LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG
Ministère de la Digitalisation

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Study on interoperable and standardised eDelivery

Structure of the report

- **Introduction**
- **What is eDelivery?**
- **Current situation**
- **Analysis and insights**
- **Potential solutions**
- **Recommended solutions**
- **Questions**

INTRODUCTION

Purpose of the study

- Analyse current eDelivery solutions and implementations at national and European level
  - to identify legal, organisational, semantic and technical *obstacles and barriers for interoperable eDelivery*
  - to analyse the links and possible *synergies of eDelivery and an API approach*
- Propose solutions to help achieving true interoperability or at least higher interoperability for eDelivery

Objects of study and interviews

Analysis of digital service infrastructures (DSI) using eDelivery

- Peppol (section 2.2)
- SDG OOTS (section 2.3)
- eCodex (section 2.4)
- BRIS (section 2.5)
- Swedish Platform for eDelivery (section 2.6)
- DE4A (section 2.7)
- US Payment Council (section 2.8)

Interviews with domain experts

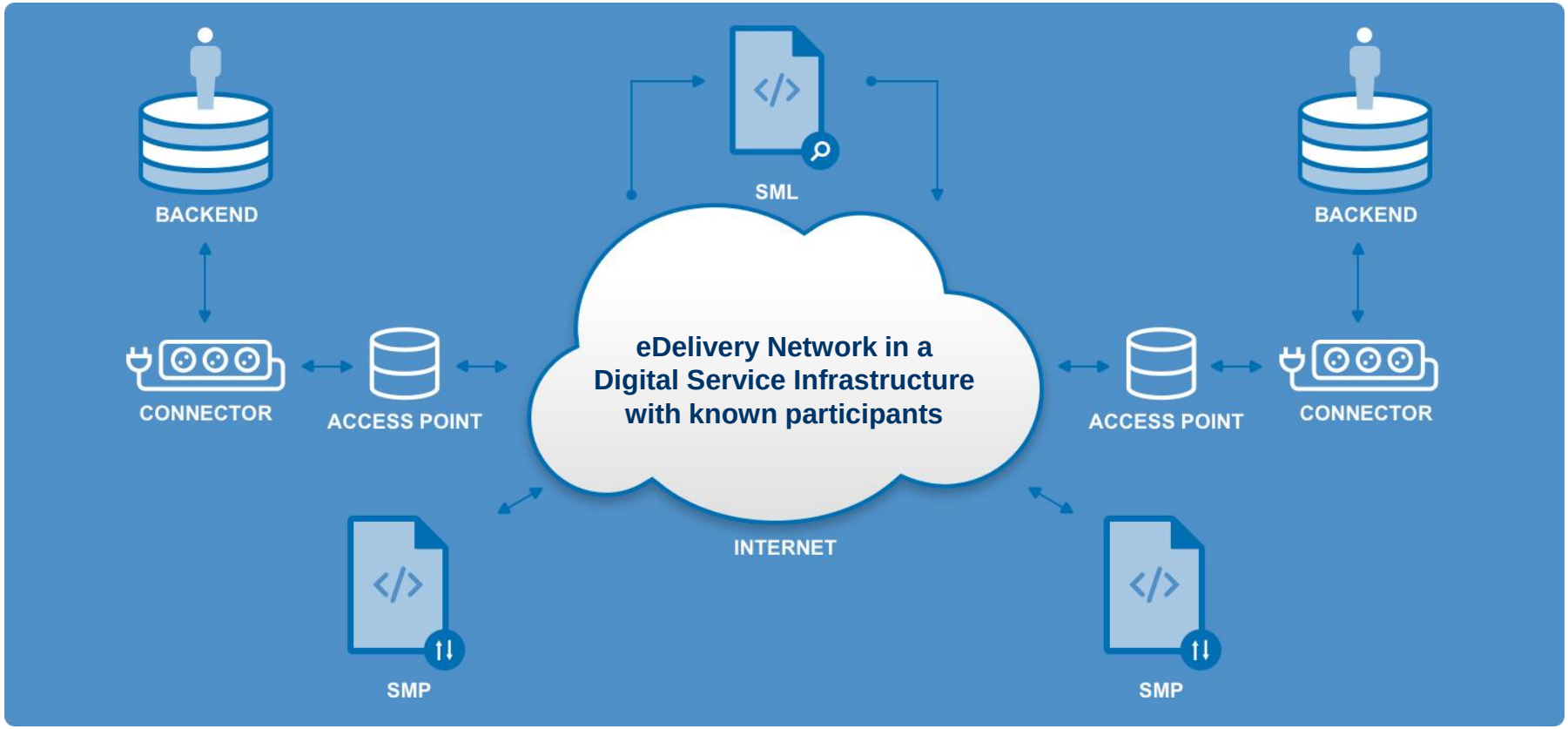
- CCSS (Jacques Kirsch)
- SIGI (Sébastien Collot)
- DG DIGIT (Maarten Daniels, Bogdan Dimitriu)
- Agence eSanté (Samuel Danhardt)
- eDelivery experts (Philip Helger, Jerry Dimitriou)
- CTIE (Laurent Linden, Pascal Gieres, Gilles Niclou)

WHAT IS EDELIVERY?

Key definitions

- The word eDelivery has many meanings, causing easily misunderstandings:
  - eDelivery - in a general sense, may not even use eDelivery standards
  - eDelivery - label for an infrastructure that uses eDelivery standards to some degree
  - eDelivery Building Block - eDelivery building block developed by EU
  - eDelivery Network - a network of (access point) nodes in which each node is a server operating software conformant with AS4 messaging protocol
  - eDelivery Digital Service Infrastructure (DSI)

What is the eDelivery 4-corner model?



Advantages and strengths of eDelivery

- Scalability
- Onboarding to a eDelivery network only necessary 1 single time
- Not a 1 to 1 connection, but by default a 1 to many connection
- Secure exchange of structured documents (XML) with other public sector or private sector bodies
- Examples:
  - Sweden: securely replace the FAX, emails, and letters in the first generation
  - EU: domain specific networks for exchange between public sector bodies (SDG OOTS, eCodex, BRIS, EUCARIS, etc.)
  - Global: Peppol (for electronic invoices, public procurement documents, etc.)

Benefits of the eDelivery building block

- Based on well-proven and established standards and specifications (AS4, SMP, Encryption, …)
- Configurable set of security measures allows for appropriate security level
- Usable for exchange of data in many different contexts (procurement, legal information, sensitive government information, payments, etc.)
- Several open source/license implementations
- Many commercial actors and service providers with solutions and competence
- Originates from Europe, used globally

Benefits of 4-corner model

- High level of decoupling and interoperability
- Possibility for organisations to use service providers for the technical communication (transmission)
- Possibility for service providers to establish economies of scale as they can offer the same service to several customers
- Dynamic addressing makes it possible to change service provider without complex migration (comparison with telecom providers). Although, some DSI use static addressing.
- Asynchronous transmission allows for a looser binding between the organisations' systems

CURRENT SITUATION

Current situation

- Data for the following DSIs are reported in section 2
  - Peppol, SDG OOTS, eCodex, BRIS, Swedish Platform for eDelivery, DE4A, US Payment Council
  - Relevant information was often hard to collect and documented in different ways.
- Data has been collected on the following topics
  - Architectural style
  - Service provider model
  - Addressing model for access points
  - Addressing model for participants
  - Trust models between access point providers
  - Trust models for participation in DSI
  - Payload packaging (enveloping) model
  - Participants Payload end-to-end security
  - AS4 implementation
  - Supporting services

ANALYSIS AND INSIGHTS

Observations and insights

DSIs large scale topics

- The significant and manifold variations between DSIs
  - reduce interoperability and efficiency,
  - thus leading to unnecessary high personnel and financial costs
- The documentation approach of DSIs varies and documentation is often hard to find
  - Makes comparisons hard and time consuming even for experts
- eDelivery is open for configuration and design choices
  - Sometimes needed, but encourages also (unnecessary or accidental) variations in DSI
- Varied use of …
  - Enveloping technologies reduce reuse of an access point
  - Transport layer security features in DSI
    - Different levels of security reduce scalability, such as use of mTLS and IP-whitelisting.
  - SMP/SML standard versions
  - Other needed services
- Most DSIs don't support secure end-to-end exchange of information
- Each DSI becomes or is perceived as a "silo"
  - High burden for service providers as they have to support multiple DSIs
  - Projects reinvent eDelivery Network for their own projects' scope and financing

Observations and insights

Data exchange projects / needs and requirements topics

- eDelivery provides today competent and robust features
  - that satisfy many national and EU interoperability use cases, needs and requirements.
  - However, variability in available DSIs complicates matching needs and requirements with available features of eDelivery networks, leading to new DSIs being constructed.
  - eDelivery has not yet been widely adopted in sufficiently standardised way
    - It can therefore not yet be seen as a commodity.
- Long term stability and reliable/trusted partners is a success factor
  - for governance, DSIs services, open-source tools and specifications
  - for development of semantics and messages
- eDelivery is perceived as complicated to understand and complex to use.
  - Requires highly knowledgeable experts
  - Lack of a sufficient number of such experts
- Lack of a common methodology for the design of the interactions between back office systems and Access points and eDelivery network.
- The characteristics of participants influence the needs and requirements
- Large scale use cases where end-to-end data protection is a legal requirement

Comparison between eDelivery and API approach

- A *central observation* - both the API and eDelivery approaches can each be used to handle a wide variety of exchange scenarios but in different ways.

--- eDelivery ---

- eDelivery is a a global standard recognised by IEC/ISO, EU, and OASIS, which provides a full stack of features and security out-of-the box.
- Supports large scale deployment (>10.000 participants)
- 1 single onboarding to a network for, by default, a 1 to many connection
- Ready-made dynamic addressing possible

--- API ---

- API technologies is lightweight with a small footprint
  - supports robust synchronous communication.
  - Missing technology for packaging of messages
- Supports complex transactional interaction patterns with multiple parties
  - handles cases with no clearly identifiable sender and intended addressee
- Larger pool of competent professionals, implementation and software.
- Although, many technologies and standardisation efforts are needed to support the richness of the standardised eDelivery such as AS4.

POTENTIAL SOLUTIONS

Areas and objectives for potential solutions

- Increase interoperability between parties that use eDelivery on National and EU-levels
- Improve the uptake of eDelivery technologies, eDelivery networks and DSIs
- Reduce time and costs for development & operations of eDelivery solutions
- Enable offering of eDelivery and eDelivery networks as a Component
- Enables offering of eDelivery and eDelivery networks as a Commodity
- Reduce unnecessary and accidental variations
- Increase comparability and matching between needs/requirements and supply/solutions
- Increase modularity and flexibility of the eDelivery solutions, allowing for easier customisation and adaptation to specific sectorial needs
- Enable and improve large scale management of specifications, components, building blocks, configurations, profiles, conformance assessment, governance, eDelivery networks and DSIs

Potential solution themes

Potential solutions organised in themes:

- Specify a *multi-purpose Access point component*
- Specify an *end-to-end security* add-on to AP and eDelivery Networks
- Harmonisation of *eDelivery specifications*
  - AS4-profiling, Envelope technologies, Secure end-to-end protection, Transport security
- Harmonisation of *eDelivery networks and DSIs*
  - Reuse and sharing of knowledge, specifications, and services
  - Standardised model for the description of features and available configurations for eDelivery specifications, services, eDelivery networks and DSIs.
  - Standardised method for analysis, development, and deployment of eDelivery based solutions based on identified work-to-be-done, needs, and requirements.
- Explore Synergies between eDelivery and API approaches
  - *Examples*: Put API gateway behind Access point using a new inner API to access the access point, share SMP for dynamic addressing.
- Improvement of Business Continuity for operations of eDelivery networks (SDG OOTS, eCodex, …) in crisis situations
- Establishment of a common cross-sectoral, cross-border, multi-purpose enabled, truly interoperable eDelivery network between public sector bodies and between public sector and private sector bodies

RECOMMENDED SOLUTIONS

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Recommended solutions

Short- and mid-term

1. **Peppol used by default and as far as possible for national purposes and extension of Peppol via the progressive addition of national document types**
2. **SDG OOTS eDelivery network used by default and as far as possible for EU purposes if Peppol cannot be used**

Mid- and long-term

1. **Raise awareness at EU level of the lack of interoperability of eDelivery and start, together with the Commission and other Member States, a project aiming at achieving truly interoperable eDelivery at EU level**
2. **A common cross-sectoral, cross-border, multi-purpose enabled, truly interoperable eDelivery network**

Short- and mid-term: Peppol

Why?

- The most largely used eDelivery network
- Continuous growth
- Strong governance and sustainability
- Many different document types accepted and relatively easily extendable for new needs
- The network that that is the closest to offer components and to being a commodity
- Dynamic discovery

How?

- Using progressively Peppol not only for eInvoicing, but also for exchange of the other document types accepted by default: Ordering, Invoice Message Response, eProcurement, etc.
- Becoming a Peppol authority: more influence at OpenPeppol level, possibility to define specific national document types (extended use) that can be exchanged via Peppol
- Recommend Peppol as the default national infrastructure for message exchange (private-private, public-private, public-public) when appropriate
- Identify use cases for extended use: investigate if Peppol is applicable (security, file sizes, interaction patterns and so on….)
- Establish stakeholder forum for end users/service providers

Short- and mid-term: SDG OOTS

Why?

- Will be the most largely used eDelivery network for exchange of document types between public sector bodies at EU level
- Will normally be reused in the context of eIDAS and become the reference eDelivery network for public sector exchange at EU level
- To a large extent already a cross-domain eDelivery network
- More and more standardised document types will probably be exchangeable via the SDG OOTS

How?

- Developing together, based on the work going on in the context of SDG OOTS, with other Member States generic, standardised, open source and as multi-purpose as possible connectors and access points that can fulfill by default the requirements and needs of many different interaction patterns and domains
- Use systematically in the future for new eDelivery needs rising from future EU legal norms the SDG OOTS and avoid creating new parallel, non-interoperable eDelivery networks
- Reuse SDG OOTS in the context of eIDAS, Data Governance Act, EU Data Spaces and other domains where data have to be exchanged at EU level
- Using dynamic discovery for the SDG OOTS

Mid- and long-term: Full EU interoperability

Why?

- Interoperability is a key strategic goal of the Commission and all the EU Member States.
- As this study has established, the existing EU eDelivery building block and EU eDelivery networks cannot yet be considered as truly interoperable.
- eDelivery is a core commodity needed for making data exchange efficient and interoperable at EU and national level.
- Full interoperability cannot be achieved by purely national initiatives, but has to be based on an European consensus that can only be found with the help of the EU Commission and together with the other EU Member States at EU level.

How?

- Raise awareness at Commission level (DG DIGIT, DG CNECT, DG GROW, etc.) of the existing interoperability issues and of the need to achieve a higher level of interoperability
- Start a project aiming at achieving truly interoperable eDelivery at EU level by establishing a common cross-sectoral, cross-border, multi-purpose enabled eDelivery network that could really be used as a commodity
- Achieve in this context also alignement between the Peppol network and the Commission eDelivery networks, i.e. mainly the SDG OOTS network, in order to make it possible to use progressively the same, common network for all purposes
- Take also into account the need, for certain use cases, of end-to-end security

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Questions?

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