Software Verification and Validation Plan

Global Fish Tracking System

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Introduction

This document describes the software verification and validation plan for the Global Fish Tracking Software (GFTS) DestinE Platform use case. GFTS is a complex system that requires solid quality assurance to deliver a stable and reliable service. For this we will verify that the software functions as expected, and validate that the result is useful for users and fulfills its overall purpose.

Verification

We are foreseeing activities to verify the functionality of the GFTS use case with respect to the project plan. The GFTS system will be tested with different levels of tests, each adapted to the respective requirements of the different components. For this, the verification will focus on state of the art software testing using both unit tests and integration tests in a continuous development and integration (CD/CI) type environments such as GitHub actions where possible. This will ensure that the incremental improvements are successfully integrated and compliant with already existing components.

Fish track reconstruction

The fish track environment will allow users to reconstruct fish tracks from biologging data. The verification of these reconstruction algorithms will be done both on a software level and on a scientific basis. The software verification will ensure that the software runs efficiently and error free. The scientific verification will compare the output with other existing datasets and the expected results. This is to verify that the algorithm itself is producing the scientifically correct results.

Decision support tool

The decision support system will have a front-end component and a back-end component. We plan to develop unit tests and integration tests for all the components of the system.

Validation

To ensure that the GFTS project delivers the right kind of product, we will focus on interacting with potential users while we build the system. This will help validate the decisions we make along the execution of the project, and help the project to stay on track to produce a system that is as useful as possible in practice.

The co-design methodology developed within the e-shape H2020 project will be adopted to ensure that all stakeholders are engaged and their needs are addressed. This co-creation process consists of two phases. The first phase involves a comprehensive "diagnosis process" to identify specific co-design requirements, categorized into four different types of co-design: (1) adjustment between user and service designer, (2) exploration for usage initiation, (3) engineering for service operationalisation, (4) exploration for usage expansion. The second phase entails implementing co-design actions to address these identified needs. The co-creation method for the development of DTs will be also open by design from the initial idea until the end of the project, and will use the same open methodology to share and facilitate reuse. This ensures that the infrastructure and co-creation process are transparent and accessible to all stakeholders, fostering collaboration and innovation. One of the key components will be new collaborative Jupyter notebooks simultaneously accessible by several developers in real time to realize the full potential of creative design and collaboration.

The following graphic shows how we are planning to implement the validation activities.
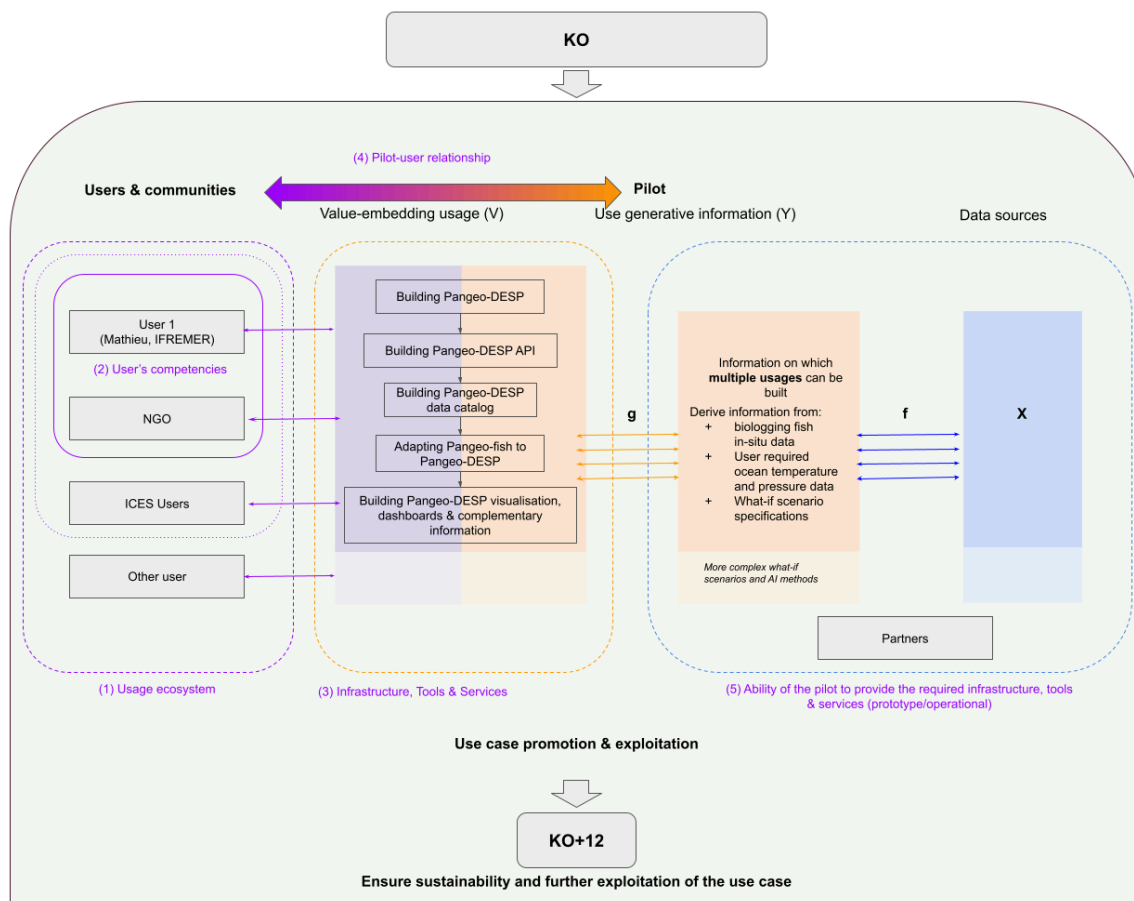
Flowchart for the Pangeo-DESP Use Case. The co-design agile methodology from e-shape H2020 project is central to our workflow: representation of the "data Use case journey" for the targeted state based on the data-information usage framework: data (in blue), information (in orange), usage (in orange-purple), function "f" linking data and information, function "g" linking information and usage are the different constitutive elements of the service, addressing the users' community (in purple).
The Use Case promotion & exploitation are also part of the co-design process to ensure optimal take-up from the communities and adapt training/promotion to the targeted users.
This approach will help to ensure the sustainability of the Use Case and facilitate further exploitation e.g. improve it for instance with additional "what-if" scenarios and the usage of more advanced AI methods.