

Beacon Südtirol - Alto Adige

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D2.7

Communication and Community Building Brochure

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1 - Introduction

The Beacon Südtirol - Alto Adige project is financed by the ERDF funding program coordinated by the Tech Transfer Digital unit of the NOI Techpark and the Division 9.0 of the Autonomous province of Bolzano. Through the installation of a beacon network and an IoT test network, the project aims to create a favourable environment for the development of new innovative ideas, projects and products.

1.1 - Project Description

The beacon project started officially the 1st May 2018 and ended the 31st January 2020. The total project budget was 545.300,00 €. As mentioned before the main goals of the project were the creation of: an open beacon network that can be used from everyone to implement innovative services, an open OoT network that can be used from everyone to test their sensors and a local IoT community that involves research centres, companies, experts, talents and other institution (both private and public). The activities of the project were divided in the following Work Packages.

1.1.1 - Project Management

This work package included all the activities that were needed to guarantee the correct implementation of all the foreseen activities in respect of the defined project plan and the budget.

1.1.2 - Communication and community building

This work package included the activities of dissemination of the project result to the different project targets and the institution of the IoT local community. As already mentioned the main goal was the creation of a South Tyrolean community of IoT companies, experts and talents that will stimulate the development of new innovative ideas, projects, products and services. Through the communication activities it was possible to create the IoT community that actually involves around 30 members.

More details about the IoT community can be found at the following link:

beacon.bz.it/community

1.1.3 - State of the art analysis

This work package realized the state of the art analysis of the IoT sector. This analysis includes the definition of:

- the best technologies in the IoT sector and how they can be integrated;
- the vision about future technologies that will come in the near future;
- the analysis of the IoT market in South Tyrol, Italy and Europe;
- the analysis of project and companies that will use or benefit from Beacon and IoT technologies in South Tyrol;
- the vision of possible future development of the project activities.

More details about the State of the Art Analysis can be found at the following link:

beacon.bz.it/wp-3

1.1.4 - Beacon Network

This work package included the following activities:

- installation of 3.500 beacons distributed over the whole South Tyrol;
- development of Open Source software tools that allows the use and the maintenance of the beacon network.

More details about the State of the Art Analysis can be found at the following link:

beacon.bz.it/wp-4

1.1.5 - Wireless Sensor Network

This work package included the followings activities:

- Installation of a LoRaWAN testing network at the NOI techpark;
- the development of an Open Source web tool to manage the network.

More details about the State of the Art Analysis can be found at the following link:

beacon.bz.it/wp-5

1.1.6 - Pilot implementation

Within this work package it has developed Open Source pilot services and applications that anyone can use as a reference implementation or as an example to follow.

More details about the State of the Art Analysis can be found at the following link:

beacon.bz.it/wp-6

2 - The Beacon Network

The aim of the project is to build a physical network of 3.500 Beacons and to distribute these Beacons over the territory of South Tyrol. Furthermore, within the 4th Work Package the software tools which allow the use and the administration of the network will be developed .

2.1 - What is a beacon

A beacon is a Bluetooth device which broadcasts a unique identifier on a regular basis allowing the apps installed on mobile devices to activate specific actions (e.g. push notifications, guide the user, etc.). The beacon, in order to maximize battery life, uses the Bluetooth Low Energy protocol and has no logic inside. For this reason, the logic is shifted to the apps using the beacons.

The beacon works as follows:

1. Beacons broadcast a unique identifier.
2. Smart-phones read the unique identifier.
3. Smartphones wake up the beacon enabled app.
4. The app recognizes the beacon through its identifier.
5. The app reacts!
6. The user receives information.

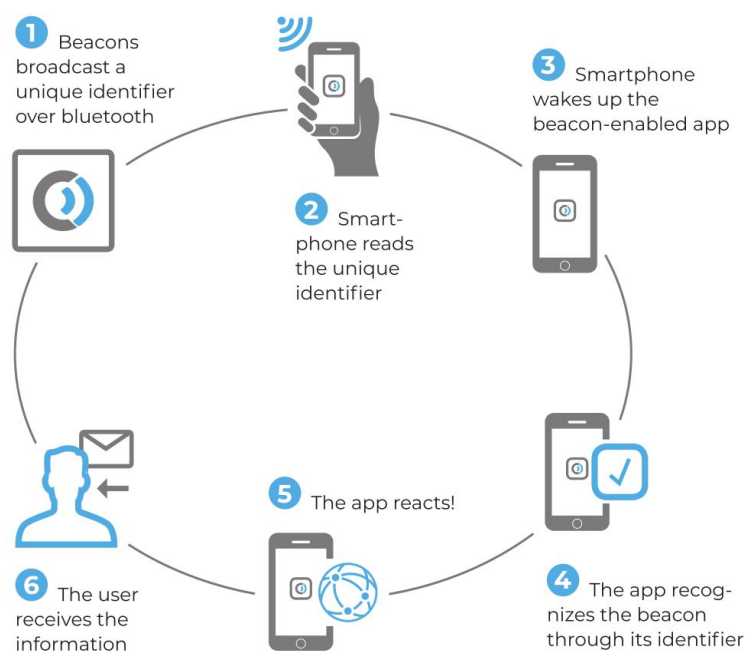


Figure 1: the beacon workflow.

2.1.1 - How can you use a beacon?

Please note that the beacons are only broadcasting an ID. This means that beacons are not able to collect information, make any other data elaboration or transmit data over the internet. The business logic and the data transmission is managed directly by the applications installed on the smartphones.

As a final user you have to follow these steps to interact with a beacon:

1. Install a beacon aware app.
2. Activate Bluetooth.
3. Once near to a beacon recognized by the installed app the app will react.

As a company, to use the beacons for your business, you need to develop an App that receives and processes the beacon signal and activates specific functionalities depending on the position of the beacon.

As an app developer to use the beacons in the app that you're developing you need to follow these steps:

1. Read the beacon identifier, use the provided SDK or API;
2. Request the beacon's position through the provided web service.
3. React!

2.1.2 - Which are the typical use cases

Some typical use cases where the beacons can be used are:

1. To locate the user even if in low GPS signal areas.
2. Precise position recognition in front of simple objects, like specific plants in a natural park or in a garden, in front of a statue, etc.
3. To implement indoor navigation and guides like for example in big building (e.g. hospitals, airports, train stations,), museums, showrooms, etc.

2.2 - The installed beacons

Within the 4th work package of the project it has been:

- identified the point of interest for the beacons;
- installed 3.500 beacons distributed over the whole South Tyrol (see the Figure 2);
- developed Open Source libraries (iOS and Android) that can be used by stakeholders which will use the installed beacons in their apps;
- developed an Open Source web tool to develop, manage and maintain the beacon network;
- developed an Open Source Android app to manage and maintain the beacon network;

- created a plan for the maintenance and the future development of the beacon network.

As can be seen in Figure 2 the Beacon Network installed within this work package covers the whole South Tyrol.

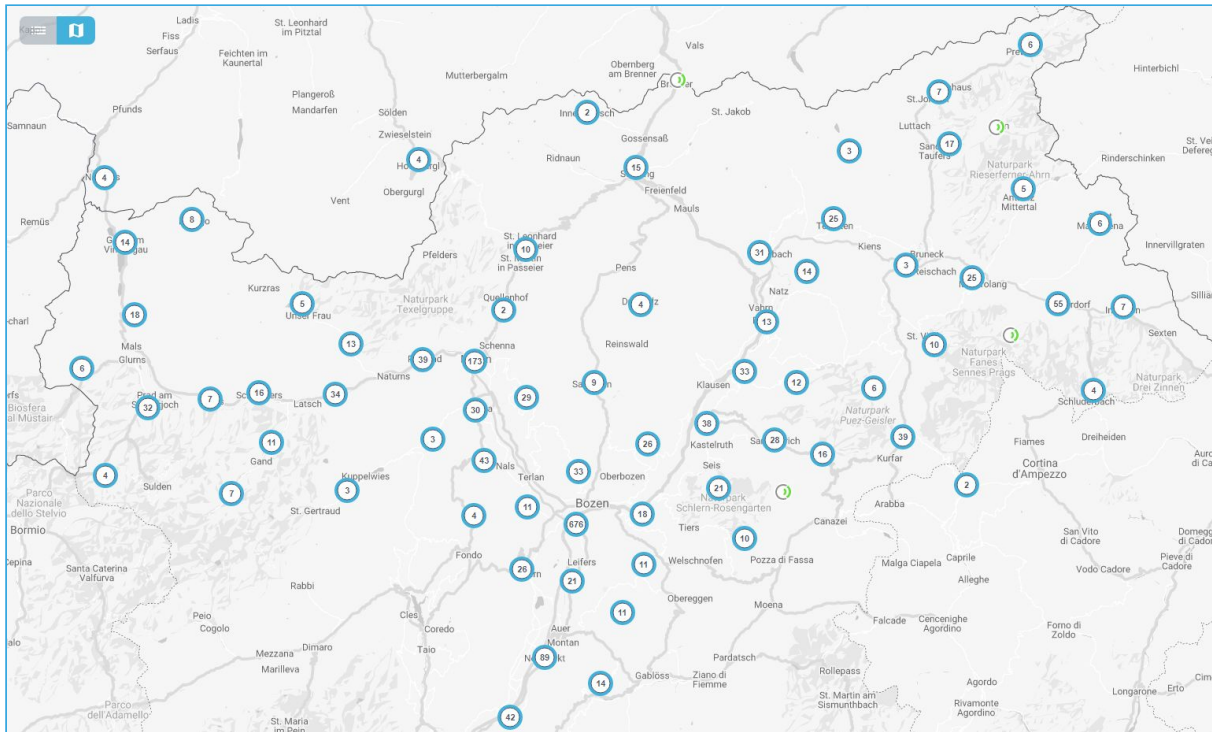


Figure 2: the south tyrolean Beacon Network.

The entire list of installed beacon can be seen at the following link:

maps.beacon.bz.it

3 - The LoRaWAN@NOI

Within the WP 5 it has been developed a LoRaWAN testing area at NOI Techpark that can be used by companies and experts to test and develop their sensors or IoT prototypes.

3.1 - What is LoRaWAN

LoRa (Long Range) is a low-power wide-area network that allows the communication of simple messages at long distances with a low energy consumption. The LoRaWAN protocol is typically used in the IoT sector to transmit data collected by sensors disseminated in a wide area. The LoRaWAN protocol can be used in order to transmit simple data (e.g. temperature, simple strings, humidity, etc.) but not to transmit more complicated or heavy data (e.g. images, video streams, etc.).

3.2 The network description

During the project, in collaboration with the Center for Sensing Solution of Eurac Research, it has been installed at the NOI Techpark in Bolzano a LoRaWAN Network that can be used by all the players that are interested in testing their sensors. The idea is to create a testing environment that:

- allows companies to test new sensors or other products that are developing;
- can be used by companies and research centre in order to develop new innovative solutions,
- enforces the collaboration between the companies that are getting in contact through the use of a shared network.



Figura 3: LoRaWAN gateway.

Moreover, during the project, the team decided to develop a jolly LoRaWAN@NOI gateway that allows to replicate the LoRaWAN@NOI IoT network in every place with an available WiFi connection. This jolly gateway allows the users to replicate the LoRaWAN@NOI network in his company to test their devices. The LoRaWAN@NOI jolly gateway is available on request at the Free Software Lab of the NOI Techpark. More information are available and the request of the gateway can be done through the following link:

freesoftwarelab.noi.bz.it/services/lorawankit

In order to use the Beacon Südtirol LoRaWAN network and test innovative devices, an user has to register his sensor in the dedicated administration web portal. Through the administration web portal he can register one or more devices on the network, both commercial or custom. The portal is available at the following link:

lorawan.beacon.bz.it



Figura 4: Home del portale LoRaWAN@NOI.

In the portal the user finds also all the useful information to retrieve the data from the sensor he registered.

4 - The IoT community

One of the main result of the communication work package is the institution of a Local IoT communities that includes both:

- stakeholder that can benefit of the introduction of IoT in their business;
- stakeholder that are experts in IoT and that can provide useful inputs.

The roles of the IoT community are: foster the creation of new innovative project ideas and provide support to all those stakeholders who want to introduce IoT solutions in their business.

4.1 - The community Members

During the project the South Tyrolean community reached the 28 members that will be listed in the following paragraphs.

4.1.1 - Airpm

Airpm is a high-tech company with high competences in the Identity Management that can help organizations and companies to create, manage and protect their digital data. The role of the company in the community is primarily related to the identity management and the protection of the IoT data.

Company website: www.airpim.com.

4.1.2 - ARO

Is a consortium of craftsmen distributed over the whole of South Tyrol. The consortium will maintain the beacon network during the 5 years after the project conclusion and moreover will benefit from the result of the project since the craftsmen will be continuously in contact with a high skilled and innovative community. This will allow them to improve their products and services.

Company website: aro.bz.it

4.1.3 - Belka

Belka is a software development company with high experience in the development of games and innovative applications. Their role in the community was the development of the Beacon South Tyrol Adventure app. Moreover Belka brought and shared with the community their experience in the design and development of innovative digital solutions using lean processes.

Company website: belkadigital.com.

4.1.4 - ByWay

ByWay is a company that develops a set of tools and applications for the management of the menu of the restaurants. ByWay brought in the community the point of view of the restaurants and how, in their opinion, IoT can help them to improve their processes and services.

Company website: www.byway.menu.

4.1.5 - Capacitas

Capacitas is a company with a high expertise in idea and game concept development. The role of Capacitas was the support of the community in the development of a gamification concept that uses the beacons and the share of the gamification concept with the whole community.

Company website: capacitas.bz.

4.1.6 - CatchSolve

CatchSolve is a software development company with a high expertise in the backend development. CatchSolve brought in the community their expertise in order to optimize the beacon management system.

Company website: www.catch-solve.tech.

4.1.7 - CISMA

CISMA is a local company with a high expertise in environmental engineering. The company is interested in using IoT solutions in order to improve the results of their services. For this reason it is also interested in participating to the IoT Community to find partners to develop new innovative projects.

Company website: www.cisma.it.

4.1.8 - Connex-x

Is a Start-Up based in Bolzano' s NOI Techpark with a clear mission to connect things with IoT solutions. In house hardware and software development allows the company to deliver custom made solutions for a connected city. For the company it is important to be part of the IoT community in order to find partners for innovative projects.

Company website: www.connexx.it.

4.1.9 - Fiera di Bolzano - Messe Bozen

The Bolzano/Bozen Exhibition Center is interested in being part of the community in order to increase their IT competence and find new project ideas and partners to develop innovative solutions to improve the experience of their visitors.

Company website: www.fierabolzano.it.

4.1.10 - Dolomitisuperski

Dolomitisuperski is the biggest ski consortium in South Tyrol and it is interested to be part of the community in order to find new project ideas and partners to develop innovative solutions to improve the experience and safety of their visitors.

Company website: www.dolomitisuperski.com.

4.1.11 - Endian

Endian's mission is to provide a secure platform that connects distributed people and things, simplifying the digitalization of businesses. Endians plays an important role in the IoT community since, the security will be an important aspect to take into consideration in future IoT projects.

Company website: www.endian.com.

4.1.12 - ECOsteer

ECOSteer is an IoT and Blockchain software company that addresses the key IoT issues of interoperability, security and privacy. Also ECOSteer plays an important role in the IoT community since, the security will be an important aspect to take into consideration in future IoT projects.

Company website: ecosteer.com.

4.1.13 - Eurac Research

The Sensor Systems and Technologies Lab of EURAC Research is part of the IoT community by contributing in the realization of the LoRaWAN@NOI Network and by sharing his high competences in IoT systems development.

Company website: <http://www.eurac.edu>.

4.1.14 - Fraunhofer Italia

The projects and research activities of Fraunhofer Italia are mainly focused to support small and medium-sized local companies through customized and

practical research services. Their interdisciplinary team is divided into the main business areas Automation and Mechatronics Engineering, Process Engineering in Construction and Business Model Engineering. The role of Fraunhofer Italia is the continuous analysis of the IoT market and his local potential.

Company website: www.fraunhofer.it.

4.1.15 - Gruppo FOS

The FOS Group is an innovative technological industry that promotes Italian polytechnic culture with strong roots in the territory and with a broad international perspective. It's proposed to the market with operating companies focused on vertical technological skills that operate in an integrated way and develop with the presence in leading international research centers and important technological districts. Gruppo FOS with his high knowledge about technologies is important for the continuous analysis of the IoT Technology state of the art.

Company website: www.gruppofos.it.

4.1.16 - IDM Südtirol - Alto Adige

Standing for Innovation, Development and Marketing, IDM Südtirol is a trailblazer for economic development in South Tyrol. The role of IDM is to bring in the community the point of view and the needs of the tourism sector.

Company website: www.idm-suedtirol.com.

4.1.17 - HDS - Unione

HDS is the association of the south tyrolean commenciants. The role of HDS is to bring in the community the point of view and the needs of the commerce sector.

Company website: www.unione-bz.it.

4.1.18 - Konverto

Konverto is a software development company with a high expertise in the frontend and backend development. Konverto brought in the community their expertise in order to design and develop the beacon management system and for the installation of the whole beacon network.

Company website:

4.1.19 - LVH - APA

LVH - APA is the association of the south tyrolean craftsman. The role of LVH - APA is to bring in the community the point of view and the needs of the craftsmanship sector.

Company website: www.lvh.it.

4.1.20 - NOI Techpark

NOI Techpark is the technology park of the Province of Bolzano and his role is the coordination of the entire IoT community.

Company website: noi.bz.it.

4.1.21 - Oberalp

Oberalp is a local company group (that includes companies as: Salewa, Dynafit, Pomoca, Wild Country, Evolv, etc.) active in the production of mountain dresses. Oberalp is interested in being part of the community in order to understand how IoT can improve their products and to find interesting partner for innovative projects.

Company website: www.oberalp.com.

4.1.22 - Orma Solutions

Is a technology company based in Bolzano's NOI Tech Park with high competences in IoT communication technologies. For the company it is important to be part of the IoT community in order to find partners for innovative projects.

Company website: www.orma-solutions.it.

4.1.23 - Press Way

Press Way is a PR agency that serves as a point of intersection between businesses and the world of media. Press Way is geared not only towards those companies striving to improve their business model, but also towards smaller-scale entities aspiring to faster yet well-managed development as the result of higher visibility now afforded by the information media. The role of PressWay it is important in order to understand how to spread the knowledge about IoT.

Company website: pressway.it.

4.1.24 - R3-GIS

R3 GIS works in the field of GIS and develops Web-GIS applications to manage and update different types of geographic information. Products and services are mainly targeted at central and local public administrations with webGIS software applications, which integrate the spatial component (topographic map, orthophoto, physical plans, cadastral maps, etc.) and databases used by municipalities and public administrations in general. For R3-GIS it is important to be part of the community in order to be continuously updated about the possible IoT, to find the best IoT technologies to integrate in their solutions and to find new partners for innovative projects.

Company website: www.r3-gis.com.

4.1.25 - Suggesto

Suggesto is a company specialized in services and technologies for e-tourism applied to the web and mobile devices; they make research activities for eTourism and they design, develop and commercialize software applications, web sites and portals as well as IoT technologies. Suggesto participated in the community by sharing their high experience in the recommendation systems.

Company website: www.suggesto.eu.

4.1.26 - Systems

Is a technology company based in Bolzano with high competences in IoT communication technologies and in general with IT solutions. For the company it is important to be part of the IoT community in order to find partners for innovative projects.

Company website: www.systems.bz.

4.1.27 - UNIBZ

The faculty of Computer Science of the Free University of Bolzano is part of the community in order to bring their expertise in the research field.

Company website: www.unibz.it/faculties/computer-science.

4.1.28 - UWE Bristol

The University of the West of England in Bristol has been involved in the IoT community in order to share their expertise in the LoRaWAN network development since they developed a low cost open IoT network in Bristol.

Company website: www.uwe.ac.uk.

5 - The pilots

During the Beacon South Tyrol project it has been developed also some prototypes that will be used by the developers, the companies and the experts as inspiration and reference tools for the integration of the beacon and other IoT solutions in their application and services. This prototypes, where possible, it has been developed starting from existing Open Source projects integrating new functionalities. Moreover, where possible, the source code of the prototypes has been released as Open Source on the Git repositories of the project.

5.1 - Maps Beacon

NOI Techpark developed a first map that shows where the beacons are located. Moreover to each beacon it has been associated with the nearest touristic Point of Interest. The tool is available at the following link:

maps.beacon.bz.it

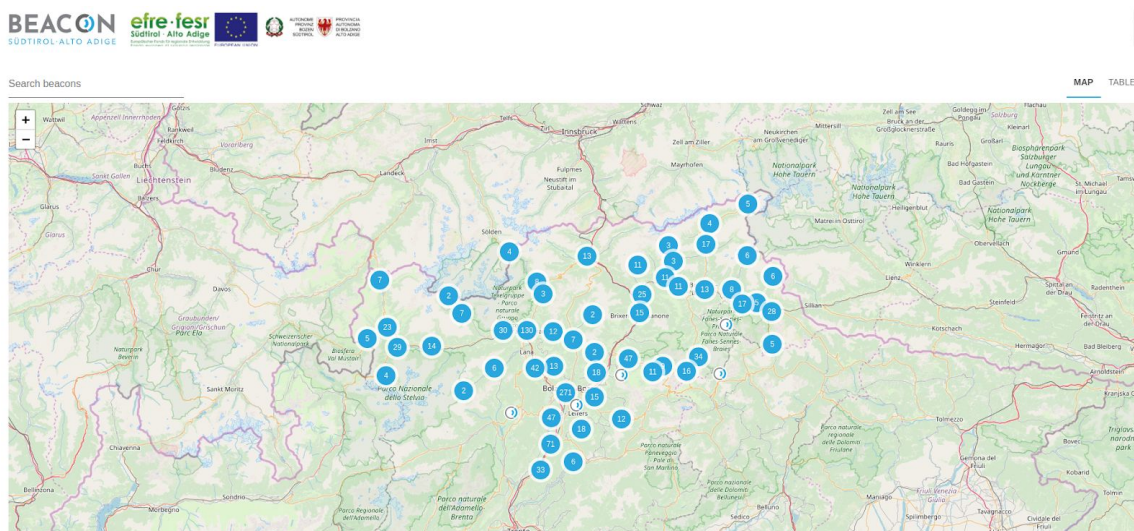


Figure 5: a screenshot of the beacon maps web component..

This webtool is based on a web component that can be easily integrated in every existing webpage. You can find the source code of the web component and the documentation in the following repository:

github.com/noi-techpark/beacon-tourismpoimapping-demo-webapp.

5.2 - Beacon South Tyrol Adventure

The **Beacon South Tyrol Adventure** application is a first demo prototype that can be used as best practice about the use of the beacons in android applications.

Progetto: Beacon Südtirol - Alto Adige

Codice: FESR-2023

CUP: B31H17000060001

The goal of the application is the promotion of less known touristic location through a gamification concept.

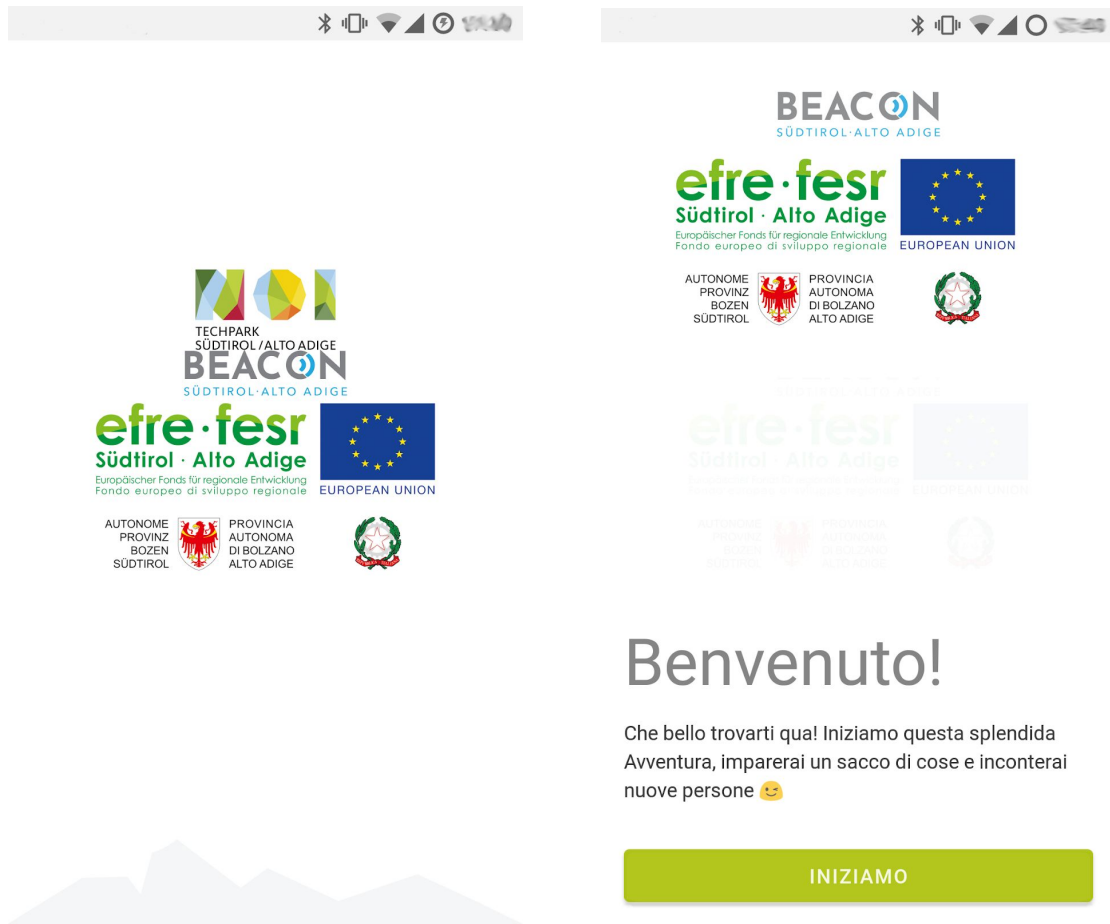


Figure 6: screenshots of the Beacon South Tyrol Adventure.

At the following links you can get the app to install on your android phone and the repository with the source code of the app.

beacon.bz.it/wp-6/gamificationmodule.

5.3 - Beacon Südtirol Guide

NOI Techpark together with Suggesto and the faculty of Computer Science of the Free University of Bolzano, starting from the actual tip of the day functionality of Südtirol Guide, has developed a prototype of Recommendation Module that uses the beacon technology in order to improve the suggestion algorithms.

The new Recommendation Module has been integrated in the **EFRE Beacon Südtirol Guide**. This is a prototype Android application based on a fork of the official Südtirol Guide that integrates the interaction with the beacons and the new Recommendation module. The application is actually available as testing app in the alpha channel of the google play store.

Since the application has been published in the alpha channel of the play store, in order to become a test user and to be able to download and install the app on your mobile device you have to send us the request via email (email: info@beacon.bz.it) including also the email address of your Google account.

6 - Contacts

In order to get in contact with the IoT community or in case of questions please feel free to contact us at the following email:

info@beacon.bz.it

In case of need of support for the beacon network or the LoRaWAN@NOI please write at:

support@beacon.bz.it

6.1 Autonomous Province of Bolzano - Bozen

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6.2 NOI Techpark

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