Smart and Healthy Ageing through People Engaging in Supportive Systems

SHAPES

Grant agreement ID: 857159

SHAPES-OC3-Marketplace Work Program

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The SHAPES Project Consortium

- National University of Ireland Maynooth (coordinator)
- Access Earth Limited
- AGE Platform Europe
- Associazione Italiana Assisteza Spastici Provincia di Bologna onlus
- Aristotelio Panepistimio Thessalonikis – Aristotle University of Thessaloniki
- Carus Consilium Sachsen GmbH
- Clinika de Kay - Clinica Humana
- EDGENEERING Lda
- European Union of the Deaf aisbl
- Fakultni Nemocnice Olomouc – University Hospital Olomouc
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- Future Intelligence Limited
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- Intracom SA Telecom Solutions
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- Northern Health and Social Care Trust
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- PAL Robotics SL
- Regional Health Authority of Central Greece
- Residencia de Mayores el Salvador – Asociatión Benéfico-Social el Salvador
- Rock Couture Productions Ltd – Agile Ageing Alliance
- Science for You – ¬Epistimi Gia Sena Astiki Mi Kerdoskopiki Etairia
- Technological Educational Institute of Crete
- Tree Technology SA
- Universidad de Castilla - La Mancha
- Universidade de Aveiro – Digital Media and Interaction Research Centre
- Universidade do Porto
- University College Cork
- University of Nicosia
- University of Ulster
- VICOMTECH
- World Federation of the Deafblind

Call description

Purpose

Organizations are invited to apply for a share of €500,000, to facilitate the creation of novel applications that support smart and healthy 'Agile Ageing' in the built environment.

Individual grants of between €50,000-- and €100,000 are available for scale-up of existing products or services, or development of new solutions. The competition is open to micro, small or medium-sized enterprises, based in Europe- including the UK – proposing compelling social innovation concepts, encompassing equality, diversity and inclusion in the design and development of a product, process, or service which can be trialed and evaluated across participating living labs and pilot sites, including the SHAPES technological platform and the SHAPES Marketplace.

This initiative is funded through SHAPES (Smart & Healthy Ageing through People Engaging in Supportive Systems) an EU Horizon 2020 Collaborative R&D "Pathfinder" project spanning 14 countries, exploring interactions between older adults, technology and the built environment.

Commitment

- Applicants are expected to demo their solution at the final review of their project
- Projects are expected to prove integration of their solutions with SHAPES core platform
- Operational form of the solution to be included in SHAPES Marketplace

Technical validation criteria

The following requirements need to be met for technical validation:

Criteria	Description
Integration with SHAPES Technological Platform	Validated interfaces to selected components of the SHAPES-TP Integration with ASAPA is obligatory Integration with SymbIoTe is essential only if dealing with IoT data
Integration with SHAPES Marketplace	Technically proven integration with SHAPES Marketplace

Expected deliverables

Name	Description	Type
Reference Documentation	Description of the solution and its integration with SHAPES Marketplace	Report
Developed software	Interfaces developed to integrate the solution with SHAPES Marketplace	Source code
Application	Application to be offered in the SHAPES Marketplace **NOTE:** Access restricted to SHAPES consortium and EC until the end of the SHAPES project. Afterwards access subject to agreement between the OC3 applicant and the enterprise that would commercialise Marketplace.	Application

The deliverables listed above are conditions for the ***formal acceptance*** of Open Call 3 project results.

References

[1] SHAPES project WEB portal: https://shapes2020.eu/

[2] SHAPES Pilot Themes and Use Cases: https://shapes2020.eu/about-shapes/pilots/

[3] Deliverable D2.6 "*SHAPES Personas and Use Cases V2*"

[4] Deliverable D3.9 "*Final User Requirements for the SHAPES Platform*"

[5] Deliverable D4.1 "*SHAPES Technological Platform (TP)"*

[6] Deliverable D5.2 "*SHAPES Digital Solutions V.1*"

[7] Deliverable D6.1 "*SHAPES Pan-European Pilot Campaign Plan*"

[8] Deliverable D8.14 "SHAPES Ethical Framework Final version"

[9] Deliverable D9.4 "*Open Calls for Innovation and Collaboration – Rules of Participation*"

[10] symbIoTe project WEB portal: https://www.symbiote-h2020.eu/

[11] symbIoTe GitHub repository: https://github.com/symbiote-h2020

Overview of SHAPES Platform Architecture

The SHAPES Technological Platform (TP) brings a combination of devices, software, and accessible modes of interacting within the living environment that can adapt to the needs and priorities of older individuals, including those facing permanent or temporary reduced functionality and capabilities.

A number of established Digital Solutions (DS) that comprise the SHAPES ecosystem are expected to interconnect and integrate with the SHAPES core Technological Platform (TP), which is depicted in the lilac-hued area of the Figure 1 below.

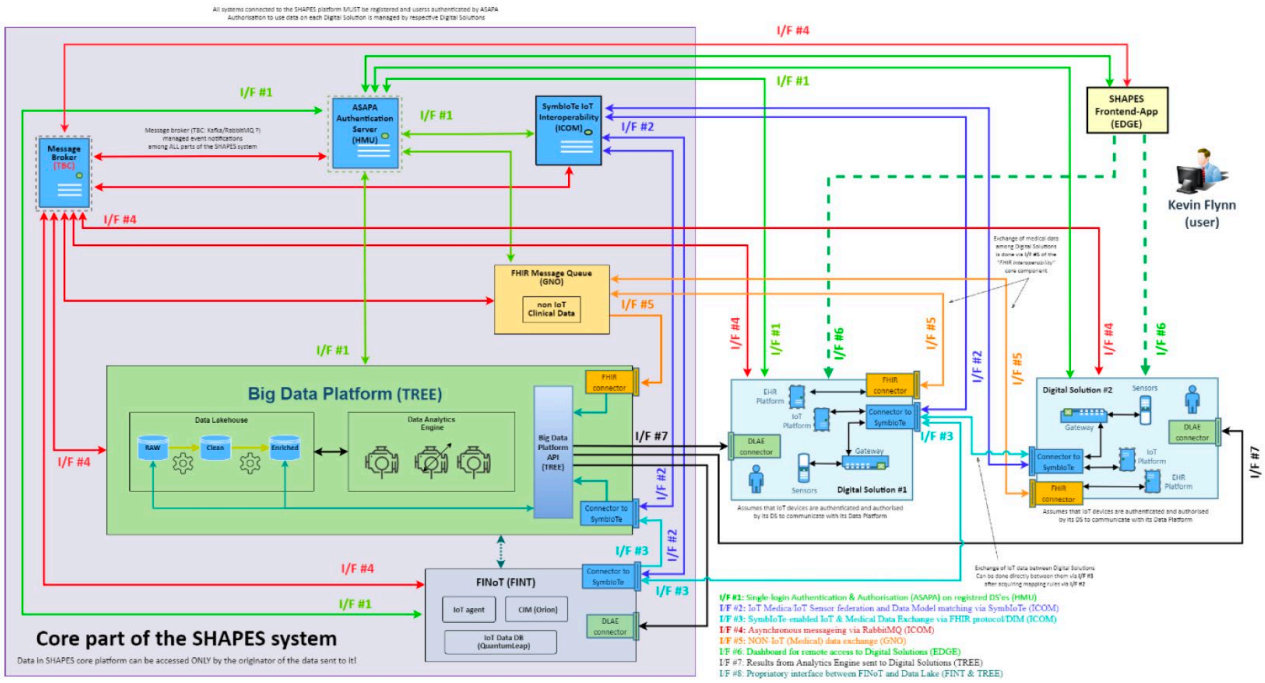

Figure 1. Shapes Core TP architecture.

A brief description of the main functionality of each core component within the realms of the SHAPES Technological Platform is given below:

- *SymbioTe* IoT Interoperability Platform from ICOM is a mediation framework that facilitates the exchange of IoT Data between Digital Solutions and Platforms.
- *FINoT* IoT Data Management Platform from FINT is a FIWARE-based IoT framework, used to interconnect sensors, actuators and loggers. It acts as a central point for gathering IoT data, before these are fed to the Big Data Lake.
- *ASaPA* Single Sign-on Authentication engine from HMU offers authentication and authorization framework. Every user, digital solution, platform etc. is required to first register to the ASAPA component to get an authorization token in order to be able to interact within the SHAPES ecosystem.
- *Gateway* from FINT facilitates the interconnection of the edge IoT devices with the SHAPES Core cloud platform enabling as such the accommodation of the IoT collected data to the FINoT IoT platform (part of the SHAPES core).
- *FHIR* Medical Data Interoperability from GNO. The FHIR medical interoperability component facilitates the interoperability and communication among digital solutions that exchange medical-related information with each other and/or other SHAPES core components. Its main component is the Message Queue (MQ), which allows the flow of medical-related resources among Digital Solutions or from Digital Solutions to the Datalake.

- *Big Data Platform* combining Data Lakehouse with Analytics Engine from TREE. The Data Lakehouse along with the Analytics Engine form the so-called Big data Platform that allows Digital Solutions to send their data to the Data Lakehouse for advance processing using AI-based Analytics Engine. Results from the Data Analytics Engine (DAE) are sent back to relevant Digital Solutions.
- *SHAPES Front-end Application* from EDGE, brings a simple user interface providing a centralized access to the SHAPES Digital Solutions installed in the participant's mobile phone or tablet. It also provides a mechanism for the single authentication of the user in the device
- *Message Broker* from ICOM, enables the asynchronous notification mechanisms for all core components and interconnected Digital Solutions to be able to schedule exchange of information among them, without a need for periodic checks.

A short description of the available interfaces between the SHAPES core components and the DS is given below. For a complete overview of the SHAPES TP and its interfaces employed to achieve seamless integration can be found in the D4.1.

Briefly, there are 8 interfaces within the SHAPES TP architecture. Briefly:

- I/F #1: **Interface between the various SHAPES Digital Solutions, the Front-end App and the ASAPA**. It is used to authenticate a user in the SHAPES Platform and SHAPES Digital Solutions. ASAPA upon an authentication request returns an authentication *token to be used to perform further actions within the SHAPES ecosystem.* (For more details, check D4.1, section 6.2.6.4 Authentication).
- I/F #2: **Interface between the SHAPES Digital Solutions and the SHAPES symbIoTe connector.** Upon successful authentication via the ASAPA component, Digital Solutions that wish to exchange IoT data between each other and the SHAPES Big Data Platform would need to become symbIoTe-enabled and deploy relevant symbIoTe mechanisms.
- I/F #3: **symbIoTe-enabled and IoT and Medical Data Exchange Protocol.**
- I/F #4 **Interface between the various SHAPES core components and Digital Solutions** to accommodate the need for asynchronous notification through a Messaging Queue service (the RabbitMQ here).
- I/F #5 **Interface between Digital Solutions** that need to integrate with the FHIR Queue to exchange non-IoT, medical data. **This FHIR Connector** enables the setup of a service to ingest non-IoT, medical data into Big Data Platform API in a scalable, secure, and compliant manner.
- I/F #6 **Interface between the Front-End App and Digital Solutions** to accommodate remote access to Digital Solutions in various use cases.
- I/F #7 **Interface between the Big Data Platform, the FINoT platform and the Digital Solution.** It transfers analysis results to either the FINoT platform and/or to appropriate DS.
- I/F #8 Interface between **the Big Data Platform and the FINoT platform. This is only a temporary solution** is to connect FINoT and Big Data Platform directly to exchange IoT data.

In SHAPES, there is a main distinction with regards to the data that DS handle and communicate either to each other or one/more SHAPES TP core components. These are categorized to i) IoT-related data and ii) medical related data. It has been agreed that medical-related data will go through the FHIR API (therefore IF #5), developed by GNOMON and this is presented in the following section. As far as the IoT data, these will go through the symbIoTe interoperability mechanism (IF), which has been extended in order to include and encapsulate new devices (and thus new record features) that are present in the SHAPES ecosystem.

Interoperability Aspects

SHAPES aims to deliver a scalable, standardized and interoperable technological platform (TP), which will enable the integration of various digital solutions in the healthcare domain. As described in D5.2, digital solutions in SHAPES range from assistive robots to eHealth wearables and IoT devices. In order for these solutions to interoperate, they need to ensure a common level of understanding among each other.

Therefore, semantic interoperability is needed to ensure seamless communication between DS across the SHAPES ecosystem. In SHAPES, we make the division between data regarded as Internet of Things (IoT), such as measurements, IoT metrics etc. and healthcare (medical) data, such as data questionnaires, medical records, etc.

To ensure interoperability in the IoT domain, SHAPES exploits the symbIoTe mediation framework, which in turn is based on several IoT standards that ensure seamless interoperation across diverse IoT devices and/or platforms. More information on the ontologies and standardization prototypes on which symbIoTe framework was built upon can be found in D4.1 (Section 2 5.2 and 5.5).

To ensure semantic interoperability between the e-health/medical Digital Solutions in SHAPES, the HL7 FHIR (Fast Healthcare Interoperability Resources) and the open MHealth standards were considered. More information on the FHIR component can be found in D4.1 (Section 6.2.4).

