RESI LINK

Increasing Resilience of Smallholders with Multi-Platforms Linking Localized Resource Sharing

Deliverable D5.2a

Evaluation technical framework – v1

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EXECUTIVE SUMMARY

Deliverable D5.2a describes the technical evaluation framework to target the final definition and component integration for the RESILINK digital platform. The document will elaborate on the ODEP platform and the associated tests to confirm ODEP's functionalities and API for RESILINK's needs, the proof-of-concept of the RESILINK mobile application, the preliminary study of the RESILINK digital platform and the preliminary study on deployment of all these components.

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1. INTRODUCTION

RESILINK's proposed approach is to increase smallholder's resilience by providing continuity of access to both resources and markets in crisis situations. It will empower the local agri-food value chain model by optimizing usage of local resources, promoting and generalizing local resource sharing approach and facilitating territorial markets. This local agri-food value chain model will also be integrated with the local e-commerce, supply & distribution channels. The concept of localized and short agri-food value chain will also impact on the agro ecological system by minimizing the food losses and contributing to the climate & environment changes with shorter food supply chains and logistics. As a result, new and local innovative services can be identified and created, enhancing further the smallholders' agri-food chain.

It develops a distributed digital resource management platform for real-time exchange of information on territorial resources and supplies & demands; connecting smallholders to new supply, sharing opportunities and distribution channels. In addition, RESILINK will incrementally use cutting-edge digital technologies to connect fields and farms resources, automatize and add intelligence in the agri-food value chain to provide simple application interfaces adapted to smallholders.

RESILINK has the clear ambition to make digital smart technologies attractive & accessible to smallholders. The proposed solutions will be simple to use on a daily basis so that its usage will become natural, even in non-crisis situations.

The core of the RESILINK digital resource management consists of the Orange Decentralized Exchange Place (ODEP) platform initially developed by Orange for energy and telecommunication ecosystems.

In addition to ODEP and to maximize RESILINK's usage by the end users, RESILINK will develop a mobile application that will be the main interface to simply, quickly and intuitively interact with the RESILINK digital resource management platform.

This document describes these preliminary steps, in link with D1.1 "Smallholders' resource requirements and distribution channels in a local & territorial agri-food chain" and D1.2a "First report on Framework for a generalized resource sharing for increased resilience of smallholder considering a local & territorial agri-food chain"

2. ODEP PLATFORM

2.1. Brief description of ODEP platform

The Orange Decentralized Exchange Place (ODEP) platform serves as a generic exchange place based on Blockchain technology. It facilitates the consolidation of sharing functionalities across diverse resource types. Through the integration of Blockchain, our platform enhances resource exchange accessibility via decentralized hosting, increases security through cryptographic mechanisms, offers flexibility with terms defined by ecosystem members, and notably reduces costs by eliminating fees imposed by a central authority.

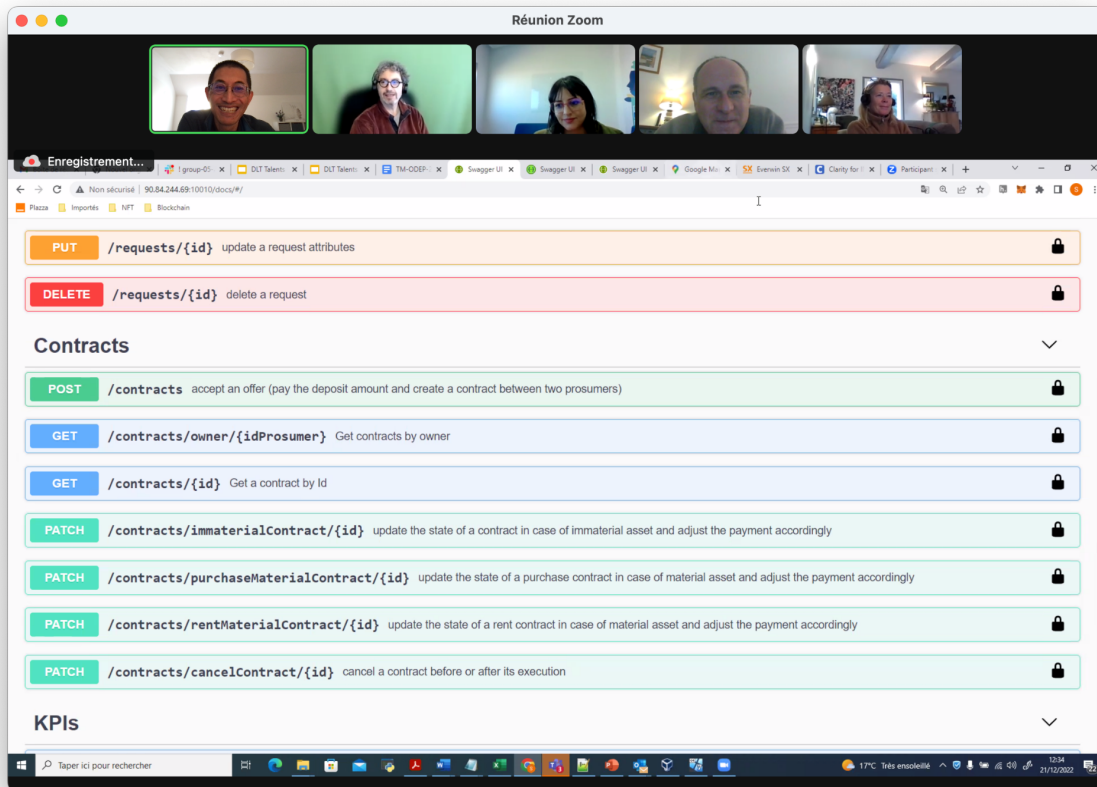ODEP is implemented in three use cases with respect to Orange ecosystem :

1- The energy exchange use case between domestic, commercial and tertiary buildings.

2- The IoT data exchange between different actors of the ecosystem.

3- The connectivity resource exchange between operators to enhance connectivity quality.

The adaptation of ODEP to each use case is done by a simple input parameterization: definition of the actors, the exchanged assets, the use interfaces, etc. This generic exchange place allows the exchange of material or immaterial assets, manages the sale or rental operations and allows the valuation of transactions through a given unit of account. To integrate such a generic exchange place to any use case, we firstly separate what could be as common treatments as part of our exchange place. We define specific aspects as recommended modules that should be undertaken by the dedicated business application.

The main functionalities of ODEP allow:

- The admin to configure different asset types that could be exchanged and manage ODEP participants.
- The producer to declare what he has to offer as an asset and to make it available for sale and notify all matched requesters.
- The consumer to declare what he needs as a request and to receive all matched offers ranked per price.
- The regulator to establish a legal basis to regulate an asset, if it is subject to regulation, by attributing a "regulated" field that mentions that all legal aspects of the asset are verified.
- The prosumer (producer and/or consumer) to supervise the delivery. All payments are automatically settled according to the delivery state.

Stakeholders could access the marketplace through a client application. For that, they should firstly authenticate and receive the access token that enables interactions with ODEP services. Those services are exposed as a Restful API and include all possible interactions with the exchange place. Restful API services call transactions in smart contracts which are installed and instantiated in the blockchain. As an intrinsic characteristic of this technology, all peers will have the same copy of the generated blocks. The exchange place smart contracts provide the business logic which orchestrates the process of offering, requesting, buying of assets, delivery supervision and payment adjustment.

A detailed description of ODEP can be found in the ODEP slides presented during the RESILINK kick-off meeting in Oct. 2022:

https://resilink.eu/wp-content/uploads/2022/11/ODEP_RESILINK_KICKOFF_26_10_22.pdf

2.2. Testing the ODEP API

Several technical meetings have been set-up with the ODEP development team to understand the ODEP main concepts and test the ODEP API.

On Nov. 18th, 2022

On Dec. 21st, 2022

2.3. Plan for a RESILINK intermediate platform

The creation of an intermediary platform that will act as a relay between the ODEP API and the mobile application is also planned in future works. Communication will take place in the same way as at present between ODEP and the application, and messages will remain in the form of a json file.

The aim of this platform is to lighten the load on the application, since as mentioned above, all business functions are called directly from the application, but also to enable automation and configuration. When the application starts up, this platform will send a configuration file so that all non-sensitive internal data can be sent directly to the smartphone, thus avoiding repeated calls to the ODEP API.

3. RESILINK MOBILE APPLICATION

3.1. Preliminary design choice

Since the application had to be usable on both Android and IOS, we had to either develop on both platforms, or find a framework capable of translating the code at compile time into Android and IOS code. To save development time, the final choice fell on the use of a framework, despite the risk of having constraints linked to it.

The Flutter framework using the Dart language (a programming language created by Google) has therefore been selected to develop the mobile application.

Customers and users will mostly be farmers and companies offering services and products on the platform. We therefore had to ensure that the application would work on as many devices as possible, even the oldest ones, which is why the importing of packages into the code has been very limited, as well as saving storage space.

Currently, the mobile application has a minSDK of 20 and the minimum version for IOS is IOS 9 (refer to the diagrams below), which means that even "obsolete" phones (smartphones that can no longer be updated) from these versions can use the application.
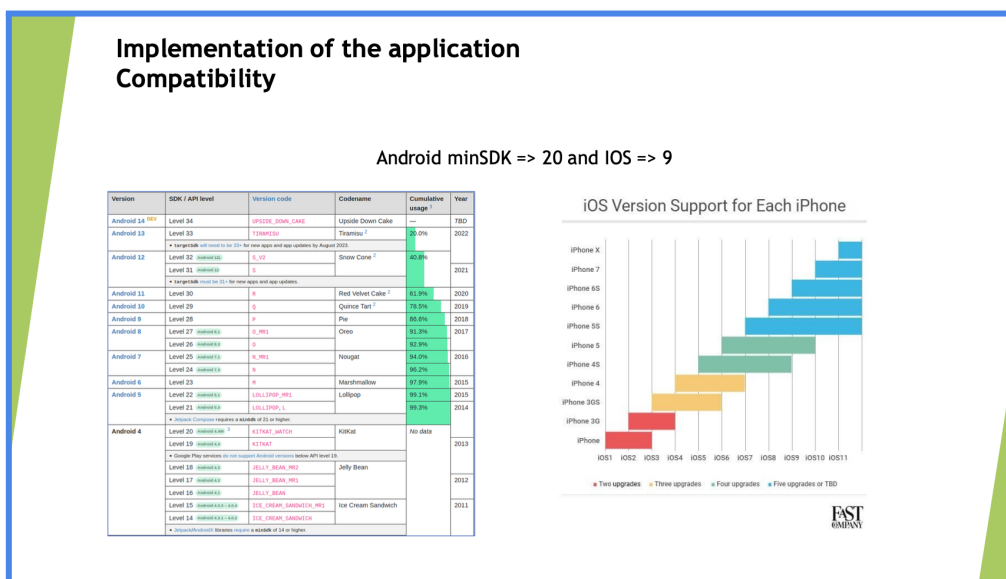

3.2. First FIGMA-based mockup

A light research of the design type and architecture for the HMI or UI as well as the user path was carried out beforehand. The different planned user paths are illustrated in the following activity diagram. It is also accessible through this link: 📄 POC_diagram_appMobile.pdf
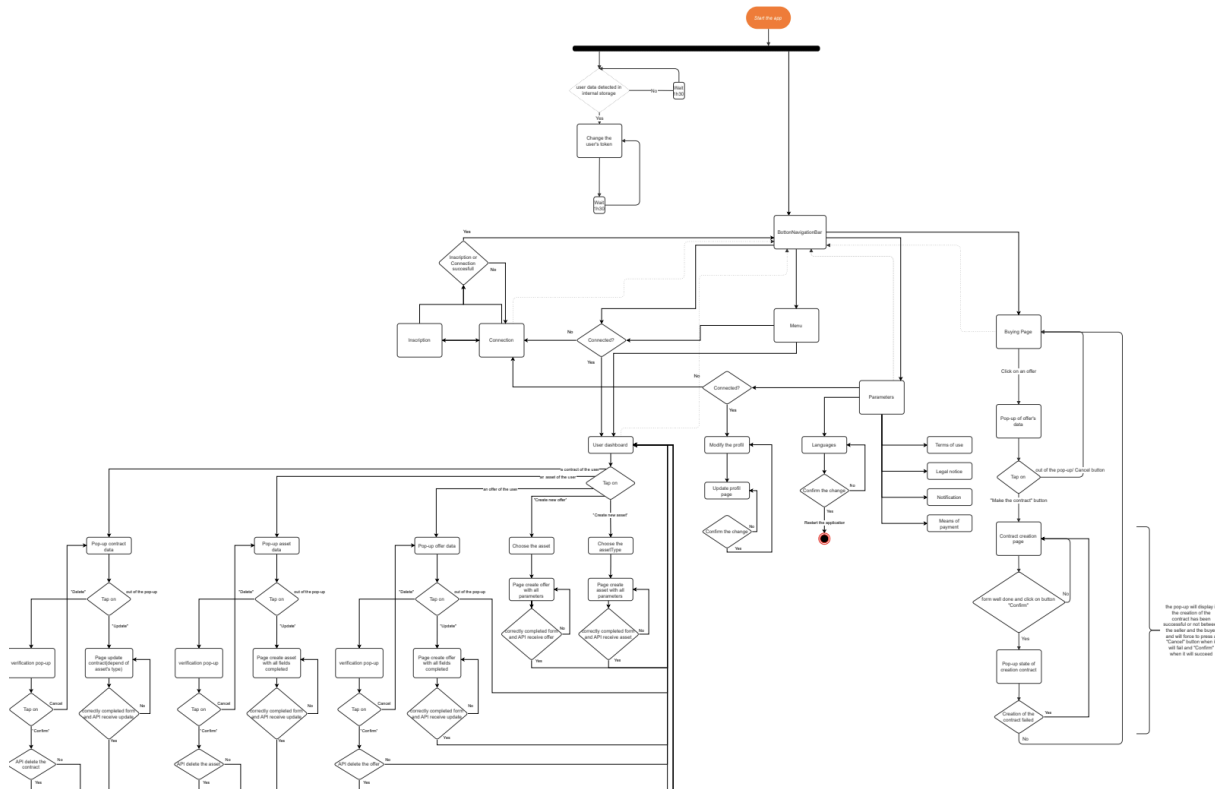
A first application mock-up was therefore created using Figma to illustrate the different user paths. The following figure shows each available screen. It is also accessible through this link: 📄 POC_functional_design.pdf
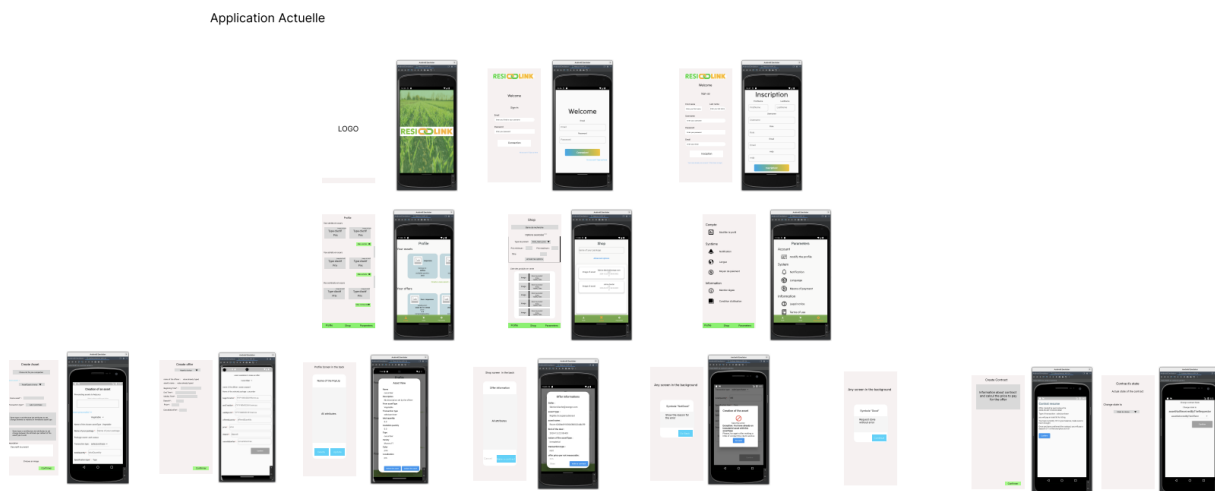
3.3. How to deploy the mobile application

There are several ways to deploy the application.

- The simplest would be to host our .APK on a platform designed for .APK applications.
- A more restrictive solution would be to build an app bundle with a security key enabling the application to be registered in the google play store and the apple store.

- The final solution would be to weed out a website where our .APK would be hosted, so that when the user opens the web page, he or she has the choice of downloading our .APK.

However, all these solutions are only applicable to Android phones. Under IOS, .APK files are not allowed and are .IPA files, however, the same process can be used if downloaded via a site that hosts our .IPA.

For the moment, priority is given to the .APK, i.e. for androids.

To host the application, we chose the 1st solution because it's much simpler and some alternatives to google play store are well developed.

For the purposes of this test, we used the Aptoide platform. Aptoide is an alternative to the google play store that allows you to install .APKs quickly and easily, and features protection against malicious .APKs.

However, this protection isn't perfect, and that's something to bear in mind.
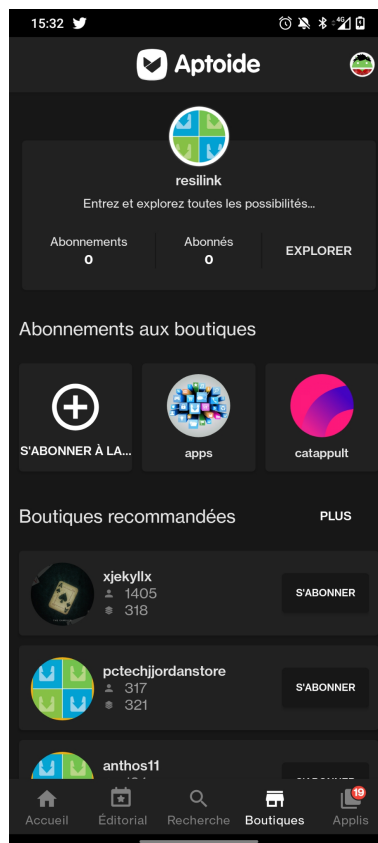
A store called "resilink" was therefore created for the test. To install an .APK, you need to use the application associated with Aptoide, Uploader Aptoide. This application searches for installed software and lets you select the ones you want to see in your store. If you select a program, its .apk will be proposed for installation in the store, and will be visible in the application's software search.
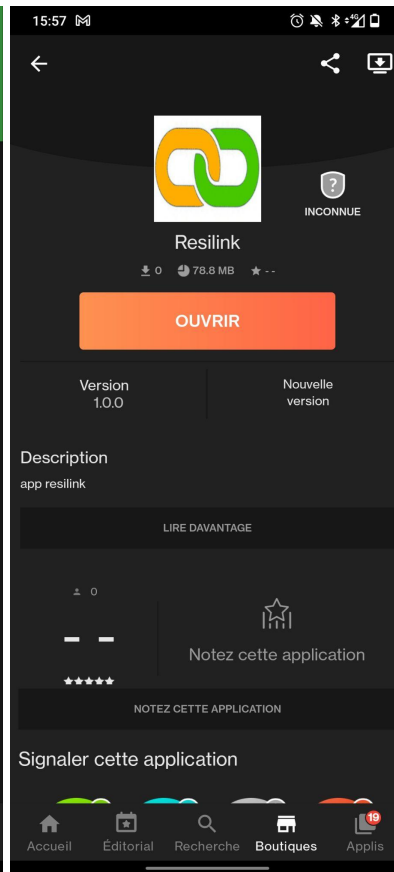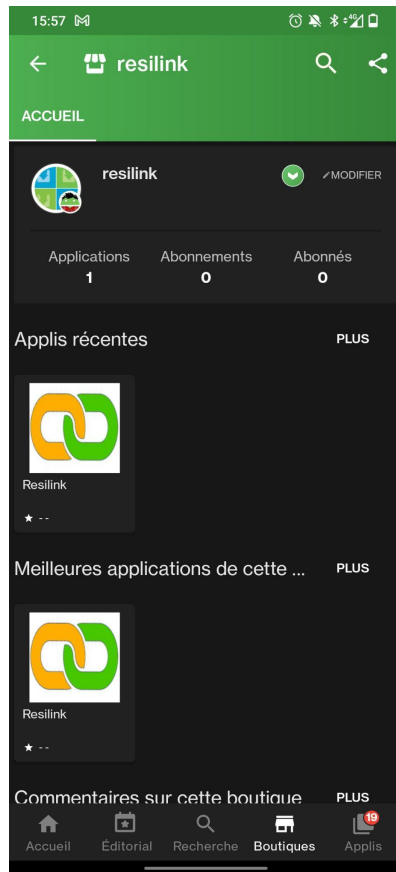
ACRONYMS LIST

Acronym	Explanation
API	Application Programming Interface
APK	Android Package Kit
HMI	Human Machine Interface
ODEP	Orange Decentralized Exchange Place
UI	User Interface

ACRONYMS LIST

Acronym	Explanation

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