvarteret apartment 105*
PlacePod Smart Parking Sensor	*Proximity sensor, magnet*	*3*	*RF*	*UC1b.1*	*Parking area*
Smart Light Philips Hue ZigBee	*Smart lights*	*3*	*ZigBee*	*UC1b.1*	*Parking area*
Philips Hue controller ZigBee	*Hub controller*	*3*	*ZigBee*	*UC1b.1*	*Parking area*
Gorenje refrigerator	*Controllable load, refrigeration*	*1*	*WSP*	*UC 1b.2*	*Kitchen area*
Gorenje oven	*Controllable load, oven*	*1*	*WSP*	*UC 1b.2*	*Kitchen area*

8.5. Value-Added Services to be installed

In delivery D5.1; 'VICINITY_D5.1 Value added services definition requirements and architectural design', the Value-Added Services to be implemented are described. The table beneath gives a short overview of Value-Added Services to be installed.

Table 13 Value-Added Services for Tromsø pilot site

Ref.	Value-Added Service Name	Goal
VAS 1b.1.2	Real-time operation	Deliver information about parking space status, assignment (also time-critical), layout and position/map. Example of services are booking, ticketing and forecasting
VAS 1b.2.1	Neighbourhood data processing	Tying together shared resource management of urban areas supporting multi-domain integration within adjacent ecosystems (transport/mobility, assisted living and smart building) in order to create new revenue models, introduce flexibility and versatility in urban area and smart building management

The premises are hosted by Tromsø municipality at Teaterkvarteret local community centre.

8.6. Phase 1: Pre-installation

In the pre-installation phase, all details regarding sensors, developments, resources and preparation activities will be achieved. HITS is responsible for integrating activity sensors (i.e. door, movement, temperature, smart plug), parking sensors and panic button into the apartment that will be used in the Pilot – and is therefore depending on other suppliers (i.e. Gorenje, Sensio, IKEA, Philips, PSI PlacePoD, UNITRONICS).

Table 14 Gantt chart: Pre-installation

VICINITY demo site Tromsø	Responsible	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December
Month		22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Pre installation																
Workshops with stakeholders and technical team defining sucess criterias and end report template	Tromsø															
Success criteras defined	**HITS**						M									
Identify need for equipment and integrations	HITS															
NDA signed with system supplier for integration (IWMAC)	**HITS**						M									
Equipment placement planning	HITS															
Equipment order/development	HITS															
Hardware for appartment acquired	**Sensio**							M								
Hardware definitions and set up	HITS															
Hardware appartment set up, tested and ready for installation	**HITS**									M						
Identify key installation personnel	HITS															
Training installation personnel	HITS															
Key installation personell defined and prepared in appartment	**Tromsø**									M						

8.7. Phase 2: Installation

HITS will integrate the equipment from the other suppliers in collaboration with Tromsø municipality care centre and has been given access to one apartment and parking spaces in garage. The decision on the parking spaces to be used in the pilot site will be made in the post-installation phase together with Tromsø municipality care centre. All necessary equipment will be tested in the post-installation phase to seek a smooth and easy installation at the pilot site.

Table 15 Gantt chart: Installation

VICINITY demo site Tromsø	Responsible	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December	January
Month		22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
Installation																	
Install refrigerator and oven in appartment	HITS																
Install gateway unit(s) in appartment	HITS																
Install door sensor in appartment	HITS																
Install PIR sensor	HITS																
Install Parking sensor	HITS																
Install Parking gateway	HITS																
Hardware installation complete	**HITS**											M					
Integration of VICINITY adapters and node	HITS																
VICINITY software integrated	**HITS**													M			
Test and verify installation	HITS																
Tests and verification	**HITS**															M	
Demosite owners accepted	**Tromsø**																M

8.8. Phase 3: Post-installation

HITS will have access to the pilot site in working hours (i.e. 7am to 5pm) and will be able to follow up and correct any errors or do supplementary work on day-time when care centre personnel are available. HITS have a possibility to monitor the solution on a daily basis.

Table 16 Gantt chart: Post-installation

VICINITY demo site Tromsø	Responsible	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April
Month		22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Post-Installation																				
Report and verification work	HITS																			
Technical verification	**HITS**																		M	
Report finalized	**HITS**																			M
Continous follow-up (replace, monitor, iterate) until end-of-project	HITS																			

9. Installation plan - Pilot Use Case 2 - Martim Longo (PT)

9.1. Infrastructure

9.1.1. Building Requirements –Summary for each VAS

To create a way to get updated values of energy consumption, water and indoor air quality of buildings, the team created a VAS that we call “Dynamic Audits and Flexibility” which allows the user, the building manager and the maintenance operator to know at any time the current state of the building, by using IoT services, according to the description below.

The detailed descriptions of the Value-Added Services are given in D5.1 document and will be expanded in the D7.2 overview of the installations.

The Multidomain services are delivered through consolidated input from many services forming Value Added Service: These are. Dynamic Audit, Smart school and Smart Clean. The hierarchical diagrams of services integration are listed below.

The design and development consideration of services is outlined below:

Table 17 Design and development considerations of services: Dynamic Audit and IEQ Smart School

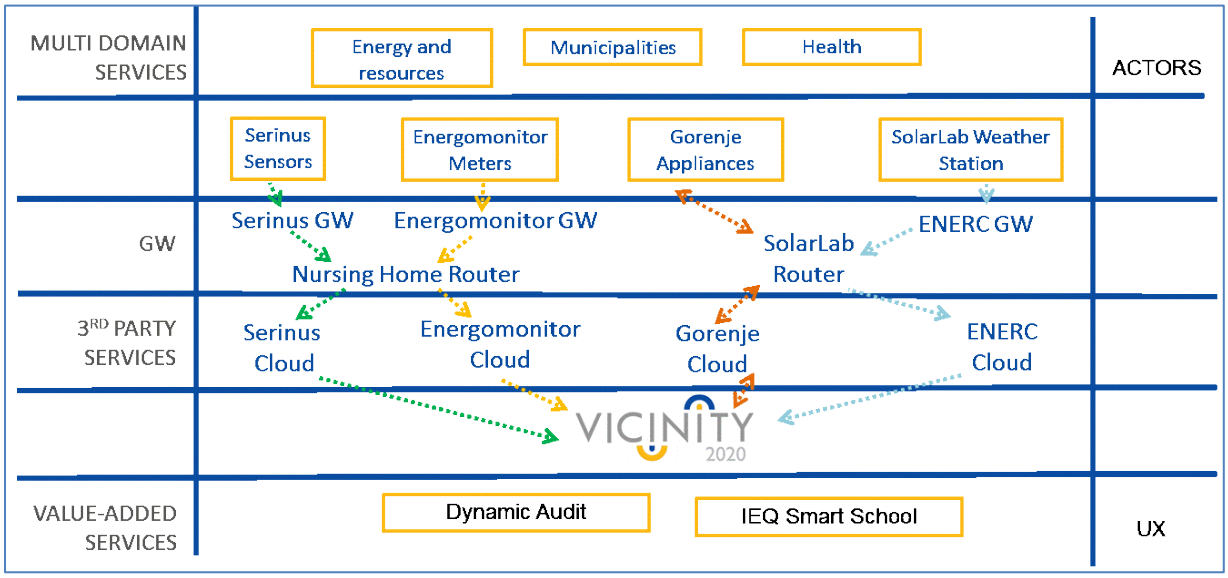


Table 18 Distributed Energy assets management – Platform Services

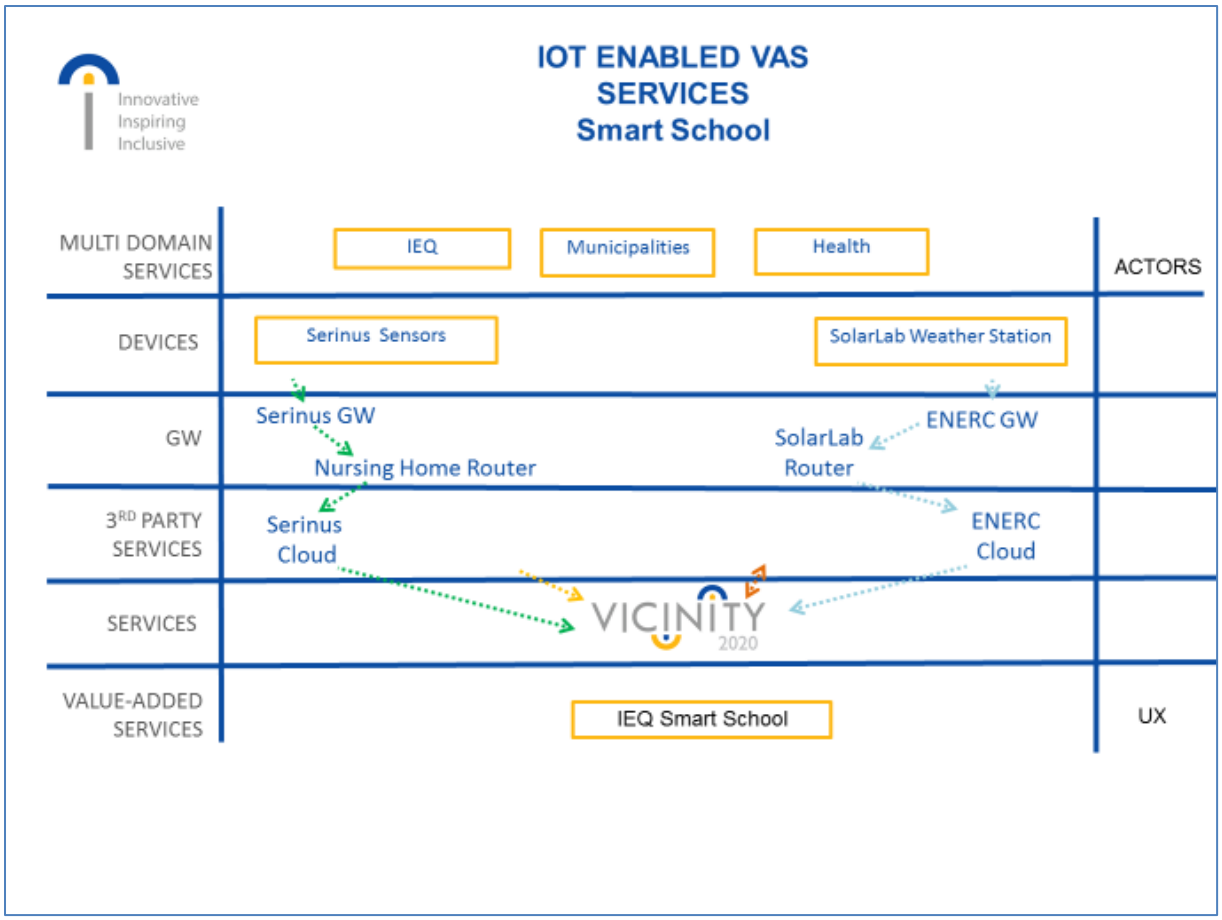
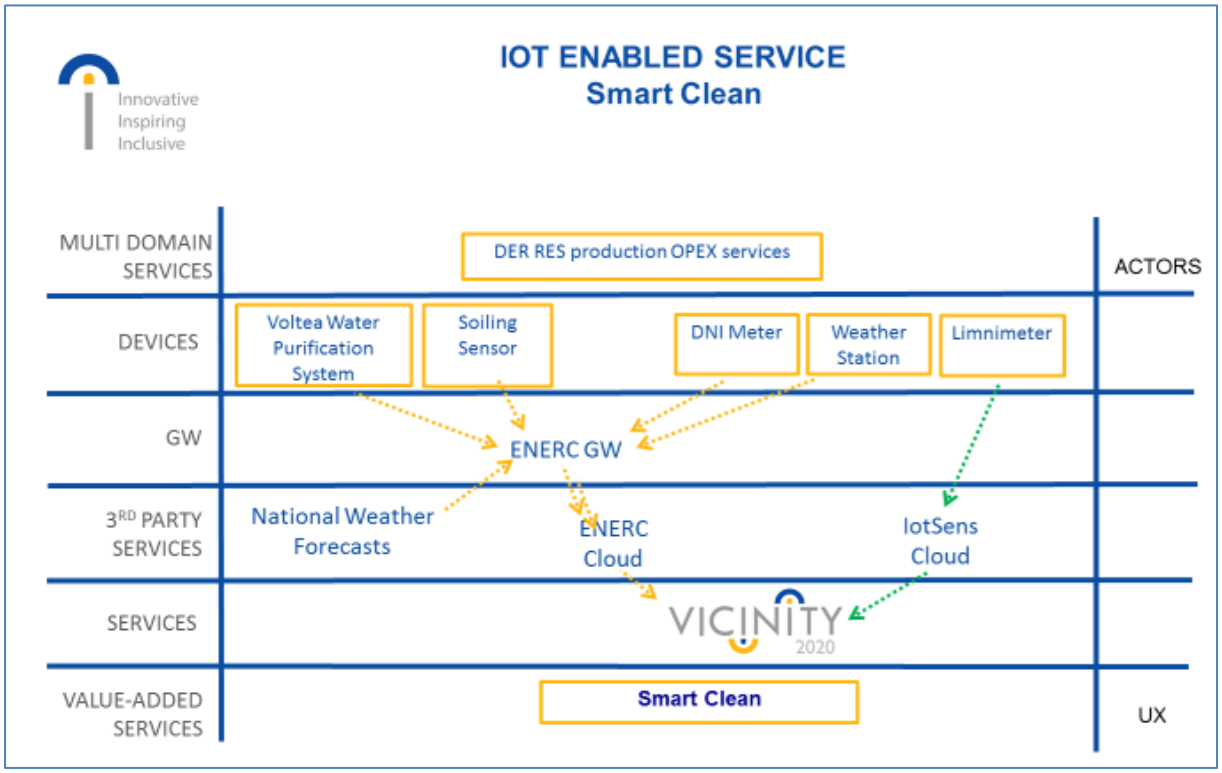


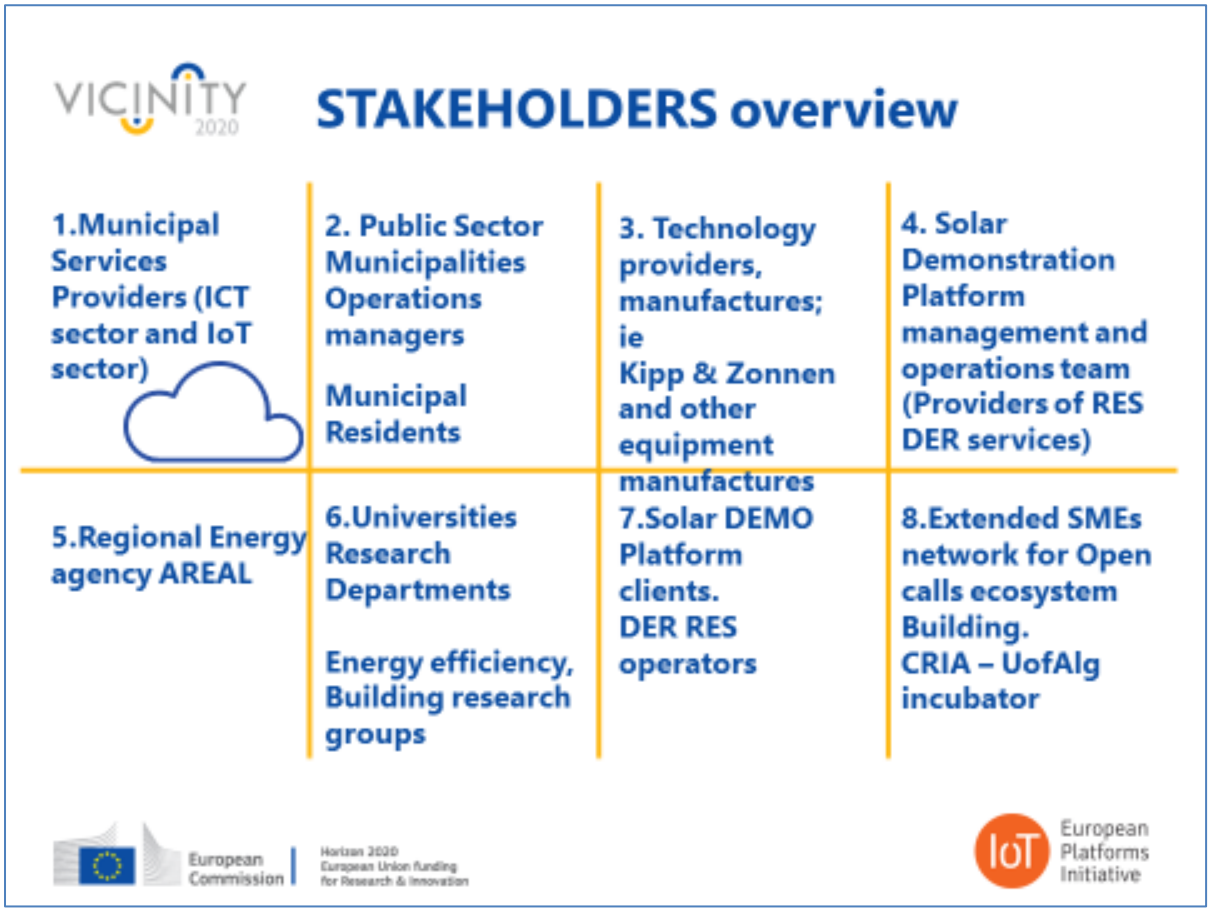
Table 19 Design and development considerations of services: Platform Services - Smart Clean



9.2. The stakeholders

Close collaboration, discussions, workshops and regional events participation ensure on-going dialogue and collaboration. Joint activities are planned at various stages of the project. Close collaboration is planned with the Municipal cluster building managers and facilities operators. A newsletter to keep the stakeholders up to date with the project developments and timetable is being designed and content is being developed. It is anticipated that these updates will be sent monthly.

Table 20 Stakeholders Overview



9.3. Installation requirements

This chapter lists the installation requirements for the demo sites. The requirements are fetched from D5.1 for the demo site. The different group of identifiers are established to easier manage and identify requirements.

Table 21 Requirements for Martim Longo pilot site

Requirement group	Requirement identifier
Supplier requirements	VICINITY-IR-SUP0XX
Personnel requirements	VICINITY-IR-PER0YY
Device requirements	VICINITY-IR-DEV0YY

VICINITY-IR-SUP0010	**Legal and organisation**
Suppliers shall be legally registered companies and shall comply with local EHS requirements to ensure worker wage and safety.	
Considered requirements:	
Preferably the suppliers should have R&I department in order to provide collaboration level needed for the solution co- creation.	

VICINITY-IR-SUP0020	**Economic/financial conditions**
Suppliers shall be creditworthy.	
Considered requirements: suppliers are required to have APIs, willing to collaborate and provide support during the phase of building the adaptors. The suppliers are considered for eventual joint commercialisation of the solutions and further collaborations.	

VICINITY-IR-SUP0030	**Wage and work conditions**
The supplier shall comply with local tariffs and regulations	
Considered requirements:	
Expected to conduct sustainable ethical practices.	

VICINITY-IR-SUP0040	**Technical knowledge**
The supplier shall have necessary technical knowledge to deliver the hardware or services (such as plumbing, electrician work etc.).	
Considered requirements:	
APIs, open collaboration, level of engagement needed for co creation of new solutions.	

VICINITY-IR-PER0010	**Management personnel**
Internal personnel are needed to specify the solutions needed for each use case, as well as making and following up the plan for the demonstration site installation.	

Considered requirements:

The ENERC team consists of four key personnel who are responsible for coordinating installations and stakeholder management. The functional focus is split between client management, technical and operational management, procurement and supplier's management, onsite technical installations and systems selection.

ENERC plans to collaborate with technology providers to install and to enable the solutions. ENERC has on site operations and maintenance team to conduct installations and provide maintenance, including sensors maintenance and monitoring, including battery replacement, for example.

VICINITY-IR-PER0020	**Technical personnel**
Personnel are needed to assemble and configure the necessary devices for the installation, as well as to perform the physical installation. The personnel involved must be sufficiently trained in device operation to confirm that the devices are operational and that they are installed successfully.	
Considered requirements: There are two different classes of operation personnel: - 1. The specialised personnel that have full knowledge of the equipment's, installation and programming. - 2. The personnel which operate the equipment in case any problem occurs (like no data being sent to the cloud). They are trained to operate and, if necessary, reset the equipment and change batteries.	

VICINITY-IR-PER0030	**Demo site personnel**
Personnel representing the demonstration site owner must be identified and available to provide access to the facilities, as well input up during the installation if necessary.	
Considered requirements: Normally these personnel are the people in charge of the maintenance in the facilities, which should have a base technical level of knowledge to give us any feedback of the equipment operation.	

VICINITY-IR-PER0040	Specialist personnel
For some use cases, special competencies are required. For example, installing a new water meter in a building will require a certified plumber, and energy meters may require certified electricians. The qualifications and availability of these key resources must be identified to ensure a successful installation.	
Considered requirements: Should be done by accredited/certified personnel with the competences to do the specific job	

VICINITY-IR-DEV0020	Local environmental impact
The device shall have a size and form that makes it interfere negatively with the daily operation of the demonstration site. Negative interference could for example be physical or aesthetical damage to property or inconvenience to patients and users. *a) No light or sound from devices when in operation (just a few signal lights when its operating)* *b) Minimalistic design and size* *c) Not in conflict with other installations* *d) Not disturbing patients, users and personnel*	
Considered requirements: The placement of the sensors took the following requirements into consideration: the ENERC team will monitor as to how the personnel interacts with the equipment and how usage of facilities reacts as to the presence of the equipment. ENERC will solicit the related feedback as well.	

VICINITY-IR-DEV0030	Power source
The devices will need a power source, and this should be considered when selecting devices. Battery powered devices may be required in some cases for ease of installation and low impact. In other cases, the device may require grid connection.	
Considered requirements: If possible the devices should preferential be connected to the grid otherwise batteries should be used. Frequency of battery replacement should correspond to the actual situation and the stated should be calibrated with the actual usage. <problems and other considerations should be reported to the equipment manufacturer.	

VICINITY-IR-DEV0060	Encryption
The devices shall provide encrypted data streams for security and privacy purposes.	
Considered requirements:	
Being considered	

VICINITY-IR-DEV0070	Communication
The devices shall be able to communicate with the internet, either directly or via a gateway unit. If the communication is wireless, the devices should have sufficient radio range and/or mesh capabilities to avoid problems with data loss in the installation environment.	
Considered requirements:	
Connectivity of various devices varies significantly. The selection of equipment is mainly based on functional use. NBIoT is explored.	

9.3.1. Description of the existing installations:

During November - December 2016 a static Energy Audit was performed by ENERC the team and all historical data was gathered from buildings' operators of the Municipal cluster of buildings located in Martim Longo (Alcoutim - Portugal) to give base reference of the existing energy and water consumption in each building to be used in each of the pilots.

The buildings are composed of an elementary school, a sports pavilion, an indoor swimming pool facility and a nursing home. All of the facilities are close to each other and they are used by the citizens from the Municipality and they are also supported by the SolarLab (1km from the Martim Longo Village).

The elementary school is composed by two floors with several classrooms, meeting rooms, teachers' office, library, gym, changing rooms and toilets, kitchen and dining room. The school is currently attended by 107 students and it has thermal and electrical loads.

The Municipal Pool is composed by a ground floor and a small upper structure that is only used by spectators and the Municipal Pavilion is composed by a ground floor with a main pitch for practicing various sports and the respective changing rooms and toilets.

The nursing home is the newest building. It is composed by one floor with several single and double dorms, office rooms, toilets, dining room and kitchen. It´s prepared to host 40 elderly people. (Note: at the date of the audit the nursing home was not yet in operation).

These audits were based on the on-site survey of existing equipment, the history of electricity, gas bills and the placement for a few days of an electrical current analyser in each place above mentioning.

9.4. Hardware and integrations catalogue

This chapter describes the hardware and integrations that will be implemented at the pilot site and give a brief overview of the purpose of the various devices, as well as to connect them to a "related use case".

All related use cases mentioned are described in detail in D 5.1 Definition of Value-Added-Services per use Case.

Table 22 Hardware and integration catalogue

type and vendor	*Functionality*	*Number of units*	*Communication*	*Related Use Case*	*Location*
IEQ Sensors Model "SERINUS"	Measures temperature, humidity, CO2, light, noise	5	Tiny Mesh (low-level) Cloud	U.C 2.2	Municipal Building (School, Nursing home, Gimno and Swimming Pool)
Water Treatment Machine Voltea	Prepare water to clean the solar panels	1	Ethernet	UC 2.7	Solar Demonstration Platform (SDP)
Wifi Routers? Model # Cisco Systems	Wireless Internet connection	4	Wifi	All	Municipal Buildings SDP
Gorenje refrigerato Model # Gorenje	Refrigeration	3	WiFi	UC 2.11	SDP, Nursing Home and private house
Gorenje ovenModel # Gorenje	Cooking	3	WiFi	UC 2.11	SDP, Nursing Home and private house
UV SensorKipp&Zonen	UV detection	1	Ethernet, RS232, USB (datalogger)	UC 2.9	SDP
Soiling sensorKipp&Zonen	Soiling detection on the PV modules	1	Ethernet, RS232, USB (datalogger)	UC 2.7	SDP
Electricity meterEnergo monitor	Measures electricity consumption	2	433MHz, proprietary (low-level), Cloud	U.C 2.2	SDP and School
Water MeterEnergo monitor	Measures water consumption	2	433MHz, proprietary (low-level), Cloud	UC 2.2	SDP
DNI MeterKipp&Zonen	Measures Direct Normal Irradiance	1	Ethernet, RS232, USB (datalogger)	UC 2.7	SDP
Meteo Station	Ambient temperature, Relative humidity, Solar radiation (global, direct), Wind (velocitu , direction) Precipitation	1	Ethernet, RS232, USB (datalogger)	All	SDP

Table 23 Brief description of the building using in the pilots

SolarLab	School	Swimming' Pool	Sport Pavilion	Nursing home	Private house
160m^2 one floor with working stations and meeting rooms for aprox. 10 people Constructed in 2015	≈975m^2 c.a., 30 users/month Constructed in 1970s	2240m^2 c.a., 300 users/month Constructed in 1990s	≈two floor with 1120m^2 each c.a., 107 students/day Constructed in 1990s	2120m^2 c.a., 40 users/day Constructed in 2016	300m^2 three stories house Constructed in 1980 for a 4 persons family house

Table 24 Brief description of the building equipment

Equipment	SolarLab	School	Swimming' Pool	Sport Pavilion	Nursing home	Private house
Smart meter *	Installed	To be installed	To be installed	To be installed	To be installed	To be installed
"Serinus" Sensors (IEQ) **	installed	installed	installed	installed	installed	-
"Gorenje"	Oven Refrigerator	?	-	-	Oven and Refrigerator	Oven and Refrigerator
Modem	Exists	Exists	Exists	Exists	Exists	
Router	Exist	Exists ***	Exists ***	Exists ***	Exists	
Wireless	Exists	Exists	Exists	Exists	Exists	Exist

* - Installation of the smart meter should be in series with the existing meter On the building side
** - Temperature, Humidity, CO_2, movement, luminosity and noise
*** - The same network of Ethernet LAN

9.5. Value-Added Services to be installed

In delivery D5.1; 'VICINITY_D5.1 Value added services definition requirements and architectural design', the Value-Added Services to be implemented are described. The table beneath gives a short overview of Value-Added Services to be installed.

Table 25 Value-Added Services for Martim Longo pilot site

Ref.	Value-Added Service Name	Goal
VAS 2.1	Municipal Services, IEQ Smart School, Dynamic Audit	Dynamic Building Audit and the IEQ services.
VAS 2.2	Local to Local Services, UV for Citizens	Create awareness for elders, children and tourists, while reducing the number of persons in need of hospital care due to sunburns.
VAS 2.3	Platform Services. Smart Clean. O&M for distributed renewable production resources.	Provide O&M (operations and maintenance) services, such as CPV trackers cleaning services taking into consideration weather predictions, human resources and equipment availability along with soiling of the surface.

These services address two separate stakeholder segments within the public and private sector. The public-sector services are specifically focused on Municipal assets management (building usage and resources consumption) and IoT related Services delivery for Municipalities that will be subsequently rolled out towards the wider public audience they serve. The O&M IoT enabled services will be demonstrated at the Solar Platform DER RES site. The image below outlines Municipal Services VAS, IoT enabled Local to Local services and IoT enabled Operations and Maintenance for distributed renewable energy assets management (DER O&M), Platform Services.

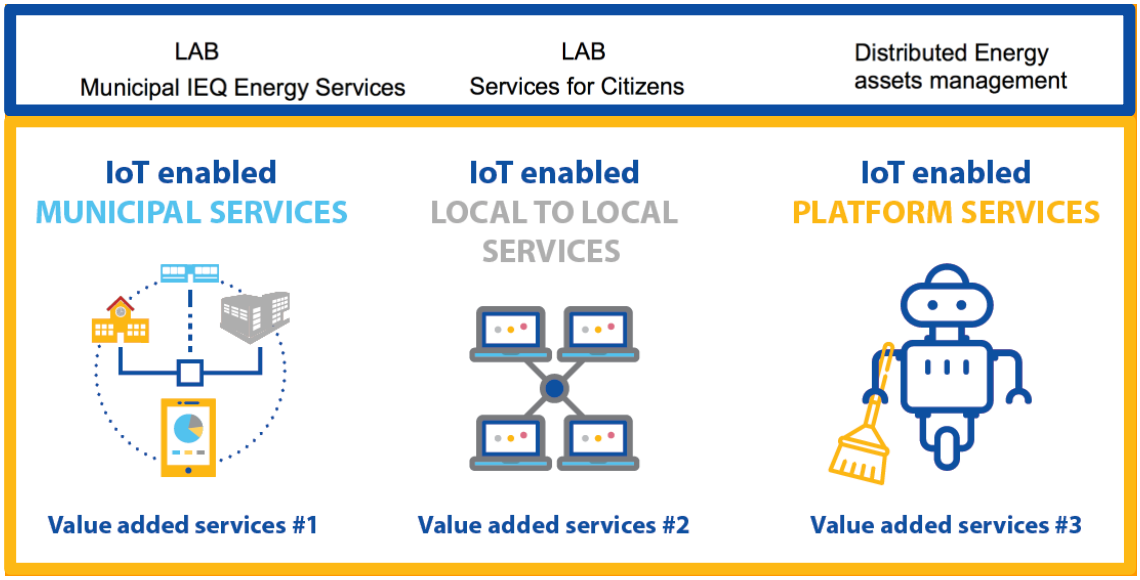


Figure 6 Value-Added Services

To begin the implementation of the VAS on October 24th, 2017, a stakeholders' workshop was held with all the responsible for the management and operation of the Municipal Buildings Cluster, such as Swimming Pool, Secondary school, the Retirement home, where we explained what we were going to do and when we would install the specific measurement equipment for the project.

9.6. Phase 1: Pre-installation

In the pre-installation phase, all details regarding sensors, developments, resources and activities preparation will be analysed and evaluated. ENERC is responsible for the selection of the best location to put the sensors according the specific requests of the building managers and physical characteristic of the buildings. An additional building was included into pilot site due to interest from the Municipality to include newly built retirement home. ENERC team accommodated the request and included the facility into pilot case. Additional studies were performed to assess connectivity, selection of rooms for sensors and functionality and usability of the spaces.

Table 26 Gantt chart pre-installation

	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April
Month	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Pre installation																			
template																			
Success criteras defined						M													
Identify need for equipment and integrations																			
Equipment placement planning																			
Equipment development																			
Hardware acquired																			
Integration possibilities identified																			
Hardware definitions and set up																			
Hardware set up, tested and ready for installation																			
Identify key installation personnel																			
Training installation personnel																			
Key installation personell defined and prepared																			
Integration of external systems																			
External systems integrated													M						

9.7. Phase 2: Installation

ENERC will install the SERINUS equipment, and in collaboration with the building owner and the ENERC personnel with the support of Serinus team. The decision as to which rooms shall be used in the Pilot, will be done in the pre-installation phase together with the owner of the buildings and ENERC staff. All necessary equipment will be tested in the post – installation phase to seek a smooth and easy installation at the pilot site. ENERC will use their own tools and according the time frame deal with the buildings manager.

Table 27 Gantt chart installation

	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April
Month	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Installation																			
Install hardware (equipments and adapters)																			
Installation complete												M							
Test and verify installation																			
Tests and verification ok													M						
Workshops for stakeholders																			
Demosite owners accepted impact on site														M					

9.8. Phase 3: Post-installation

After the completion of the installations there will be a plan in place to maintain stakeholders' engagement and updates through newsletter and a series of workshops (specific for the Municipal stakeholders and students and for the building users in general.

The use cases and VAS will have to be monitored and documented on the regular basis with weekly and monthly frequency.

Each use case will be run taking into account set parameters (D1.3 and D5.1).

The results will be documented and discussed with stakeholders. The consortium team and the equipment manufacturers for the iterative solutions creation leading towards commercialization goals of Value-Added Services.

The outcomes of the trials will be evaluated within the KPIs selected in WP8, which span between business, technical and impact evaluation criteria. More details on these will be provided in the WP8 upcoming deliverables.

The results of use cases trials would directly impact the viability of Value-Added Services delivery, since Value-Added Services contain input from a number of use cases.

Data management is expected to be treated according to the data management plan.

After the finalization of the project the equipment and continuation of the Value-Added Services will depend on a number of parameters. The options will be assessed from technical and business standpoint; the results will be discussed with the stakeholders and equipment providers to design business models.

The ENERC team internal personnel deployed at the platform is in the physical proximity of both DEMO sites and is trained to perform necessary maintenance. They participated in installation training and will maintain each installed equipment.

ENERC team´s management keeps regular contact with the municipal stakeholders and already received further suggestions as to the use cases and areas of interest as to sensor data.

All infrastructure components at the Solar Demo platform are already running to provide services at the platform. Solar Lab is located within physical proximity of the platform. Specific tests will be run at the Solar Lab to simulate various uses of the facility. Masters students from KIC Innoenergy program are engaged as well as stakeholders.

Table 28 Gantt chart post-installation

	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April
Month	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Post-Installation																			
Report and verification work																			
Technical verification ok																	M		
Report finalized																		M	
Continous follow-up (replace, monitor, iterate) until project end in December 2019																			

10. Installation plan - Pilot Use Case 3 - Pilea-Hortiatis (GR)

10.1. Infrastructure

The pilot site of the Municipality of Pilea Hortiatis (MPH), will host two VICINITY use cases (3.1, 3.2), which were thoroughly described in D1.3 and D5.1.

In Use Case 3.1, homes of elderly citizens living alone will be deployed with sensors and devices in order to remotely monitor their routine tasks, everyday activities and medical data and provide them with assisted living services.

In use case 3.1 elderly citizens and their homes will be equipped with:

- Medical devices
  - blood pressure monitor devices
  - weight scales
  - panic buttons

and/or

- Occupancy sensors
  - door sensors
  - motion detectors
  - pressure mats
- Smart appliances
  - fridge
  - oven

which will be used in order to provide assisted living services.

A Raspberry Pi will be used as a gateway that collects the sensor signals and forwards them to the VASs through internet connection and VICINITY P2P network, via routers, offered by OTE VICINITY partner.

Use case 3.2 focuses on the promotion of a healthy lifestyle to the middle-aged citizens of MPH. In order to achieve this goal the middle-aged citizens of this use case will be provided with:

- Medical devices
  - wearable fitness trackers
  - weight scales and/or blood pressure monitors

while

- small Bluetooth radio transmitters, called beacons, will be deployed in the sport centres of MPH.

Citizens of use case 3.2, will use their mobile phone as a gateway to connect via Bluetooth to the devices and sensors and forwards them to the respected VASs through internet and VICINITY P2P network.

A total number of 40 homes in the municipality of Pilea-Hortiatis will be equipped with the equipment mentioned above. The devices and sensors of the houses will connect to a Raspberry Pi which will serve as a gateway and will forward all measurements to a VICINITY VAS. The GDPR compliant VAS operating though the VICINITY platform will ensure privacy. The GDPR VAS will further communicate through VICINITY with the rest of the VASs of this use case. An illustration of the hardware and software in this use case is displayed below.

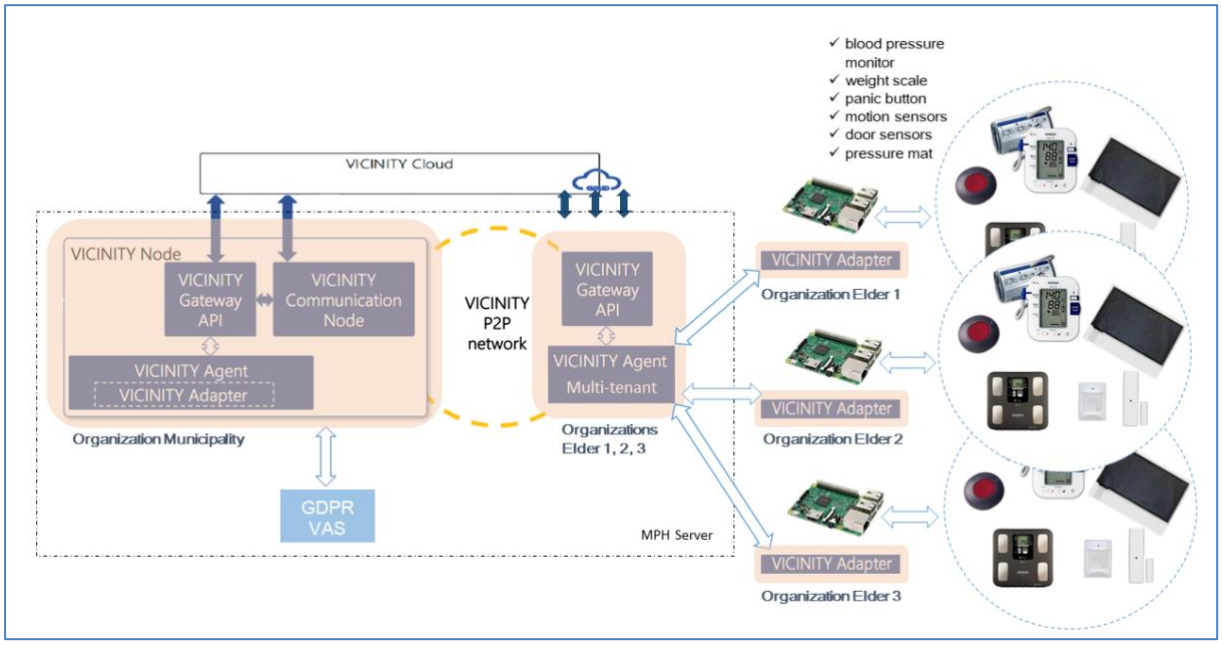


Figure 7 Use case 3.1 infrastructure

Fifty middle-aged citizens of MPH will have the chance to acquire the equipment mentioned above and connect it to VICINITY. In this use case (3.2), citizen's smartphones will serve as a gateway that communicates with VICINITY in a similar way as described for the above use case. A part of the deployment view of the hardware and software of use case 3.2 is displayed below.

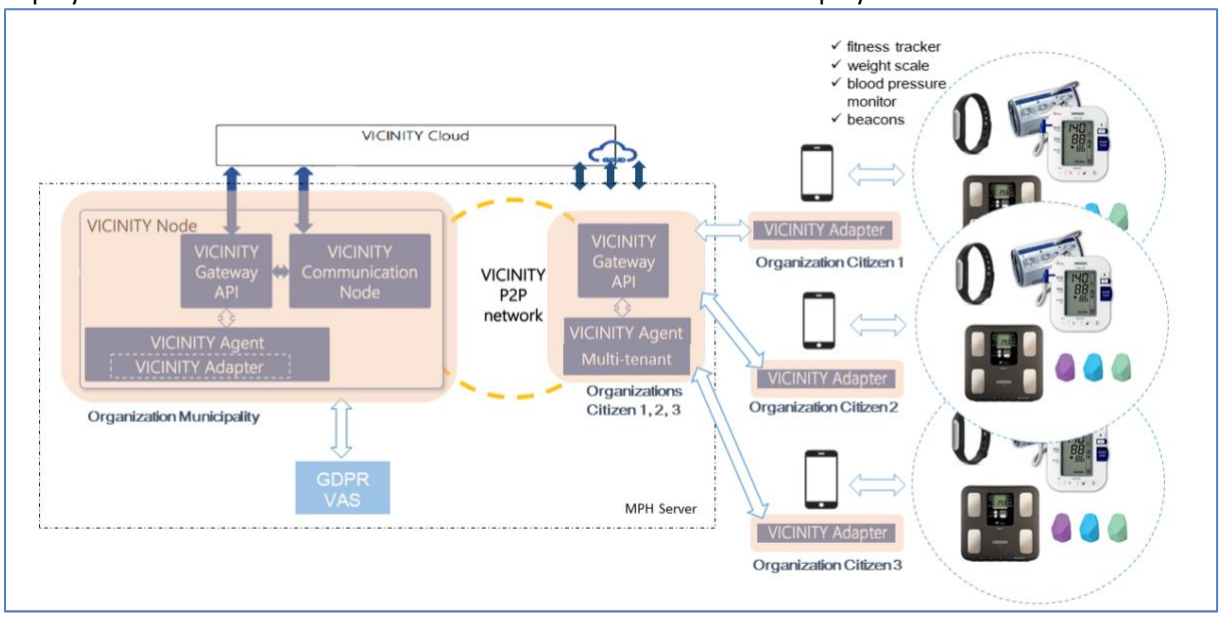


Figure 8 Use case 3.2 infrastructure

The middle-aged citizens of this use case can also use the municipality's sport centre facilities in order to exercise regularly. This activity will be identified by beacons installed in every municipal sport centre in the area. When a citizen visits a municipal gym, he/she will be able to track this activity, by scanning the signal of installed and integrated to VICINITY beacons, with his/her mobile phone. The map images below, show the sport facilities where beacons will be installed for this use case.

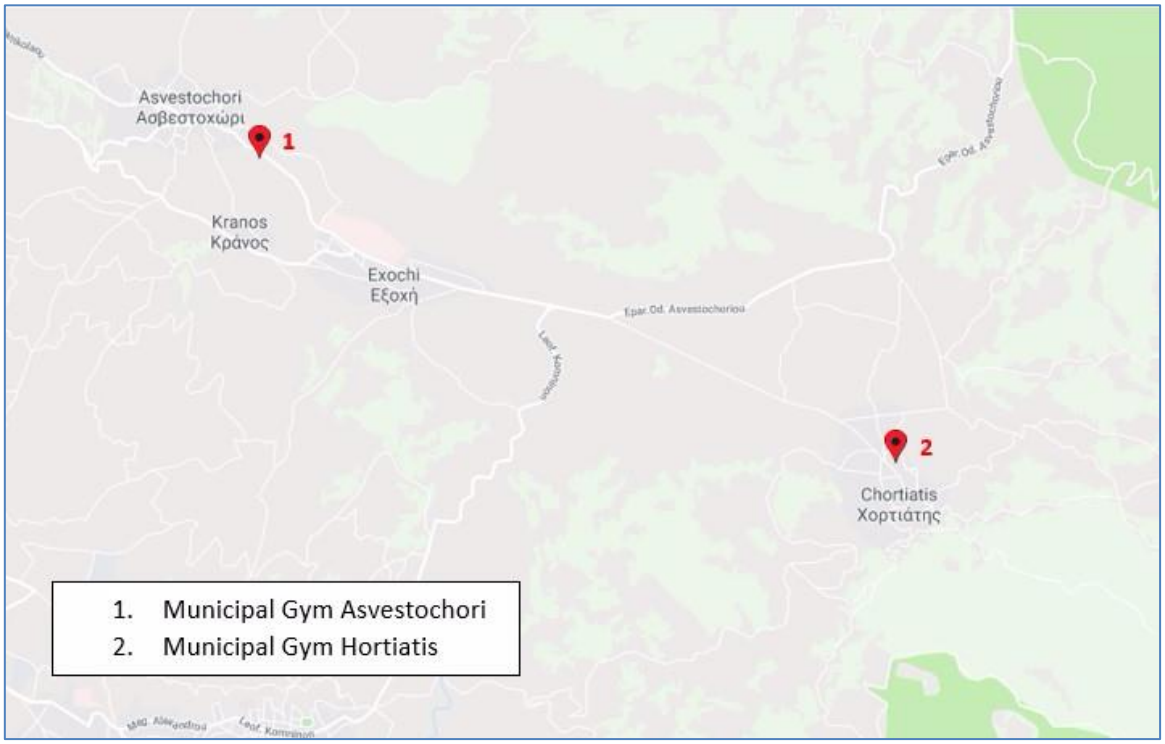


Figure 9 Use case 3.2 infrastructure - Sport Centre facilities deployed with beacons (a)

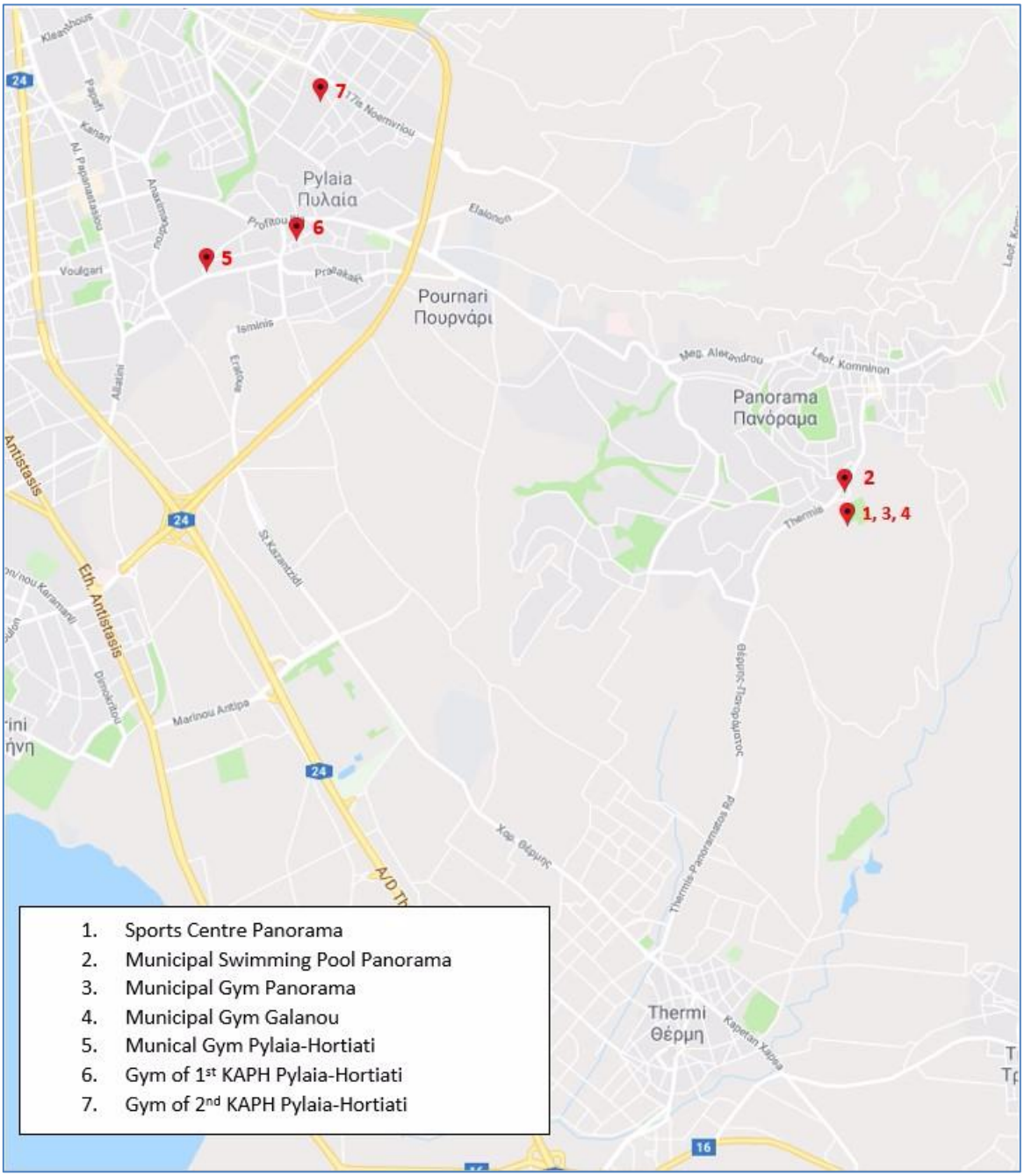


Figure 10 Use case 3.2 infrastructure - Sport Centre facilities deployed with beacons (b)

10.2. The Stakeholders

The Municipality of Pilea-Hortiatis (MPH) belongs to the Region of Central Macedonia, Greece and is located 18 km northeast of the urban Complex of Thessaloniki.

It consists of three municipal units:

1. Panorama, with a population of 17,546
2. Pilea, with a population of 34,678
3. Hortiatis, with a total population of 18,429, consisting of the municipal communities of Asvestohori (6,404 inhabitants), Filyro (5,440 inhabitants), and Hortiatis (4,809 inhabitants), and the local community of Exohi (1,776 inhabitants).

The municipality aims to offer "smart city" services to its citizens in the areas of Governance, Environment, Health Care and others. To further this objective the municipality also participates in other European programs in order to enhance the range of services.

In Health Care domain, it is offering a 24-hour support to elderly citizens living alone. They are equipped with some medical devices and a panic button and are connected to a health care Call Centre, which handles emergencies (such as when the panic button is pressed by the elderly citizen). To maintain privacy, the knowledge that could be extracted from the medical data coming from the IoT equipment is not exploited in this demonstration.

With its participation in VICINITY the municipality aims to:

- Enhance the already provided municipality service by providing additional Value-Added Services to its citizens (VICINITY VASs). The new VASs belong to e-health and assisted living domains and target both elderly and middle-aged citizens.
- Take advantage of existing medical IoT equipment.
- Have the ability to choose or integrate IoT equipment, regardless of the vendor and IoT platform, but only according to the needs.
- Offer its services to a wider range of population.
- Develop an interoperable IoT framework, which could be further used in other municipal IoT services, such as the city lighting, cleaning services, parking services and others.

10.3. Installation requirements

This chapter will list the installation requirements for the demo site.

Table 29 Requirements pilot site Pilea-Hortiatis (GR)

Requirement group	Requirement identifier
Supplier requirements	VICINITY-IR-SUP0XX
Personnel requirements	VICINITY-IR-PER0YY
Device requirements	VICINITY-IR-DEV0ZZ

VICINITY-IR-SUP0010	Legal and organisation
Suppliers shall be legally registered companies and shall comply with local EHS requirements to ensure worker wage and safety.	
Considered requirements: We will have legal transactions with all of our suppliers but we are not the responsible to assure if they comply with local EHS requirements to ensure worker wage and safety.	

VICINITY-IR-SUP0020	Economic/financial conditions
Suppliers shall be creditworthy.	
Considered requirements: Suppliers will be creditworthy.	

VICINITY-IR-SUP0030	Wage and work conditions
The supplier shall comply with local tariffs and regulations	
Considered requirements: The supplier will comply with local tariffs and regulations	

VICINITY-IR-SUP0040	Technical knowledge
The supplier shall have necessary technical knowledge to deliver the hardware or services (such as plumbing, electrician work etc.).	
Considered requirements: All chosen suppliers have the technical knowledge to deliver the needed equipment under safety regulations.	

VICINITY-IR-PER0010	Management personnel
Internal personnel are needed to specify the solutions needed for each use case, as well as making and following up the plan for the demonstration site installation.	
Considered requirements: CERTH, Gnomon and MPH will be responsible for checking on the plan for the demonstration site installation.	

VICINITY-IR-PER0020	Technical personnel
Personnel are needed to assemble and configure the necessary devices for the installation, as well as to perform the physical installation. The personnel involved must be sufficiently trained in device operation to confirm that the devices are operational and that they are installed successfully.	
Considered requirements: The technical personnel for the equipment deployment will be carefully chosen, respecting this requirement. For devices that don't need deployment, such as blood pressure monitor, CERTH, GNOMON and the municipal health assistants will help in the usage of the devices.	

VICINITY-IR-PER0030	Demo site personnel
Personnel representing the demonstration site owner must be identified and available to provide access to the facilities, as well input up during the installation if necessary.	

Considered requirements: MPH personnel will be responsible to represent, the municipality citizens that will participate in the two use cases. Access to the facilities will be limited and upon request since we are referring to the citizens homes.

VICINITY-IR-PER0040	Specialist personnel

For some use cases, special competencies are required. For example, installing a new water meter in a building will require a certified plumber, and energy meters may require certified electricians. The qualifications and availability of these key resources must be identified to ensure a successful installation.

Considered requirements: Medical devices will not need any installation, only their usage will be explained to the elderly and middle-aged citizens by CERTH/Gnomon/MPH personnel. The building sensors will be deployed by certified personnel.

VICINITY-IR-DEV0010	Functional variable identification

The device shall be able to identify the variable it is intended to measure, e.g. people moving in and out of a room, the water consumption, the temperature of a room, the pulse of a person or some other variable specific to use case.

Considered requirements: The devices' functionality will be tested after installation and any fault devices will be replaced.

VICINITY-IR-DEV0020	Local environmental impact

The device shall have a size and form that makes it interfere negatively with the daily operation of the demonstration site. Negative interference could for example be physical or aesthetical damage to property or inconvenience to patients and users

a) No light or sound from devices when in operation
b) Minimalistic design and size
c) Not in conflict with other installations
d) Not disturbing patients, users and personnel

Considered requirements:

Use case 3.1: Motion and door sensors are relatively small and wireless components; thus their deployment will not cause any physical or aesthetical damage. Smart appliances (fridge, oven) will be installed in the kitchen and can be operated as usual. Medical devices don't have to be installed and can be stored anywhere in the house.

Use case 3.2: Beacons are relatively small devices that will be installed at the municipality's sport facilities and are expected to have to aesthetic or any other impact. Activity trackers will have to be worn by the citizens and this might cause a change in their daily routine. This change is not expected to have a negative impact. On the contrary it is expected to create healthier daily habits. Medical devices don't have to be installed and can be stored anywhere in the house.

VICINITY-IR-DEV0030	Power source

The devices will need a power source, and this should be considered when selecting devices. Battery powered devices may be required in some cases for ease of installation and low impact. In other cases, the device may require grid connection.

Considered requirements: Battery powered devices will be used.

VICINITY-IR-DEV0040	Variable identification and accuracy

The device shall be able to identify the variable it is intended to measure, e.g. people moving in and out of a room, the water consumption, the temperature of a room, the pulse of a person or some other variable specific to the use case. The measurements should be sufficiently precise and accurate, and applicable in the use cases and Value-Added Services defined in previous Work Packages.

Considered requirements: The devices' functionality will be tested after installation and any fault devices will be replaced.

VICINITY-IR-DEV0050	Encryption

The devices shall provide encrypted data streams for security and privacy purposes.

Considered requirements: All devices and sensors will be connected to a gateway that will be responsible for forwarding the measurements outside of the local network through encrypted communication.

VICINITY-IR-DEV0060	Communication

The devices shall be able to communicate with the internet, either directly or via a gateway unit. If the communication is wireless, the devices should have sufficient radio range and/or mesh capabilities to avoid problems with data loss in the installation environment.

smartphone), which will be responsible for transmitting data over the Internet. Z-wave, Bluetooth, Wifi protocols will be used for the communication between the devices and the gateway, which will be extensively tested. Furthermore, OTE partner will provide wireless routers for the elderly peoples' homes. The gateway will hold the last devices' measurements and check that they are transmitted successfully before erasing them.

10.1. Hardware and integrations catalogue

This chapter describes the hardware and integrations that will be implemented at the pilot site and gives a brief overview of the purpose of the various devices, as well as to connect them to a “related use case”.
All related use cases mentioned are described in detail in D 5.1 Definition of Value-Added-Services per use Case.

Next page

Table 30 Hardware and integration catalogue

Device type and vendor	*Functional-ity*	*Number of units*	*Communi cation*	*Related Use Case*	*Location*
Blood Pressure monitor 708-BT Omron	Measures blood pressure	15	BT	3.1, 3.2	Elders' houses type 1[1]
Weight monitoring device BF206-BT Omron	Measures Weight in Kg	15	BT	3.1, 3.2	Elders' houses type 1 and middle-aged citizens' houses
Panic button Model # Company	Triggered if button is pressed	20-30	DTMF	3.1	Elders' houses type 2,3
Motion sensors FGMS-001 Fibaro	Triggered when a motion is detected in the room	40	Z-wave	3.1	Elders' houses type 2
Interlink Electronics 1.5" Square 20N FSR	Triggered when a person lies on the bed	10	Wired	3.1	Elders' houses type 2
Arduino Uno R3	Read the pressure mat measurement	10		3.1	Elders' houses type 2
Arduino Wifi Shield	Send pressure mat measurement to raspberry Pi.	10	Wifi	3.1	Elders' houses type 2
Door Sensors FGDW-002 Fibaro	Triggered when a door is opened or closed	10	Z-wave	3.1	Elders' houses type 2
Raspberry Pi Model 3B+ Raspberry Pi Foundation	Gateway for devices and sensors	10	Ethernet, Wifi, BT	3.1	Elders' houses type 2
Raspberry Pi Model B+ V1.2 Raspberry Pi Foundation	Gateway for devices and sensors	30	Ethernet, Wifi, BT	3.1	Elders' houses type 1,3
Raspberry Pi Z-wave shield ZMEERAZ2 RaZberry	Shield for communicatio n with Z-wave devices	10	Z-Wave		Elders' houses type 2
Routers D-Link DWR-921 Wireless N 4G LTE Router OTE	Wireless Internet connection	35-40	Wifi/Ether net	3.1	Elders' houses type 1,3

Gorenje refrigerator Model # Gorenje	Refrigeration	1	WiFi	3.1	Elders' houses type 2
Gorenje oven Model # Gorenje	Cooking	1	WiFi	3.1	Elders' houses type 2
Wearable fitness trackers Mi Band 2 Xiaomi	Measures human activity by measuring steps, heart rate etc.	50	BT	3.2	To be worn by middle-aged citizens of MPH
Beacons Model # Sensoro	Transmits a BT signal with certain power which alternates when other BT devices are close.	10	BT	3.2	Sport facilities of MPH

10.2. Value-Added Services

In delivery D5.1; 'VICINITY_D5.1 Value added services definition requirements and architectural design', the Value-Added Services to be implemented are described. The table beneath gives a short overview of Value-Added Services to be installed.

Table 31 Value-Added Services to be installed in Pilea-Hortiatis pilot site

Ref.	Value-Added Service Name	Goal
VAS 3.1.1, 3.2.1	Privacy-preserving Data Gathering and Storage ft. GDPR data auditing	Gather the data coming from the IoT equipment in a way compliant to the GDPR. Offer auditing of the data transactions and access control mechanisms for the user.
VAS 3.1.2	Analysis and clustering of elderly's people medical data to detect unusual behavioural events	Use medical data of elderly people living alone in order to inform health care providers and relatives about their condition

[1] House Type 1 has only medical devices. House Type 2 has building sensors and panic button. House Type 3 has only panic button.

VAS 3.1.3	Triggering abnormal detection in homes	Detect abnormal behaviour of elder citizens, based on IoT building sensors.
VAS 3.2.2	Individual Statistical Analysis of data from wearables, medical devices, beacons	Provide evaluation of citizens' health status, promote fitness awareness and improve their health based on activity related data.
VAS 3.2.3	Aggregated Statistical Analysis of data from wearables, medical devices, beacons	Provide statistical analysis of health data for the municipality's population.

10.3. Phase 1: Pre-installation

CERTH and GNOMON are responsible for deciding on the hardware and software to be used in the use cases, in order fulfil the above requirements. During pre-installation phase MPH will promote the VICINITY eHealth program to the citizens and try to identify the participants.

Table 32 Gantt chart: Pre-installation

	Responsible	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April
Month		#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
Pre installation																				
Workshops with stakeholders and technical team. Sucess criterias and report template																				
Milestone: Success criteras defined	**GNOMON**						M													
Identify need for equipment and integrations																				
Equipment placement planning																				
Equipment development																				
Hardware acquired	**MPH, CERTH, GNOMON**										M									
Hardware definitions and set up																				
Hardware set up, tested and ready for installation	**CERTH, GNOMON**											M								
Identify key installation personnel																				
Training installation personnel																				
Key installation personell defined and prepared	**CERTH, GNOMON**									M										

10.4. Phase 2: Installation

CERTH, GNOMON will be in charge of the installations, in collaboration with MPH who will be responsible for handling the communication with the citizens that take part. CERTH, GNOMON will also be responsible for testing and verifying the installed equipment.

Table 33 Gantt chart: Installation

	Responsible	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April
Installation																				
Install motion, door sensors																				
Install smart appliances																				
Install gateways																				
Install beacons																				
Hardware Installation complete	**CERTH, GNOMON**												**M**							
Test and verify installation																				
Tests and verification ok	**CERTH, GNOMON**													**M**						
Demosite owners accepted impact on site	**MPH, CERTH, GNOMON**														**M**					

10.5. Phase 3: Post-installation

Continuous monitoring and support will be provided by CERTH and GNOMON concerning the technical equipment installations. Moreover, the citizens' satisfaction on the overall installation will be measured through questionnaires, in collaboration with MPH, during T7.5 Pilot Area Installation of eHealth at Home Use Case.

Table 34 Gantt chart: Post-installation

	Responsible	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April
Post-Installation																				
Report and verification work																				
Technical verification ok	**CERTH, GNOMON**																	**M**		
Report finalized	**MPH, CERTH, GNOMON**																		**M**	
Continous follow-up (replace, monitor, iterate) until project end in December 2019																				

11. Conclusion

The work of establishing the common plan and methodology has involved all VICINITY partners and selected stakeholders in the pilot sites.

When several partners develop and implement different Pilot Sites it is necessary to have common milestones and activities which can be used to follow up the progress and identify any risks.

The adoption of common templates for both hardware and software installation has clarified the work of all Pilot Sites and made it easier for managers to see what is to be delivered and what will be maintained after the implementation. The work is also coordinated with WP8 Pilot demonstration and Overall Evaluation and has helped to improve the parameters for evaluation work.

All software development is part of Work Packages 3, 4 and 5 and has made it easier to just focus on installation of devices and communication with the Stakeholders.

All partners involved have agreed on the common methodology and structure for the installation plan. This methodology reduces the risk of failure by adding a level of formality which could otherwise lead to omissions or slips in the installation schedule. The four pilots address different service benefits and domains so there are differences in each Pilot site approach which is visible in some parts of the document. Nevertheless, this methodology provides a way of ensuring that all demonstrations will be installed and operative during the timescale of the project and meet the overall milestone for WP7.

At the time of writing, M31, the project is on track to complete all installations in WP7 subtasks, as planned, by the M39 milestone.

12. References

No references used in this document.