ACTIVITY 3 – LIVING LABS

ASPECTS OF LL TESTING
30 November 2022

Subject: How to do testing in the FEDeRATED project?

This note proposes to divine the LL esting in three parts:

1. Process
2. IT System
3. Operational/Acceptance testing

What is at stake?

The testing of the Living Labs relates to 4 FEDeRATED (Grant Agreement) deliverables – Milestones.

- Milestones 8 and 12 require testing results of the LivingLabs- identifying what the LivingLabs have actually done, executing work. An important reason being that the EC, as providing 50% of the project budget, would like to check whether the money they provide has actually been spent.
- Milestones 10 and 14 require an assessment of the LivingLabs against the FEDeRATED (Interim) Masterplan/Reference Architecture. This is called validation. The Reference Architecture should be validated based on real business cases (LivingLabs). The testing of the LivingLabs is not the same as validation. Testing can contribute to validation in case the testing contains aspects of the Masterplan – being the technical specifications (semantics, service register, index, IAA.

Testing is important for the success of the FEDeRATED project. What is testing and can it be done by the current 23 LivingLabs? Is testing only possible when it is based on piloting?

The current LL state of play

Actually, all 23 LivingLabs have constructed an individual business case and stakeholder engagement. Thus, they have developed a process, which has often proved to be very time consuming. It is unclear whether the technical setting of all LivingLabs will comply with the FEDeRATED Reference Architecture. Some LLs have difficulty understanding the FEDeRATED Reference Architecture. Only from October 2022 onwards, the FEDeRATED architecture has been translated in relatively understandable language (Milestone 10 - http://federatedplatforms.eu/images/Library/Activity2/final_MILESTONE_10_LL_ASSESSMENT_29102022.pdf).

Of the 23 LLs appr. 8-10 LLs have no clear-cut concept yet on how their technical setting will look like in detail and how they are going to execute a data sharing practice on their business case. Non the less, these LivingLabs can be considered as being in good shape – alive and kicking - as they have constituted a **future proof engagement of many different stakeholder.** They share a **common engagement, tangible target** and **vision**. The technology should follow later, whereby the demands on the technology should be identified by the LL leader, based on the business case. For some LLs the connection between the LL leadership and the IT developer is rather opaque. For these LLs there is much room for improvement. A focus should preferably on making the LLs implementation ready

The importance of the LL development process

Can FEDeRATED, being in its final project phase, keep the LLs that are rather clueless or their technological applications for data sharing alive? Or should these LivingLabs be deleted as they probably won't engage in a piloting stage during the project lifetime?

The proposed answer is NO. Keep them alive. FEDeRATED should not be considered as a technology project only. Its task is to develop the foundations for a secure, open and neutral data sharing infrastructure provision through practical Living Labs. Can it be done? If so what is necessary to accomplish this? The answer to these questions do not only relate to technology. They also relate to human involvement, social capital. For sure, the amount of 23 LivingLabs indicate the FEDeRATED has generated a lot of engagement - amovement. Part of this engagement will pay out in technological data sharing practices during the FEDeRATED project, but also after the lifetime of the FEDeRATED project. Some of these LivingLabs will only be capable of technological piloting after the lifetime of the FEDeRATED project. Thus, there is a kind of obligation of the project management and the EC to the LivingLabs to enable them "to sow the seeds for federated data sharing" through their LivingLabs, whereby the consummation of the applicable technical setting, according to FEDeRATED requirements and specifications, only might take place only after the FEDeRATED project lifecycle. For these LivingLabs the testing will only refer to the Process.

Testing the process

In practical terms the process perspective relating the LL testing needs to be described in:

1. Business case
2. Business potential
3. Transport modes
4. Focus on implementation treadiness status
5. Geography
6. Planning
7. Stakeholder engagement and analysis (i.e. Do they opt for federated data sharing - data at source)
8. Data user and data holder
9. Information flow
10. Technical setting available

Task: All 23 LivingLabs can be tested on Process. Much information can be derived from the FACTsheets. The FACTsheet information needs to be updated, especially 3, 5, 6 and 7, towards testing through interviews.

The outcome of the process testing should preferably be:

- a sincere dedication of all stakeholders towards a real-life business case – preferably a piloting phase within 2 years - on federated data sharing

A testing questionnaire is attached. It is divided in three parts. Part 1 is about the Process. Preferably during the Gothenburg workshop the LLs will explain their state of play concerning the process, i.e. the stakeholder engagement.

Testing the system

All LLs have described the technical setting of their LLs. However, many have not detailed these aspects in detail. In 2022 various questionnaires were sent to the 23 LivingLabs, many requesting information on the technical setting and the state of play concerning testing. For testing, the LLs were you supposed to be in a piloting phase. Based on the results of the questionnair, it appeared that many LivingLabs that originally had indicated to be in a piloting phase were only developed until the phase of their technical setting, their IT system.

Based on the questionnaire a number of LLs filled in the questionnaire. These were the following LLs #1, #2. #3, #5, #10, #11, #12, #13, #14, #15, #16, #17, #18, #19, #21 and #23. Based on their answers, it is doubtful whether all these LLs are really engaged into a piloting phase, or rather were engaged in the testing of their IT environment , but had not entered into a operational (acceptance test) phase - actual sharing. As yet, it appears that LLs #5, #13, #14, #15, #17 have not really engaged in a piloting phase. They do not seem to be piloting ready yet. Through interviews during the LL Workshop in Gothenburg the specific LL leaders should be questioned on their state of play.

The outcome of the system testing should preferably be:

- application of a federated data sharing system approach, containing various FEDeRATED technical specifications
- System capability for testing in an operational setting

A testing questionnaire is attached. It is divided in three parts, Part 2 is about the System

Testing the operations

The operational testing is the third phase of the FEDeRATED testing. It relates to testing the business case in an operational setting through a pilot whereby the IT system should enable data sharing between different stakeholders.

Through interviews during the LL Workshop in Gothenburg the specific LL leaders should be questioned on their state of play Based on the results of the questionnaire, it appears that only 9 LLs #1, #2, #3, #10, #11, #12 , #19, #21 and #23 have engaged in a piloting phase. There results are not so obvious yet,

The outcome of the operational testing should preferably be:

- The technical solution enables data sharing in the selected business
- Tangible outcomes (what federated data sharing can bring to the table)
- Stakeholders feel committed to further engage
- application of a federated data sharing system approach, containing various FEDeRATED possible recommendations on how to improve the technical settingh

A testing questionnaire is attached. It is divided in three parts, Part 3 is about the System operability, Acceptance testing.

ANNEX THE TESTING TEMPLATE – QUESTIONNAIRE – Three parts

PART 1 – PROCESS		
Scope		
	Business case	*Describe the (to be expected) benefits of the complete LL and the individual stakeholders in the LL. (See your FACTsheet – should preferably be tangible, see page 3 outcome).*
	Business potential	*Describe its usefulness*
	Transport modes	
	Focus implementation readiness	*Do partners really get it done?*
	Geography	
	Planning	
Stakeholder engagement (*indicate the stakeholders and their commitment – see also factsheets*)		
	Stakeholders	
	Do shareholders opt for federated data sharing - data at source	
Parties involved (*indicate data holders and users – see also factsheets*)		
	Data holders	*i.e. which party(ies) is/are providing data to (an)other party(ies), potentially acting on behalf of someone else.*
	Data users	*i.e. which party(ies) have access to the data of (an)other party(ies).*
Information flows (*indicate iin generic terms what data are concerned*)		
	i.e. the information that is to be exchanged within this Living Lab. Does not need to be specific. Possibly an itinerary can be added.	
Technical setting (*indicate in genera;l terms whether a technical setting has been ageeed*		

PART 1 – PROCESS

PART 2 - SYSTEM			
Scope			
Topic of test		*Describe how the technical setting you have put in place would enable data sharing between data holder and data user. Indicate which aspects are subject to testing, whether there are one or more testing scenarios and the form of the (to be expected) testing output.*	
Type of data (*indicate which type of data are to be shared*)			
	Visibility data	*i.e. the reporting of the planned (ETAs) and actual progress of transport and transshipment.*	
	Business document data set(s)	*i.e. any type of business document that is shared digitally (e.g. eCMR, eAWB, eB/L). Indicate which "documents", if any, are shared.*	
	Ordering – and planning data	*i.e. order data shared in a contractual relation by a customer to a service provider. Indicate which data, if any, are shared.*	
	Identifications	*i.e. the identifications used for any relevant (set of) object(s), e.g. shipper, location, shipment. Indicate which identifications are used.*	
Test data sets (*each row should contain a brief name and description of the test data set, refer to the type of data that is exchanged and data volume of the test case. Insert more rows if needed.*)			
	Test use case	Description	Volume
Technical context			
	Data sharing infrastructure (*indicate which is applicable*)		

PART 2 - SYSTEM		
	P2P	*i.e. data sharing between a data holder and – user without any third-party platform provider involved.*
	(Single) platform	*i.e. a (single) platform acting supporting data sharing between stakeholders in the LL.*
	Multiple (interoperable) platforms	*i.e. data sharing between stakeholders in the LL, where stakeholders utilize different platforms.*
	P2P and platforms	*i.e. a combination of P2P data sharing implemented by some stakeholders in the LL and others using (multiple or single) platforms.*
	Technical Specifications – functional data sharing	
	Semantics	*i.e. the semantics of data that is shared by events and other relevant data (see before). Select below which is applicable (note: if the LL has first used a proprietary model but plans to use/test the FEDeRATED model then both should be selected).*
	Proprietary model	*i.e. the LL has a single model specifying all interactions or a model per interaction. It is proprietary to the LL. If applicable indicate which and the (to be) tested aspects.*
	FEDeRATED semantic model	*i.e. the FEDeRATED semantic model has been/will be applied to specify semantics of all interactions. Indicate which parts are used (e.g. location, transport, cargo, etc.). Also, do you have a semantic end-point? Indicate to be tested aspects.*
	Syntax based	*i.e. the semantics is defined by the syntax, e.g. an XSD for XML. Indicate means used and to be tested aspects.*
	Events	*i.e. use of a logistics event mechanism to share access to data (Linked Event Data). The types of events that are shared, e.g. load / discharge events, pickup / drop off events, position events. Elaborate which and testing regime adopted.*
	APIs	*i.e. a defacto standardized way to access data implementing web services. Select below which are applicable.*

PART 2 - SYSTEM			
		Synchronous / asynchronous	*i.e. a synchronous protocol for accessing data or an asynchronous protocol for pushing (event) data. Elaborate testing regime adopted solution.*
		Single / multiple	*i.e. a single endpoint for implementing all interactions (e.g. a SPARQL endpoint) or one endpoint per interaction. Elaborate testing regime adopted solution.*
	Syntax		*i.e. the syntax used to structure data when it is shared (e.g. RDF, JSON(-LD), XML, EDI). Indicate means used and to be tested aspects.*
	Connectivity protocol		*i.e. the protocol applied for sharing data with a platform or P2P. The protocol can be directly related to the APIs, e.g. REST APIs use http(s). Protocols like the FENIX – or IDSA protocol between connectors, eSens Delivery (ebMS), AS/4, and any queuing protocol. Indicate mechanism/means used and to be tested aspects.*
	Data quality validation		*i.e. the validation of any data that is shared between a data holder and user according to the specifications of the interactions (e.g. SHACL validation). Indicate mechanism/means used and to be tested aspects.*
	Technical Specifications – data sharing security		
	Data sharing security protocols		*i.e. the security of the data sharing protocol that is supported, e.g. https, TLS or any other. Indicate mechanism/solution used and to be tested aspects.*
	Cyber security		*i.e. support of any norms (e.g. ISO) and acts (e.g. EU Cyber Security Act). Indicate mechanism/solution used and to be tested aspects.*
	Privacy		
	Identity provider(s)		*i.e. unique identification of a person that can be authenticated. Authentication can be based on tokens like OAUTH2. Indicate mechanism/solution used and to be tested aspects.*
	Authorization		*i.e. the rights of a person with respect to accessing and manipulating data, assigned by its employer. Indicate mechanism/solution used and to be tested aspects.*

PART 2 - SYSTEM		
	Identity broker(s)	*i.e. a trusted environment providing trusted Identity providers. Indicate mechanism/solution used and to be tested aspects.*
	Log / audit trail (non-repudiation; traceability)	*i.e. an immutable function to provide proof of data sharing with, and access by, a data user. It provides full traceability of which data has been shared or accessed by others. Indicate mechanism/solution used and to be tested aspects.*
	Technical Specifications – non-functional	
	Systems maintenance	*i.e. maintenance of all relevant components of the solution (semantics, APIs, P2P, platform(s), etc.). Indicate mechanism/means for testing and expected form of results.*
	Resilience	*i.e. continuation of the system when one or multiple components fail. This also relates to MTBF (mean time between failure) and a contingency plan. It can also be the failure of a single component of one stakeholder in its role of data holder. Indicate mechanism/means for testing and expected form of results.*
	Maximum load capacity	*i.e. the maximum load of the system based on the number of events and queries that can be processed by the system when still providing the required performance. This is of particular relevance in case of a single platform; a P2P environment can probably handle more. Indicate aspects/means for testing and expected form of results.*
	Performance	*i.e. the maximum time for retrieving a result of a query to the system. This can be a local query (e.g. to a local Index) or a query by a data user to a data holder. Indicate aspects/means for testing and expected form of results.*
	Contingency plan	*i.e. any fallback procedures when (crucial) systems components fail. Are there procedures, and if so outline type of procedures and to be tested aspects.*
	Onboarding	*i.e. procedures for including new stakeholders to the LL. Are there procedures, and if so outline type of procedures and to be tested aspects.*

PART 2 - SYSTEM		
Methodology		
	Development – monitoring method	*i.e. a description of the development of the technical setting, e.g. relevant documentation, use of a CD/CI (continuous development / continuous integration) environment. The GA states that a method should be in place for each LL. Please indicate which is used in the LL and how and what you are able to provide in terms of output, both as input for the overall testing results and as "evidence" of operational pilots.*

PART 3 – OPERATIONAL RESULTS (ACCEPTANCE TESTING)	
Method - monitoring	
Testing method applied/ testing monitoring system in place	*Identify how you monitored the testing and the data derived from the testing - Like CI/CD*
System operability	
Operational capacity of the system settings	*What is the output of the testing in relation to the data sharing business case?*
Technical setting	*i.e. identification of potential technical barriers and bottlenecks, recommendations. These can be on any aspect of the technical context. Indicate how potential input is to be determined/collected.*
Business adoption, acceptance	*i.e. identification of potential barriers or bottlenecks in adoption of the outcome by business/[public authorities. This relates to the logistics stakeholders involved in the LL and their roles. Indicate how potential input is to be determined/collected. Any findings/results should be reported following piloting.*

PART 3 – OPERATIONAL RESULTS (ACCEPTANCE TESTING)	
Stakeholder engagement	*Are the various stakeholders satisfied with the results? What are the recommendations? Have they become further engaged to move towards an implementation ready status of this business case?*
Outcome (targets)	
Tangible results	*i.e. identification of LL testing outcome in tangible terms (e.g. CO2 reduction, less km, less congestion…. (in relation with business case). Indicate the type of "tangible" results you envisage from your LL and how this will be measured.*