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D3.7 Sustainability plans for eSENS building blocks

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Acronym	Explanation
A2A	Application to Application
ABB	Architectural BB, functional level description. The Architectural Building Block is a sibling of the High level Building Block or SAT and its specific attribute is that it consists of specifications not code
B2B	Business to Business
BB	Building Block. A Building block can be High level (HBB), Architectural (ABB) or Solution/Service/Software (SBB). The SBB specific attribute is that it consists of executable code. SBB's are excluded from this document.
BDXr TC	Business Document Exchange Technical Committee
CEF	Connecting Europe Facility
CEN	European Committee for Standardization
CENELEC	European Committee for Electrotechnical Standardization
D3.1	Deliverable 3.1 "Guidelines to the assessment of the sustainability and maturity of building blocks"
DIGIT	Directorate-General for Informatics
DNS	Dynamic Name Server

DSI	*Digital Service Infrastructures*
DSS	*Digital Signature Service*
ebXML	*Electronic Business XML*
e-CODEX	*e-Justice Communication via Online Data Exchange*
EIA	*European Interoperability Architecture*
eIDAS	*Draft Regulation "on electronic identification and trusted services for electronic transactions in the internal market"*
EIF	*European Interoperability Framework*
EIRA	*European Interoperability Reference Architecture*
EN	*European Standard*
epSOS	*Smart Open Services for European Patients*
EU	*European Union*
EU-PL	*European Union – Public License*
e-SENS	*Electronic Simple European Networked Services*
ETSI	*European Telecommunications Standards Institute*
(F)RAND	*(Fair) reasonable and non-discriminatory*
IEC	*International Electrotechnical Commission*

IETF	*Internet Engineering Task Force*
IPR	*Intellectual Property Rights*
ISA	*Interoperability Solutions for European Public Administrations*
ISO	*International Organisation for Standardization*
ITU	*International Telecommunication Union*
LSP	*Large-Scale Pilot*
OASIS	*Organisation for the Advancement of Structured Information Standards*
PDF	*Portable Document Format*
PEPPOL	*Pan-European Public Procurement Online*
REST	*Representational State Transfer*
SAT	*Solution Architecture Template, provides detailed EIRA implementation. A SAT is sub-set of the building blocks of the EIRA. The term SAT is used in this document as equivalent of High Level Building Block (HBB) in other WP 3 documents. In the CEF programme it is comparable to the term DSI, though not exactly the same*
SBB	*Solution BB*
SBDH	*Standard Business Document Header*
SLA	*Service Level Agreement*
SPOCS	*Simple Procedures Online for cross-border Services*
STORK (2.0)	*Secure Identity Across Borders linked (2.0)*

T3.2	*Task 3.2 of Work Package 3 focuses on the sustainability assessment of the building blocks that e-SENS will consolidate.*
Ten-Tele Regulation	*Regulation of the European Parliament and of the Council on "Guidelines for trans-European telecommunications networks" (part of the CEF)*
W3C	*World Wide Web Consortium*
WP2	*e-SENS Work Package 2 "Communication and Marketing*
WP3	*e-SENS Work Package 3 "Sustainability and Long-Term Governance"*
WP4	*e-SENS Work Package 4 "Project Legal Expertise Centre"*
WP5	*e-SENS Work Package 5 "Piloting"*
WP6	*e-SENS Work Package 6 "Building Block Provision"*
XML	*eXtensible Markup Language*

Table 1: Abbreviations

Executive Summary

The e-SENS project - Electronic Simple European Networked Services - focuses on strengthening the Single Market by facilitating public services across borders. In the previous and on-going LSPs (STORK, PEPPOL, e-CODEX, SPOCS, epSOS) technical building blocks have been developed and piloted, enabling seamless cross-border services that cover all the various challenges and requirements that were faced. The purpose of e-SENS is to consolidate and improve the work done by the previous LSPs, by industrialising the solutions and extending their potential to new domains. Within this context, the goal of e-SENS Work Package 3 – Sustainability and Long-term Governance is to pave the way for the sustainable usage and long-term governance of the e-SENS BBs to achieve the interoperability of public services across all European Member States and Associated Countries. Also, task 3.2 of Work Package 3 focuses on the assessment of the BBs that e-SENS will consolidate. This assessment focuses on the maturity and long-term sustainability of BBs. These BBs will be handed over to the Connecting Europe Facility (CEF).

The objective of this document is to present sustainability plans for maintenance of the e-SENS building blocks after the timespan of the project. The focus is in principle on the building blocks developed in the eSENS project that have not been covered under the Deliverable 3.7.v.1. However, specifically the focus is on the building blocks clustered in SAT e-ID and in SATs   e-Documents, Trust Establishment, Non-repudiation and Traceability and Semantics. For SAT e-ID and its ABBs, the document briefly describes the current maturity status, the future owner responsible for the maintenance, the type of ownership and sustainability actions to be taken by the owner to maintain the BB after the timespan of the e-SENS project, and for other SATs the document briefly describes the related ABBs (that are not covered by Deliverable D3.7 v1) and a short assessment on their maturity status and uptake recommendation The main target group for this document is the DGs of the EC that are active with setting up the CEF. As the CEF already maintains and stimulates a few DSIs that are closely related to some of the e-SENS SATs, this document looks at the current status of these DSIs and of the DSIs that will be further uptake by the CEF The document makes statements on the way the e-SENS building blocks are already adopted in these DSIs and how this can be improved. Moreover, this document details comprehensively the owners of the e-ID SAT and the possibility of other EU projects that can/will take over the matured SAT. Also, the document reveals an important aspect of sustainability and take-over: the types of BB owners and a clear description of what BB ownership means regarding responsibilities and expectations.

Regarding the maturity of the SAT e-ID and its building blocks we can mention that the e-SENS project already succeeded in partly sustaining the SAT e-ID. The SAML specifications of the ABB Authentication Exchange Protocol are widely used in the CEF e-ID DSI that is already defined. So this part has been taken over and augmented by the CEF community. A next challenge for the maintenance and adoption of the e-SENS specifications is the development of a good interoperability solution between the e-SENS PEPS nodes that are currently in use and the eIDAS nodes that have been defined by the CEF. In addition to that, one of the main concerns is for the change management of the underlying ABBs to be

taken up by the CEF and continued after 2020. This will be assured by defining a good transfer towards the long-term sustainability organization defined by the e-SENS deliverable D3.4v4.

Regarding the SAT Trust Establishment, the authors see fit that further augmentation should take place within CEF (after hand over). The **ABB Trust Network - Mutual recognized Certificates** is mature as it was implemented in piloting scenarios in eHealth, e-Justice and Business Lifecycle piloting domains.

The ABB Trust Network PKI is sufficiently mature as it was implemented in piloting scenarios in eProcurement use cases.

ABB Trust Network - Trust service Status List cannot be considered mature as there are no technically ready pilot implementations.

Regarding the SAT e-Documents, the targeted ABBs are not mature yet according to both WP6 and WP3 methodology and since there were not used in any of the pilot areas yet. Hence, it needs further development, e.g. in a next H2020 project or an EC program like ISA2, or further adoption under CEF programme.

Regarding the SATNon-repudiation and Traceability ,it could be considerd mature since it was deployed in several pilot implementations and it could be further uptaken by CEF.

Regarding SAT Semantics, it is technically ready in both the eProcurement and Business Lifecycle pilots. These pilots share the common need to define mapping between typologies of documents that are required in business service related or e-Procurement procedures.

The SAT Semantics could be consideredmature since it was deployed in pilot implementations and it can be further uptaken by CEF.

An overall conclusion of these sustainability plans is that most of the SATs and their ABBs are sufficiently mature to be used, maintained and/or augmented by the CEF community, in general, and by specific DGs that lead the CEF, in particular.

1. Introduction

1.1. Scope and Objective of Deliverable

The objective of this document is to present sustainability plans for maintenance of the e-SENS building

blocks after the timespan of the project. The focus is in principle on the building blocks developed in the eSENS project that have not been covered under the Deliverable 3.7.v.1. However, specifically the focus is on the building blocks clustered in SAT e-ID and in SATs   e-Documents, Trust Establishment, Non-repudiation and Traceability and Semantics. For SAT e-ID and its ABBs, the document briefly describes the current maturity status, the future owner responsible for the maintenance, the type of ownership and sustainability actions to be taken by the owner to maintain the BB after the timespan of the e-SENS project, and for other SATs the document briefly describes the related ABBs (that are not covered by Deliverable D3.7 v1) and a short assessment on their maturity status and uptake recommendation. The main target group for this document is the DGs of the EC that are active with setting up the CEF. As the CEF already maintains and stimulates a few DSIs that are closely related to some of the e-SENS SATs, this document looks at the current status of these DSIs and of the DSIs that will be further uptake by the CEF The document makes statements on the way the e-SENS building blocks are already adopted in these DSIs and how this can be improved. Moreover, this document details comprehensively the owners of the e-ID SAT and the possibility of other EU projects that can/will take over the matured SAT. Also, the document reveals an important aspect of sustainability and take-over: the types of BB owners and a clear description of what BB ownership means regarding responsibilities and expectations.

. The document makes statements on the way the e-SENS building blocks are already adopted in these DSIs and how this can be improved.

1.2. WP3 "Sustainability and Long-Term Governance" and Task 3.2 "Sustainability of building blocks"

e-SENS Work Package 3 "Sustainability and Long-Term Governance" concerns the long-term consolidation and maintenance of the technical solutions developed within e-SENS. In this regard it will prepare the path towards a sustainable infrastructure for interoperable electronic cross-border services. Governance, policies and agreements on the organisational as well as political and legal level need to be taken into account.

Task 3.2 "Sustainability of building blocks" of WP3 focuses on the sustainability of the BBs that are developed by e-SENS for their maturity and long-term sustainability within the "Connecting Europe Facility" (CEF). This document focuses on the sustainability plans for the maintenance of the building

blocks after the timespan of the e-SENS project.

1.3. Methodology of Work

The sustainability plans are based on

- The building block maturity assessments that have been performed during the project;

- Input from WP6 on the technical maturity and handover of building blocks to the CEF;

- Interaction with the DGs that are responsible for the adoption of the building block DSIs.

1.4. Relations to Internal e-SENS Environment

Cooperation with WP6 is very important and have been maintained throughout the e-SENS project. The technical assessments done in WP6 as well as the handover activities to the CEF are used as input for the sustainability plans in WP3.

1.5. Relations to External e-SENS Environment

The relations with the external e-SENS environment can be found in external stakeholders that have a role in the further adoption of the BBs. Various types of those stakeholders can be distinguished, such as the CEF DGs of the European Commission, standardisation organisations, IT industry, public administrations in the various EU countries, etc. For each of the assessed BBs that have been found mature enough, it can be decided within the e-SENS project how to further promote the adoption of these BBs towards these stakeholders. Interaction with the DGs that are responsible for the adoption of the building block DSIs are used as input for the sustainability plans in WP3.

1.6.   Quality Management

This section describes the process used to ensure the quality of the deliverable.

Category	Remarks	Checked by
Conformance to e-SENS template	OK	WP3M
Language & Spelling	OK	WP3M

Delivered on time	A delay request has been made.	WP3M
Each technology description contains the correct elements	OK	WP3M
Consistency with description in the TA and in other e-SENS deliverables	OK	WP3M
Contents is fit for purpose	OK	WP3M
Contents is fit for use	OK	WP3M
Commitment within WP	OK, final remarks can be made in the 1st review cycle.	WP3M

Table 2: Quality Checklist

1.7. Risk Management

This section describes the process used for effective risk management. It summarises the risks identified for creating this deliverable and includes: identifying risks, risk analysis, risk assessment and defining responses and risk owner.

Description	Probability	Impact	Priority	Response	Owner
Low involvement of partners working in the project	low	medium	medium	**Approval of WP3 structure and task division**	**WP3 leader, T3.2 leader**
Limited resources and time against high expectations and unforeseen work	medium	high	high	**Prioritization of the tasks and responsibilities, which need to be carried out**	**WP3 leader, T3.2 leader**
Contributions by the partners are not delivered in time/the deadlines are not met	medium	high	medium	**Controlling timeline and reminding the partners to meet the deadlines/ monitoring the delivery**	**T3.2 leader**
Contributions by the partners do not have the sufficient quality and quantity	medium	high	high	**Monitoring of the development process of the deliverable and iterating the document**	**T3.2 leader, WP3 leader**

Analysis of the given information is not detailed enough	medium	high	high	Drafting a table of content and formulation of guidelines and expectations	T3.2 leader, WP3 leader
Interaction with other work packages is minimal	high	medium	medium	Maintain the relationship with WP6 as best as possible and ask for input/review	T3.2 leader, WP3 leader

Table 3: Risks

1.8. Legal issues

No legal issues have been identified for the work described in this document.

1.9. Structure of the document

The document is structured into eight chapters.

Chapter 1 describes the rationale for drafting the deliverable, defines how the work was planned and completed, and the methodology it followed. It describes where the work fits, in relation to other deliverables in WP3 and the relation to the external environment of e-SENS.

Chapter 2 focuses on the methodology of work and framework that were used, the main aspects of the sustainability plans and BB maturity level. Further on this matter, the chapter talks about BB owners and ownership type.

Chapter 3 describes the sustainability plan for SAT e-ID, their current maturity, future ownership and also recommendations for future owners.

Chapter 4 briefly describes SAT e-Documents, respectively ABB Documents Annotation and ABB Business Rules Integration, followed by recommnedation for further uptake.

Chapter 5 briefly describes SAT Non-repudiation and Traceability, respectively ABB Non-repudiation and ABB Timestamping, followed by recommendation for further uptake.

Chapter 6 briefly describes SAT Semantics, respectively ABB Semantic Mapping Service, ABB Base Registry Identification and Access, ABB Core Vocabulary-Based Data Modelling and ABB Domain Specific Vocabulary Definition, followd by recommendation for further uptake.

Chapter 7 briefly describes SAT Trust Establishment, respectively ABB Trust Network - Mutual recognized certificates, ABB Trust Network - PKI and ABB Trust Network - Trust Service Status List, followed by recommendation for further uptake.

Conclusions and recommendations are found in the "Conclusion"- section of the document (Chapter 8).

A list of references is added in the annex of this document.

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[1] http://wiki.ds.unipi.gr/display/ESENS/SBB+-+Minder+-+0.6.0

2. Methodology and framework

In order to define the sustainability plans for each of the building blocks a number of steps have been followed that are briefly described in the next section. After that, the three main aspects of the framework will be described that will be used to describe the sustainability plans, namely the kind maturity levels, the possible owners of building blocks and the type of future actions that can be taken. Finally, this chapter describes a brief sustainability plan of the entire EIRA itself and the WIKI tool that has been generated during the e-SENS project.

2.1. Methodology used

The first step in the methodology used consisted of the selection of the building blocks. An important aspect was at which building block level to describe the future sustainability plans, i.e. HBBs, SATs, ABBs, SBBs, etc. It seemed logical to start with the cluster or HBB/SAT level as the amount of such areas of building blocks is relatively limited to less than 10. Furthermore, the focus has been put on the description of sustainability of the ABBs within a SAT, as they are the specifications to be maintained for the future. The SBBs are therefore out of scope, as they are example implementations of the ABBs and in the future other implementations might arise.

As a second step, the main SATs have been selected based on their current maturity, adoption and potential usage and based on thier non-inclusion in the Deliverable 3.7 version 1. Therefore, the focus has been put on the SATs eID, eDocuments, Trust Establishment, Non-repudiatio and Traceability and Semantics as the vertical areas of building blocks to be used in various domains .

To draw up the sustainability plans for each SAT, a number of steps have been taken for each SAT. Firstly, we analysed each SAT on a general level. The maturity of each SAT has been reviewed, using e-SENS maturity assessment cycles as described in the two deliverables of D3.2 and input from WP6 on maturity, as well as assessments from the EU Multi Stakeholder Platform (MSP) on ICT Standardization, the Large Scale Project STORK and the CEF DSI's. Secondly, the community sustainability of the SATs has been described by giving an overview of the current stakeholders and owners of the SAT. This has been done in close cooperation with the authors of deliverable D3.4v4, which will describe the different BB and domain communities in detail. On the basis of the inventoried maturity and the current sustainability of the community, a proposal for a future owner of the SAT was then formulated and recommendations for future actions to assure the middle-term sustainability of the SAT were given.

Next, the SAT was analyzed in more depth. For each SAT the underlying ABB's and standards were identified using the eSENS Generic Architecture Repository on the WP6 WIKI. For each ABB and standard, the current maturity, future ownership and recommendations for further actions were described according to the same method as for the SAT itself. Together the recommendations for future owners on the general and on the ABB / standard level form the sustainability plans for each SAT. Each sustainability plan has been discussed with the DG from the EC that is responsible for the adoption of the corresponding building block DSI's [PLANNED].

Finally, a note on the difference between HBBs, SATs and CEF DSIs needs to be made, as these terminologies are closely linked, but can also be the cause for confusion.

This deliverable used the term SAT in order to make the transfer the results of WP6 to this deliverable easier. HBB is a term that can be used for communication purposes, as this is a less technical description. HBB and SAT do not differ that much in essence. So far in e-SENS WP3 focused on no other HBBs than e-Delivery, e-ID, e-Signatures and e-Documents for measuring sustainability. WP6 has

defined more SATs than the aforementioned four in the WIKI. More details on SATs can be found in this deliverable.

Nevertheless, it is noted that there was initially a discrepancy between SATs and CEF DSI. SAT has been defined in e-SENS and encompasses more ABBs than in the CEF DSIs. In the meantime, the eSENS metamodel for building block description has been adopted by the CEF for the description of its DSIs. So, part of this discrepancy has been solved.

In order to be complete, also the term 'trusted services' exist. This is a legal term used in the eIDAS regulation. The eIDAS Regulation introduces mutual recognition of e-identification means and various kinds of electronic trust services, i.e. e-signatures, e-seals, e-registered delivery services, time stamping, e-documents, and website authentication.

2.2. Main aspects of the sustainability plans

The sustainability plans consists of three main aspects, which are the current maturity of the building block, the possible future owners and types of ownership of the building block and the possible future actions to be taken.

2.2.1. Maturity levels

With respect to the maturity levels of a building block, there are various models being used in the work packages of e-SENS as well as outside the project. These models either focus on the technical, the business or the sustainability point of view or a combination of them. It is not the objective of this document to define a new maturity model or to try to combine the various models into a new one. Therefore, we simply distinguish various logical and intuitive kinds of maturity levels that are distinguished like the following:

- In development

- Fully developed

- In use

- In use in one or more single domains

- In use cross-domain

- Already maintained by organization

2.2.2. Owners and type of ownership

With respect to the type of owners and the types of ownership of a building block, we build on the e-SENS IT Governance Model that is described in deliverable D3.4v3 [5]. In that deliverable, the following picture describes the ecosystem and the environment of a long-term governance model for the e-SENS results: .

In the long-term, the e-SENS building blocks, i.e. SATs and their ABBs, are maintained in the (Common) Building Block Communities. In these communities, three types of actors are distinguished:

· DG, from the European Commission that are concerned with the policy issues around a BB,SDO, which is concerned with the standardization activities of specifications used in the BB.

· SP, which is a service provider that is concerned with the operational issues around the provisioning and maintenance of the BB, and[WK(I62]

Based on these actors, we distinguish the following type of owners and possible specific owners, which are relevant in the mid-term (after the end of e-SENS) and may also, play a role in the long-term (beyond 2020):

- European Commission, that is the prime owner of the common building blocks developed within e-SENS. Various parts of the EC can be the specific owner of SATs or BBs, such as the CEF program, DG Connect, DG DIGIT, the eIDAS Task Force, CIPA, etc.

- International standardization organizations, which are the prime owner of the standards that are being used in the various building blocks. Specific standardization organizations that are targeted are the 3 EU SDOs CEN, Cenelec and ETSI, but also international non-formal organizations like W3C and OASIS.

- New EU projects that succeed the e-SENS project, which can adopt building blocks that are not yet mature enough for deployment and need further development. These projects do not own [E3] the building blocks but take care of further development and piloting with the involvement of a wide variety of EU stakeholders. Maintenance of these building blocks is not yet at hand and can be arranged for at a later stage.

As described in deliverable D3.4v3 [5], ownership of a BB means that the BB community is able to (and aims to) deliver public electronic services or cross-domain BBs, and cooperate with other communities

in the joint governance model.

From the experiences gathered in multiple Large Scale Pilots and in the course of e-SENS, ownership means that each community

1. is able to **operate and deliver**, meaning either handling the development and support for a BB, or providing public electronic services that rely on these BBs, usually via service providers and other industry players in the field.

2. is able to **influence decisively the policy making** in its field at the EU level, for instance via a strong commitment or ownership of one (or more) EC DG in the field.

3. has a clear and known **responsible entity**, which is efficient and pro-active and acts as a first contact point to facilitate contacts. It should have a good knowledge and vision of the stakes and works of the whole community to efficiently route information. A possible option is to set up a permanent secretariat.

4. **involves interested experts** in defining the evolution of the community, including interested MS, Standardization Organizations and sometimes (public) users representatives, to ensure societal, technical and organizational (in one word: political) relevance of the community actions.

2.2.3. Type of actions for future owners

With respect to the type of actions that are proposed, we distinguish between the following:

- Define a new initiative for further development of the building block

- [WK(I65] Bring the building block towards a standardization organization

- Stimulate and act within the standardization community

- Involve stakeholders to use the building block

- Involve companies that need to implement building block

- Organize communication for adoption of the building block

Obviously, the lists of maturity levels, type of owners and type of actions might not be complete, but they give a basic overview of the possibilities. For each specific building block different specific possibilities might be identified.

2.3. Sustainability of eSENS RA and the SATs

The European Interoperability Reference Architecture (EIRA) is an instrument defined and maintained by the ISA program to implement the European Interoperability Framework (EIF). It defines the most important architectural building blocks needed to develop interoperable digital public services and provides a common terminology that can be used by architects, portfolio managers, analysts, and other stakeholders. The EIRA is currently presented in Joinup (https://joinup.ec.europa.eu/asset/eia/description).

In line with the EIRA defined by ISA, the eSENS project has worked out the eSENS Reference Architecture. Detailed implementation of the eSENS Reference Architecture is provided by Solution Architecture Templates (SATs). A SAT is sub-set of the building blocks of the EIRA, which focuses on the most widely used building blocks such as eID, eDelivery, and others, that are needed to build an interoperable solution addressing a particular interoperability need. The SATs and ABBs are provided on the e-SENS WP6 Building Blocks WIKI (http://wiki.ds.unipi.gr/display/20150515ESENS/WP6+-+Building+Blocks).

The eSENS RA and its extending SATs need continuous update and maintenance. As an example, the SATs have to reflect continuous changes in their underlying legislation, standards, and infrastructure. Another example of this need is the Document Provisioning ABB of the e-Document SAT , discussed on Chapter 6 of the current document.

To ensure sustainability of the eSENS RA and its extensions, an underlying development and maintenance organization, financial backing, operating procedures, sustainability plans, etc are needed. In this respect, the eSENS RA and its extending SATs may be seen as yet another type of building blocks, albeit a very general ("umbrella") one. Therefore, it should be governed according to the governance models proposed for the other building blocks. In particular, its long-term governance structure should reflect the proposals given in the e-SENS deliverable D3.4v3, Preliminary Proposal for a governance body – Instruments.

3.Sustainability plan for e-ID BBs

3.1.Objective

The chapter describes the sustainability plan for the SAT e-ID as well as all the BBs that are used in this SAT and that were not addressed in the first version of this deliverable.

3.2. SAT e-ID

This SAT makes use of the following ABBs (see: http://wiki.ds.unipi.gr/display/ESENS/SAT+-+eID+-+1.0):

- Cross-Border Authentication
- Cross-Border Attribute Provision
- Cross-Border Mobile ID Integration
- Local Attribute Provision

The first three ABBs are all developed and in line with Stork2.0 building blocks and the last one is Smart-Card related ABB. The ABBs addressed in this deliverable are the Attribute Exchange Protocol and Attribute Exchange Forward ABBs under Cross-Border Attribute Provision and **Local Attribute Retrieval and Mapping** under the Local Attribute Provision ABB, respectively. The relationship with the eIDAS specifications and specifically the eIDAS node is explained in more detail per ABB below.

3.3. Current maturity

With respect to the maturity of the SAT e-ID and its building blocks we can mention that the basic specifications have been developed in the STORK projects and the e-SENS project has further developed the EIRA for e-ID based on these documents to make them more mature and pilotable. A sustainability maturity assessment in e-SENS D3.2v1 showed that the Authentication Exchange Protocol SAML and the Quality Authentication Assurance building block are already mature enough to be piloted and further adopted by stakeholders. The maturity of the Authentication Exchange Forward is also at a level that several stakeholders use it. The relevant STORK specifications are the following:

● The D5.8.1c Software Design deliverable of STORK 1.0 describes in detail the exchanging message mechanism (chapter 2.6.1 Authentication Engine). STORK 2.0 uses the same mechanism with some modifications on signature standards and with extra features (Document Transfer Layer) and attribute handling;

● STORK 1.0 SAML Engine https://www.eid-stork.eu/index.php?option=com_pro-cesses&Itemid=&act=streamDocument&did=961 ;

● STORK 2.0 Deliverable D4.9 Final Version of Functional Design_Final (chapter 3 Functionali- ties of processes) https://www.eid-stork2.eu/index.php?option=com_phocadown-load&view=file&id=66:d49-final-version-of-functional-design&Itemid=174&start=5 ;

● STORK Deliverable D4.10 Final version of Technical Design https://www.eid-stork2.eu/in-dex.php?option=com_phocadownload&view=file&id=71:d410-final-version-of-technical-de-sign&Itemid=174&start=10 .

In the meantime, the CEF has partly picked up the STORK-based e-SENS specifications on e-ID and pushed it towards a CEF building block. This is is maintained at the JoinUp website in the catalogue of CEF building blocks: https://joinup.ec.europa.eu/community/cef/og_page/catalogue-building-blocks. In addition, a legal framework on electronic Identification and Signature (eIDAS Regulation) has been developed by the member states to legislate the regulatory measures to be taken when exchanging electronic IDs and signatures.

The CEF eID solution can be found on JoinUp and contains also an eIDAS technical specifications document that describes the technical foundations for the regulatory framework (see https://joinup.ec.europa.eu/software/cefeid/release/all). In this technical specification document, the concept of an eIDAS node is described that is closely aligned to the SAML specifications of OASIS. Some of the MSs heavily invest in STORK2.0 infrastructure and due to various reasons they both want to keep their situation while still being able to interoperate with other MSs that will use eIDAS node. Hence, there is a need for an adaptor solution for the interoperability between existing e-SENS PEPS nodes and the eIDAS node that will be developed by e-SENS. There is therefore a need for further alignment between the eIDAS technical specifications and the e-SENS specifications, best achieved through extending current e-SENS e-ID BB, which supports only STORK2.0, with eIDAS node. An eIDAS/STORK plug-in (adaptor) was developed and made available. Two countries using STORK infrastructure, Greece and Iceland, successfully tested this plug-in. In the meantime, the first cross-border, eIDAS compliant connections have been achieved by e-SENS Citizen Lifecycle/eAgriculture domain. Germany, the Netherlands and Austria have successfully connected their electronic identification and authentication infrastructure.

3.4. e-SENS Community sustainability

As mentioned, the SAT e-ID specifications are mostly based on the STORK specifications. From an implementation point of view we can state that they are implemented in a number of STORK 2.0 pilots:

● In 6 Member States a framework has been developed for an interoperable service allowing foreign citizens (using their eID credentials) to notify all relevant entities of an address change. This was achieved without modifying current procedures in each Member State;

● 12 Member States have integrated STORK with the European Commission Authentication Service (ECAS). This integration allowed citizens from those Member States to use their nationally issued eIDs to access electronic services provided by the European Commission;

● 5 Member States are currently using the STORK solution in their e-Delivery applications, allowing citizens from other Member States to access the service with their own eID credentials;

● In 5 Member States foreign students can access online administrative and academic services offered

by European Universities with their eID;

● 10 Member States allow foreign citizens to register for social security with their eID credentials.

●2 Member states successfully tested the eIDAS/STORK plug-in

●   3
Member states have successfully connected their electronic identification and authentication infrastructure by making the first eIDAS compliant connection

Consequently, there is already a good implementation basis that is needed for long-term sustainability. It is important that these member states and the specific stakeholders active in these pilots are involved in the sustainability organization that needs to be set-up for the long-term maintenance of the e-ID building blocks.

3.5. Future ownership

With respect to future ownership of the SAT e-ID, we state that the future owner will most probably be the CEF e-ID. The details will be given in deliverable D6.5 on transfer of operation and ownership. The owners and solution providers of the CEF eID DSI will be the respective persons within DG Connect and DIGIT that maintain this building block. However, the domain specific services that use this building block need to be actively involved in the community to help shape its development and reflect current political priorities across Europe.

The (technical) ownership of the technical specifications is already provided outside e-SENS, such as OASIS for SAML https://www.oasis-open.org/standards#samlv2.0 and https://www.oasis-open.org/standards#spmlv2.0. The ownership of the SAML profiles to fulfill the authentication exchange protocol is not yet clear. The ownership of the Quality Authentication Assurance is now in the hands of STORK, and we would advise that this building block should be maintained by the CEF eID DSI owner after the lifetime of the e-SENS project.

3.6. Recommendations for future owners

We recommend future owners should encourage input from all stakeholders (including the domains that use this e-ID building block), resulting in the community acting as the owner of the e-ID building block. The future owners must make sure there will be continuity in management and maintenance of the building block.

The following actions can be taken to further improve on the maintenance of the SAT e-ID in general as developed by e-SENS:

● Choose one SAML profile for all implementations so that standardization is reached on that level

● Ensure continuity for the ABBs and SBBs and allow for a proper requirements and change management process.

The following actions can be taken to further increase adoption of the e-ID building block:

● Roadshow;

● Further piloting, also after the e-SENS pilots have ended;

● Proving and publicizing the utility of the building block to promote uptake/use by as many suitable domains as possible;

● Use a big launching customer, such as customs with their UUM-DS implementation. In the following subsections, more details will be provided of the future sustainability of the specific ABBs.

● Invite countries using STORK infrastructure to test and deploy the eIDAS/STORK plug-in solution

The sustainability plans in detail for the remaining ABBs of the SAT e-ID that were not addressed in the first version of this deliverable are given in the following sections:

STORK2.0 Related BBs:

ABB Cross-Border Attribute Provision - Attribute Exchange Protocol

This ABB addresses the protocol used to forward query and get replies from the IdP and the AP during a cross-border attribute exchange procedure (and after an authentication procedure). It provides the protocol profile to transport the attribute query (attribute request) and the attribute values (attribute response) from the SP in a member state A and the IdP in a member state B and an AP in a member state C. The ABB uses STORK2.0 SAML protocol which is based on the OASIS SAML2.0 (Secure Assertion Markup Language) standard [OASIS, 2008, Security Assertion Markup Language (SAML) V2.0 Technical Overview] specifications.

Current maturity

Technical and business maturity has been reached and the building block is in use cross-domain and the ABB is mature according to WP6 methodology. It is maintained by the European Commission, specifically by DG DIGIT and the CEF under eIDAS node specifications but mainly on a subset of the supported attributes and functionalities of the ABB using a modified version of the STORK SAML profile.

Future ownership

Although STORK2.0 eID has been handed over to e-SENS mainly for security sustainability and interoperability assurance of STORK2.0 PEPS/MW nodes with the eIDAS nodes, the owner of this ABB D3.7 Sustainability plans for e-SENS building blocks 36 is already DG DIGIT, more precisely the CEF, and a modified version of the STORK2.0 profile is included in the CEF eID DSI.

Future Actions

Involve International Organization for Standardizations for further improvements and standardization of the ABB.

Collaborate with the CEF for the extension of the eIDAS node specifications on the supported attributes and functionalities. There is a provision for the node technical specifications in the implementation act on the interoperability framework and specifically at Article 8 "Message format for the communication" (d) flexibility to meet the needs of additional attributes relating to identification. Therefore, more attributes related to identification can be integrated without changing the regulation.

ABB Cross-Border Attribute Provision - Attribute Exchange Forward

This ABB is concerned with the forwarding of Attribute requests and response from/to the service provider to/from the Attribute Provider. It provides the service of forwarding the Attribute request and the Attribute Response between the SP in a member state A and the IdP in the member state B. The key point to achieve a secure transmission to allow confidential and robust channels to exchange attribute information is the achievement of proper trust between the PEPS infrastructure components (namely, C-PEPS and S-PEPS). The specifications are being maintained in the WIKI of e-SENS:

Current maturity : mature according to WP6 methodology

The current maturity of the ABB Attribute Exchange Forward, when considering the technical secure infrastructure, is very mature and in-use .

Future ownership

The European part of the eIDAS node will preferably be owned by DG DIGIT under the CEF eID DSI. All member states will own their own part to communicate with this European component, so the ownership will be divided into several owners. The governance question will be who will coordinate this within the eID community and maintain the relationship at the interface between the owners. In the e-SENS deliverable for long term governance (D3.4v3) more information is given how to organise this in the long term. The eID community will be free in the way they would like to organise this, as long as they meet the requirements set by the overall coordination structure.

Future Actions

Define service level agreements between a member state and the EU that is in line with the SLA that is developed by DG DIGIT as the owner of the eIDAS node reference implementation.

Smart Card Integration Related BBs:

ABB Local Attribute Provision - Local Attribute Retrieval and Mapping

The Local Attribute Provider Architecture Building Block enables arbitrary client components to request identity attributes from different kind of smartcards ranging from notifiable eIDs to sector specific cards (e.g. electronic health cards) that were issued by different countries or organisations. The Local Attribute Provider Building Block complements cross-border Remote Attribute Providers when there is no such service due to lack of adoption or cannot provide the information required.

Information that is retrievable using the Local Attribute Provider Architecture Building Block can be used to uniquely identify persons as well as to retrieve further information if authorization is given.

Two modes of operation are provided by the building block: Retrieval and mapping of unauthenticated as well as authenticated identity attributes. When using the latter all attributes will be digitally signed by using the signature capability of the smartcard (if available).

These two operations realized by Local Attribute Retrieval and Mapping Feature and Local Authentication Feature:

The **Local Attribute Retrieval and Mapping Feature** addresses a generic function that enables its user to request and retrieve identity attributes from different smartcards in a consistent way and format without the need to further investigate on card specific aspects. Smartcard specific configuration data is defined for each of the supported cards. It contains information on how to identify certain smartcard types, how to retrieve identity information (e.g. from what Elementary File) and how to map or convert those identity information consistently onto a common set of predefined attributes.

The **Local Authentication Feature** extends the Local Attribute Retrieval and Mapping by vouching for the Identity Attributes through the electronic signature of the card holder. The signature is created through the cryptographic means provided by the smartcard.

Current maturity

Local Attribute Provider has not been assessed in the e-SENS deliverable "D3.2 Assessment on the maturity of building blocks: second cycle", therefore maturity of the BB has been evaluated according to WP6 inputs. Technical maturity has been reached and the building block is **in use in one or more single domains.**

Future ownership

The Local Attribute Provision ABB artefacts were created in and are currently maintained by e-SENS arising from the e-Health pilot domain needs.

With respect to future ownership of the SAT e-ID, we foreseen that the future owner will most probably be the CEF e-ID.

Future Actions

-Bring towards standardization: The ABB specification has been developed under WP5 on the other hand standardization efforts should be taken into account as well. Reference architecture currently does not offer a specification library for this ABB.

-Investigate possible candidate for piloting countries and develop further possible use cases.

Federated eSigning :

This ABB is not mature yet according to both WP6 and WP3 methodology. Hence , it needs further development, e.g. in a next H2020 project or an EC program like ISA2.

Mobile eID Integration:

This ABB is not mature yet according to both WP6 and WP3 methodology. Hence, it needs further development, e.g. in a next H2020 project or an EC program like ISA2.

4.3. Conclusion: e-ID sustainability plan

The e-SENS project already succeeded in partly sustaining the SAT e-ID. The SAML specifications of the ABB Authentication Exchange Protocol are widely used in the CEF e-ID DSI that is already defined. So this part has been taken over and augmented by the CEF community. A next challenge for the maintenance and adoption of the e-SENS specifications is the development of a good interoperability solution between the e-SENS PEPS nodes that are currently in use and the eIDAS nodes that have been defined by the CEF. In addition to that, one of the main concerns is for the change management of the underlying ABBs to be taken up by the CEF and continued after 2020. This will be assured by defining a good transfer towards the long-term sustainability organization defined by the e-SENS deliverable D3.4v4.

4. Sustainability plan for e-Document BBs

Brief Description of the ABBs

ABB Document Annotation

Designed initially as a component of the Document provisioning ABB, the e-Document Annotations ABB defines a specific profile to address particular e-Document annotation needs. The specification relies on the Open Annotation (OA) Data Model described by W3C Open Annotation Community Group and refers to a textual comment or a note that is about, or refers to, an e-Document or a segment

thereof, namely an identifiable data element.

The Document Annotation ABB which describes a profile for document annotation, was not used in any of the piloting areas according to ABB readiness and deployment maturity for domain and national pilots, thus we can assume that it has not reached a sufficient level of maturity.

ABB Business Rules Integration

Described as a component of the Document Provisioning ABB, Business Rules Integration ABB aims to provide the means to separate the business knowledge from its implementation in order to manage dynamically the business logic. The ABB recommends the usage of Schematron, a rule-based XML schema language which is an ISO/IEC standard along with XML Path Language (XPath) 2.0 expressions, a W3C Recommendation, in order to serialize and attach to an e-Document many of the business rules defined in that phase.

The Document Annotation ABB provides recommendations for document business rules integration and describing a document using semantic tools. However this ABB was not used in any of the piloting areas thus we can assume that it has not reached a sufficient level of maturity.

6.3.Conclusion e-Documents ABBs sustainability plan

Those ABBs are not mature yet according to both WP6 and WP3 methodology and since there were not used in any of the pilot areas yet. Hence, it needs further development, e.g. in a next H2020 project or an EC program like ISA2, or further adoption under CEF programme.

5.Sustainability plan for Non-repudiation and Traceability BBs

Brief Description of the ABBs:
ABB Non-repudiation

The Non-Repudiation Architecture Building Block enables the four corners of the e-SENS eDelivery model to generate and emit electronic evidence used for non-repudiation purposes, based on each domain respective regulations and technological need. The expected set of evidence emitted is the domain-specific one (e.g., IHE ATNA) and the generic, interoperable one (e.g., ETSI REM) and it may be signed according to the domain needs.

ABB Timestamping

Electronic timestamps, in line with RFC 3339 and 3161, are used for temporal traceability of electronic transactions with evidential value such as log and audit information. Evidences are provided to entities and kept for proof purposes as for capturing the time instant that a given data was produced

(e.g., electronic signatures, documents).

In ePrescription, Business Registration and Activity Registration pilots, the Evidence Emitter ABB component was implemented on a technical readiness level and in eConfirmation pilot the Timestamping ABB was deployed on a technical readiness level thus we can assume that Non-repudiation reached a sufficient level of maturity.

.Conclusion SAT Non-repudiation and Traceabilit

The SAT Non-repudiation and Traceability could be considerd mature since it was deployed in several pilot implementations and it could be further uptaken by CEF

6. SAT Semantics

Brief Description of the ABBs:

ABB Semantic Mapping Service

Semantic Mapping Service ABB, describes the specification of a service which translates terms or concepts between different domains or communities or between different levels of abstraction, completing the agent's knowledge with relevant domain knowledge.

In the scope of e-SENS, the service's conceptual functionality is to provide legal and semantic interoperability, with the provision of legal document equivalence mapping.

For e-SENS use cases, the proposed specifications are: RDF(Resource Description Framework), RDFS(Resource Description Framework Schema), OWL(Web Ontology Language), SPARQL(Sparql Protocol AND Rdf Query Language), ISA Core Vocabularies, SKOS(Simple Knowledge Organization System)

ABB Base registry Identification and Access

Semantic Mapping Service ABB, is an architectural specification of a service which translates terms or concepts between different domains or communities or between different levels of abstraction, completing the agent's knowledge with relevant domain knowledge. In the scope of e-SENS, the service's conceptual functionality is to provide legal and semantic interoperability, with the provision of legal document equivalence mapping.

ABB Core Vocabulary-Based Data Modelling

ABB Core Vocabulary-Based Data Modelling proposes ISA reference process and methodology, published on Joinup, to reach *consensus* on a set of Core Vocabularies (Process and Methodology for Developing Core Vocabularies, 2011), assuring the widest possible participation of the involved parties during the development and later in the adoption phase.

Core Vocabularies are defined in ISA as simplified, extensible and re-usable data models that capture the fundamental characteristics of an entity in a context neutral fashion. They can become the basis of new context-specific data models or they can be mapped to context-specific data models that are

already in use.

ABB Domain Specific Vocabulary Definition

The ABB proposes a centralization of the terminologies and of the vocabularies in order to avoid inconsistencies between applications that use these knowledge assets. Because terminologies can vary in content, structure, and purpose, user requirements terminology differ (real time, decision support, reimbursement,..), storage formats differ (relational database, XML, Graphs…) it is necessary standardized terminology to ensure that content is accessed and distributed consistently.

Conclusions SAT Semantics

SAT Semantics is technically ready in both the eProcurement and Business Lifecycle pilots. These pilots share the common need to define mapping between typologies of documents that are required in business service related or e-Procurement procedures.

The SAT Semantics could be consideredmature since it was deployed in pilot implementations and it can be further uptaken by CEF.

7. Sustainability plan for SAT Trust Establishment

Brief description of the ABBs:

ABB Trust Network - Mutual recognized Certificates

The ABB proposes the use of certificates for digital signatures on service-request and – response messages for purposes of authentication and integrity, for client authentication (e.g. SSL / TLS) and may optionally also be used for encryption of messages. The certificates are exchanged between all members of a Trust Domain (TD) and kept in a trusted Key Store by all TD nodes which mutually must authenticate each other.

The ABB is mature as it was implemented in piloting scenarios in eHealth, e-Justice and Business Lifecycle piloting domains.

ABB Trust Network - PKI

ABB Trust Network - PKI proposes using a single PKI issuing Certificates for all members of a Trust Domain (TD). Certificates are used for digital signatures on service–request and –response messages for purposes of authentication and integrity, for client authentication (e.g. SSL / TLS) and may optionally also be used for encryption of messages. In this model only Issuer certificates are exchanged between all members of a Trust Domain (TD) and kept in a trusted Key Store by all TD nodes which

mutually must authenticate each other.ari

The ABB is sufficiently mature as it was implemented in piloting scenarios in eProcurement use cases.

ABB Trust Network - Trust service Status List

Trust service Status Lists aim at supporting the validation of Qualified Electronic Signatures (QES) and Advanced Electronic Signatures (AdES) supported by a Qualified Certificate (AdESQC) in the meaning of Directive 1999/93/EC as EUMS are obligated to expose actual and historical status information on supervised/accredited CSPs established in their country offering qualified certificates. TLs enable EU-wide validation of service supervision/accreditation status and hence quality of Trust Service Providers (TSPs) issuing (qualified) certificates.

The ABB cannot be considered mature as there are no technically ready pilot implementations.

Conclusion Trust Establishment.

The **ABB Trust Network - Mutual recognized Certificates** is mature as it was implemented in piloting scenarios in eHealth, e-Justice and Business Lifecycle piloting domains.

The ABB Trust Network PKI is sufficiently mature as it was implemented in piloting scenarios in eProcurement use cases.

ABB Trust Network - Trust service Status List cannot be considered mature as there are no technically ready pilot implementations.

8. Conclusions

To help pave the way for sustainable usage and long-term governance of the e-SENS BBs in order to achieve the interoperability of public services across all European Member States and Associated Countries, this document has presented sustainability plans for maintenance of the e-SENS building blocks after the timespan of the project. To this end, an assessment was carried out of the maturity and long-term sustainability of the BBs that e-SENS will consolidate and eventually hand over to the Connecting Europe Facility (CEF).

In principle, the focus has been on the building blocks developed in the eSENS project that have not been covered under the Deliverable 3.7.v.1. However, more specifically, the focus has been on the building blocks clustered in SAT e-ID and in SATs e-Documents, Trust Establishment, Non-repudiation and Traceability, and Semantics.

For SAT e-ID and its ABBs, the document has briefly described the current maturity status, the future owner responsible for the maintenance, the type of ownership and sustainability actions to be taken by the owner to maintain the BB after the timespan of the e-SENS project. For other SATs the document has briefly described the related ABBs, that are not covered by Deliverable D3.7v1, and has provided a brief assessment of their maturity status and uptake recommendation.

The overall conclusion of these sustainability plans is that, generally speaking, most of the SATs and their ABBs are sufficiently mature to be used and maintained by the CEF in general, and by specific DGs that lead the CEF in particular. Only the SAT e-Document needs more comprehensive further development before usage and adoption can be widely stimulated.

For each cluster of building blocks in SATs e-ID, e-Documents, Trust Establishment, Non-repudiation and Traceability, and Semantics the following conclusions on maturity have been reached:

Regarding the maturity of the SAT e-ID and its building blocks, the e-SENS project has already succeeded in partly sustaining the SAT e-ID. The SAML specifications of the ABB Authentication Exchange Protocol are widely used in the CEF e-ID DSI that is already defined. A next challenge for the maintenance and adoption of the e-SENS specifications is the development of a good interoperability solution between the e-SENS PEPS nodes that are currently in use and the eIDAS nodes that have been defined by the CEF. In addition to that, one of the main concerns is for the change management of the underlying ABBs to be taken up by the CEF and continued after 2020. This will be assured by defining a good transfer towards the long-term sustainability organization defined by the e-SENS deliverable D3.4v4.

Regarding the SAT e-Documents, the targeted ABBs are not mature yet according to both WP6 and WP3 methodology and since there were not used in any of the pilot areas yet. Hence, it needs further development, e.g. in a next H2020 project or an EC program like ISA2, or through further adoption under a CEF programme.

Regarding the SAT Trust Establishment, the authors suggest that augmentation should take place within CEF (after hand over). The ABB Trust Network - Mutual Recognized Certificates is mature as it was implemented in piloting scenarios in eHealth, e-Justice, and Business Lifecycle piloting domains. The ABB Trust Network PKI is also considered sufficiently mature as it was implemented in piloting scenarios in eProcurement use cases, whereas the ABB Trust Network - Trust Service Status List cannot be considered mature as there are no technically ready pilot implementations.

Regarding the SAT Non-repudiation and Traceability, it is considered mature since it was deployed in several pilot implementations and could be further supported by CEF.

Regarding SAT Semantics, it is technically ready in both the eProcurement and Business Lifecycle pilots, which share the common need to define mapping between typologies of documents that are required in business service related or e-Procurement procedures. The SAT Semantics is considered mature since it was deployed in pilot implementations and it can be further supported by CEF.

References

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2. http://wiki.ds.unipi.gr/display/ESENSPILOTS