DIGIT Support to Data Spaces

Reusable, interoperable, trust-building solutions to support the Digital Single Market

May 2023
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Why

Understanding the policy context
Policy Context

Europe’s digital future will be enabled by a **data-driven economy** and the use of **Artificial Intelligence**, fully respecting EU values and regulations. The public sector also needs to become more data-driven; improve the capability of developing policies and services through the management, sharing and use of data.

The **European Data Strategy** aims to create a single market for data through common European data spaces that benefit from common standards and interoperability protocols.

**AI legislation** and **coordinated plan** to foster the development and use of AI in Europe, highlighting the public sector as a trailblazer for using AI.

The **Interoperable Europe Act** complements the EU data and digital policy landscape on data availability and data exchange, from a public sector angle. It implements interoperability by design and fosters the sharing and reuse of interoperable solutions.
What
Understanding the role and services from DG DIGIT
DG DIGIT’s role and services

DG Informatics is ready to support data spaces with existing assets and services, as well as to establish synergies with stakeholders active in this field to provide a more comprehensive support.
DG DIGIT’s roadmap towards a co-development approach

We help match your needs to the appropriate solution(s) via a single point of contact.

GET in touch
Understand YOUR needs
Co-DESIGN the technical solution
Co-DEVELOP the solution
TEST the solution
GO LIVE

Requesting service

Explain your needs
Projectathons, PlugFest, TestBed, etc

DIGIT B team

Match to appropriate solutions

DIGIT B Solution team

Ideate
Develop Solution
How

Learning more about DG DIGIT’s services and solutions to support data spaces
Overview of services

DG DIGIT provides a set of services and solutions divided into three layers of support to data spaces.

**Interoperability**
- Reference architecture
- SEMIC
  - SEMIC specifications
  - SEMIC Pilots
  - SEMIC Knowledge Hub
- Access to Base Registries
- Interoperability Test Bed

**Trust & Identity**
- eID
- eSignature
- eDelivery
- EBSI Framework
- TESTA Network
- EU Digital Identity Wallet (in the future)

**Analytics**
- Data Advisory Services
- Big Data Test Infrastructure
Interoperability
Supporting cross-border and cross-domain interoperability

A portfolio of mature specifications enabling interoperability
Our specifications enable interoperability within and across data spaces, in a cost-effective way, based on open standards and in respect of EU values and regulations.

Contributing to ‘interoperability by design’ through piloting
Our offering is tested with early-stage pilots based on use cases from MS to showcase cross-border data exchange.

A well-established knowledge hub which fosters community building
Our way of working engages communities with technical experts and stakeholders to exchange experiences, good practices and knowledge.
Promoting interoperability within and across data spaces

What does DIGIT have to offer at the moment?

• Reference architecture which provides a blueprint to ease data exchange
• Reference data models as a cornerstone of semantic interoperability
• Application Profiles for tailored and specific applications
• Principles and methodology to bring people from different backgrounds to agree on data models based on concrete use cases
• Tools to support this methodology, create and publish data models, edit online and validate data according to data models
• Linked Data consulting services to structure DBs to support innovative, cost-cutting services
• Develop and propose interoperable solutions for managing the exchanges and the reuse of personal data within the data spaces

What is DIGIT looking further into?

• Catalogue of concepts supporting different use cases
• Collaborative environments for sharing practices and reuse in modelling
• Translation capabilities
• Automation of modelling activities
Reference architecture

Blueprint supporting i) the identification and formulation on business agnostic requirements and ii) the design of the solution building blocks (i.e. connectors) so that it makes it easier to exchange data with other organisations in a data space.

Benefits of a business agnostic data spaces reference architecture

- Identifies building blocks to create interoperable digital government systems
- Helps reduce silos and adopt a user centric and service-delivery approach
- Promotes solutions based on re-usable components to reduce unnecessary redundancy by taking a whole-of-government approach

- Reduces technology lock-in and promotes innovation across government services
- Facilitates reuse and interoperability across government
- Follows an approach which focuses on interoperability and is business agnostic (built upon the IDS RAM v4.0 and EIRA - eGovERA provides a Business Agnostic reference architecture, v2.0.0).
SEMIC specifications

SEMIC specifications enable interoperability by:

- Making data transparent and available
- Supporting coherent implementation of laws and policies
- Helping implement cost efficiencies
- Helping digitalisation and harmonising processes

Core Vocabularies

The cornerstone for semantic interoperability

Core Vocabularies provide a standardised approach for describing key concepts such as locations, businesses, organisations and natural persons.

Application Profiles

A tailored data model for specific applications

Application Profiles make use of vocabularies for a detailed set of use cases to define mandatory relations, constraints and relationships.

We adopt a balanced approach providing flexibility, customisation and solid indications to ensure a high degree of semantic interoperability.

Examples

SEMIC Core Vocabularies are reused in various implementations and extensions across domains and countries, from INSPIRE regulation to national databases (e.g. organisation registers) and private initiatives (Smart Data Models from Fiware).

DCAT-AP is a standard model to describe data catalogues. It is used by all open data portals in Europe. We have already made available extensions for statistics, geospatial and base registries. We are currently supporting the European Health Data Space and the Mobility Data Space to extend DCAT-AP in their respective domains. This will ensure that minimum data descriptions will flow across data spaces.

CPSV-AP is a reusable and extensible data specification used for harmonising the way public services are described in a machine-readable format. Public administrations and service providers use this approach to describe their services and guarantee a level of cross-domain and cross-border interoperability at European, national and local level.
SEMIC pilots

SEMIC sets up pilots to showcase the value of new approaches and ecosystems, which can be leveraged across public administrations to scale up their interoperability maturity. Pilots usually involve participants from several Member States and sector-specific DGs co-creating solutions with SEMIC’s support.

Wikidata / Wikibase

Supporting community-driven efforts

Tools to enable the co-creation of semantic data models emerging from a community of users.

Linked Data Event Streams

A new data publishing approach

A publishing strategy by which a data provider allows multiple third parties to stay in sync with the latest or historical versions of the data source in a cost-effective manner.

Personal Data Spaces

Empowering individuals and supporting the data economy

There is a need for more coordination and synergies between Personal Data Spaces implementations to ensure interoperability between existing and potential solutions in this emerging market.

Examples

SEMIC organised a dedicated hands-on workshop about community-driven data spaces in 2022. As a result of this workshop, we developed a training module about Wikibase and Semantic MediaWiki for data-driven semantics.

Another relevant example related to Wikidata/Wikibase is Kohesio, an implementation supported by SEMIC.

The European Railways Agency has deployed a solution based on the LDES technology which allowed them to save costs and efficiently transfer only the data that has changed, together with what has changed and when, for historic records.

SEMIC is collaborating closely with a selected group of experts and practitioners to coordinate efforts and foster synergies towards an interoperable roadmap for Personal Data Spaces (which will feed into the various data spaces initiatives).
SEMID Knowledge Hub

SEMID acts as an enabler to exchange experiences, good practices and insights. By sharing knowledge we aim to facilitate the development and use of data specifications, as well as to discuss the latest technological trends, and present expert views on semantic interoperability topics.

Community building

Experience exchange and building consensus

Organisation of webinars, workshops and other events to understand user and market needs, foster experience and good practice exchange, and help reach consensus between stakeholders.

Training

Providing online learning materials

SEMID contributes to advancing digital skills in the area of interoperability to support policy, service delivery and impact evaluation.

Studies & other materials

Setting trends and providing guidance

Over the years SEMID has published many reports, studies and other guidance materials revolving around semantic interoperability.

Examples

SEMID is organising a series of three workshops revolving around personal data spaces. Each workshop focuses on a different aspect of personal data spaces, with the aim of boosting their sustainable development and implementation in Member States or any other organisation to enable improved interoperability.

This series of workshops will result in the co-creation of a roadmap to support the advancement of EU-wide interoperable personal data spaces, as well as a white paper to describe the state-of-play of personal data spaces and related interoperability challenges.
Access to Base Registries

SEMIC and Access to Base Registries joined forces to boost interoperability across public administrations in the EU.

**Examples**

BregDCAT-AP is dedicated to an application profile of DCAT-AP for base registries, aiming to provide a standard data model / specification for base registries access and interconnection.

BregDCAT-AP is an extension of DCAT-AP, a standard model to describe data catalogues used by all open data portals in Europe.

**Semantic assets**

Core Vocabularies and BregDCAT-AP as key trusted tools.

**Support centre**

Resources, helpdesk and pilots on interoperability topics (incl. Data spaces, SDG, LDES...).

**Monitoring interoperability**

Following up on interoperability and approaches to Base Registries, preparation of factsheets and dialogue with MS.

**Knowledge Sharing**

Guidelines, good practices and case studies on the benefits of semantic interoperability.
Interoperability test bed

The Interoperability Test Bed is a service to facilitate conformance testing of IT systems. The Test Bed is a software system that can be both downloaded and installed locally, but also reused through a shared online installation operated by DIGIT.

How does it work?

Test Bed is a complete platform consisting of both software and hardware components to facilitate testing.

When to use it?

The particular focus is conformance and interoperability testing, ensuring that tested systems conform to a specification’s requirements and can interoperate consistently with conformant peer systems.

Validators

The Test Bed also has standalone validation services, operated independently from the Test Bed, which focus specifically on receiving content via various channels and validating it against specifications to produce reports.

Case studies

Data.Europa.eu

Data.Europa.eu offers uniform, central access to open data from public authorities. The data published on data.Europa.eu is harvested from various data providers who are expected to make their datasets available in DCAT-AP. As a means of verifying the quality of provided data and reporting issues, data.Europa.eu is using the DCAT-AP validator, a validator instance hosted by the Test Bed.

CEF eInvoicing Building Block

The validation of invoices against the European standard’s core invoice is the central objective of the eInvoicing conformance testing service. Given that the supported syntaxes are XML-based, this was realised by means of the Test Bed’s core XML validation service that was used to create a new validator supporting the validation of invoices and credit notes for each syntax.
Trust & Identity
Building Blocks are relevant in all EU data sharing initiatives

EU REGULATIONS
- GDPR
- Data Act
- SDGR
- eIDAS
- Interoperability Act

DATA SHARING INITIATIVES
- DATASPACE
- SECTORAL NETWORKS
- SELF-SOVEREIGN INFORMATION SHARING

TRUST LAYER
- eID
- eSignature
- eDelivery
- TESTA
- EUDI-Wallet
- EBSI

Standards-based, interoperable by default, and ensure applicable regulations are respected
Reusable solutions are key to enable trusted data sharing, while *preserving citizens’ privacy*
The challenge
Ensuring trust, user-centricity and respect for privacy in compliance with EU Regulations.

Value proposition
- Data-centric
- Cross-border
- Privacy / User Centricity

Data Sharing initiatives
- Dataspaces
- Sectoral networks
- Self-sovereign information sharing

Regulations
- GDPR
- Data Act
- eIDAS
- Interoperability Act
- SDGR

Standard-based Offering
- eID
- eSignature
- eDelivery
- EUDI Wallet
- TESTA
- EBSI
## Why are reusable solutions the best choice?

DG DIGIT’s interoperability solutions – building blocks – are domain and technology neutral, making them ideal to support dataspaces, sectoral networks, or SSI projects.

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| **eID**
Building Block | **eSignature**
Building Block | **eDelivery**
Building Block | **EUDI**
| **TESTA**
Network | **EBSI**
framework |

### eID
**Building Block**
Federated authentication and identification using national identification means across borders.

### eSignature
**Building Block**
Sign and seal documents using qualified certificates

### eDelivery
**Building Block**
Send documents and files securely over the internet, encrypted and signed, using standards-based protocols.

### EUDI
**Coming soon**
The EU Digital Identity wallet will be the result of the revision of eIDAS.

### TESTA
**Network**
The TESTA network service provides a backbone network for data exchange between a wide variety of public administrations.

### EBSI
**framework**
The pan-European blockchain services infrastructure makes information hard to fake but easy to verify using W3C Verifiable Credentials.
What are the benefits of reusing these solutions?

- **Reuse**: Reuse a proven and secure solution
- **Costs**: Save Development costs
- **Focus**: Focus on your core business
- **Security**: Benefit from highly secure implementation of standards
- **Services**: Services and support at your disposal
eID Building Block
Secure authentication and authorisation using the eIDAS network

Ready-to-use  Standards based  Support services  Sample software
What is eID?

eID is a set of services provided by the European Commission to enable the mutual recognition of national electronic identification schemes (eID) across borders. It allows European citizens to use their national eIDs when accessing online services from other European countries.

Interoperability

The eID Building Block ensures interoperability on 4 fronts: legal, organisational, semantic and technical interoperability, providing a powerful enabler of digital operations that require cross-border identity recognition.

Security & Trust

The high levels of assurance, possible with eIDAS eIDs, result in a reduced risk of identity theft and misuse of personal information. DIGITAL eID ensures the legal validity of cross-borders transactions, providing the same legal status as traditional paper based processes.

Cross-border

The solution drastically reduces the administrative burden, in terms of time, expenses and effort, associated with the use of foreign public services — a necessity for many in an increasingly globalised world.
How does it work?
Identity provider must be connected to the eIDAS Node in Member State B. Service provider must be connected to the eIDAS Node in Member State A.
eID Service Offering

**ENABLING SERVICES**  
*enable the adoption of the core services*

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<td>eIDAS-Node integration package</td>
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**ENHANCING SERVICES**  
*enhance customer experience*

**TECHNICAL SPECIFICATIONS**

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**STANDARDS OF ESOs**

| CEN Standards | ETSI Standards |

**CORE SERVICES**  
*facilitate cross-border/ cross-sector technical interoperability among heterogeneous information systems*
eSignature Building Block
Sign and seal documents using qualified certificates
What is eSignature?
eSignature is a set of free standards, tools and services that help public administrations and businesses accelerate the creation and verification of electronic signatures that are legally valid in all European Member States.

Boost your digital transactions
By removing the need for paper to obtain a signature or seal, the solution facilitates the digitalisation of business processes, eliminating the time, costs and risks of dealing with paper formats.

Cross-border legal assurance
eSignature is compliant with the eIDAS Regulation, meaning that it ensures the legal recognition and cross-border interoperability of the electronic signatures and seals produced by solutions based on this building block.

Guaranteed documents’ integrity
With eSignature, you reduce risk of document duplication or alteration. The signer’s identity is bound to each specific document, ensuring that signatures and seals are verified, authentic and legitimate for that document alone.

Improved user experience
Shorter approval times, thanks to faster document signing processes, which leads to higher satisfaction rates.
How does it work?

eSignature is composed of **three main components**.

- The Digital Signature Software (DSS) Open-Source library is an open-source software library for electronic signature creation and validation. DSS supports the creation and verification of interoperable and secure electronic signatures in line with European legislation, and it can be re-used in an IT solution for electronic signatures to ensure its alignment with European legislation and standards.

- The Trusted List Browser is an online tool provided by the European Commission that allows for searching qualified trust service providers in Europe.

- The TL Manager is a web application for browsing, editing, and monitoring Trusted Lists used by the Trusted List Operators of each Member State.
### eSignature Service Offering

**Canvas**

#### CORE SERVICES
facilitate cross-border/ cross-sector technical interoperability among heterogeneous information systems

#### ENABLING SERVICES
enable the adoption of the core services

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<td>Digital Signature Services (DSS) e-signature tool</td>
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<td>Trusted List Browser (EU Trust Services Dashboard)</td>
<td>TL-Manager tool for managing trusted lists</td>
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<td>Pilot for the International Compatibility of Trust Services</td>
<td>Notification tool (EU Trust Services Dashboard)</td>
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#### ENHANCING SERVICES
enhance customer experience

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#### TECHNICAL SPECIFICATIONS

| European Profiles | Implementing Acts | Implementing Guidelines |

#### STANDARDS OF ESOs

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<tr>
<td>E-signature standards</td>
<td>Trusted list standard</td>
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#### AUDIENCE

- E-signature users (general public)
- E-signature solution providers
- Trusted List Scheme Operators (TLSOs)
- eIDAS list notifiers
- Third countries representatives
eDelivery Building Block
Send documents and files securely

Ready-to-use  Standards based  Support services  Sample software
What is eDelivery?
eDelivery provides technical specifications and standards, installable software and ancillary services to allow projects to create a network of nodes for secure digital data exchange.

Interoperability

eDelivery enables the exchange of documents and data among heterogeneous information systems using a standardized protocol, thereby laying the foundation for cross-domain and cross-project interoperability.

Scalability and performance

eDelivery solutions ensure sustainable levels of performance and maintainability even as the number of participants and/or messages in a network grows.

Security and accountability

eDelivery ensures data integrity and confidentiality in every transmission through the use of digital signatures and encryption. eDelivery also guarantees legal assurance and accountability by mandating that the recipient of a message must send a digitally signed acknowledgement of receipt for every message received.

Vendor and platform agnostic

Because this is a vendor and platform neutral solution, its specifications are not proprietary or controlled by one vendor alone. Also, eDelivery is available in multiple products and solutions from different vendors you can choose from.

Flexible and configurable

eDelivery supports multiple types of data exchanges and is easy to adjust to each organisation’s needs, since it can be configured using parameters and doesn’t solely rely on programming.
Data sharing through eDelivery in the HealthData@EU

HealthData@EU Pilot: building a pilot version of HealthData@EU using eDelivery, eID (and DCAT-AP)

• eDelivery Access Points to ensure interoperability for cross-border data sharing

• eDelivery PKI service to obtain the certificates to establish trust and ensure security

• Information about data users and data holders will be managed in a dynamic manner by publishing it in the (central) eDelivery SML service

• 17 partners, among which:
  • health data access bodies
  • health data sharing infrastructures
  • European agencies
How does it work?
A four-corner model

1. **Submit**
   Sender sends message to sending AP

2. **Send**
   Sending AP processes message
   a) Validation and compression of the user message;
   b) Signing of the compressed message;
   c) Encryption of the signed compressed message.

3. **Receive**
   Receiving AP processes message
   a) Receives and decrypts the encrypted message;
   b) Verifies the sender's signature;
   c) Decompresses the decrypted message;
   d) Validates the original user message;
   e) Sends the acknowledgement to the sending AP;
   f) Stores the user message for download.

4. **Deliver**
   Recipient receives message from receiving AP
eDelivery Service Offering

eDelivery Service Offering Canvas

**CORE SERVICES**
facilitate cross-border/ cross-sector technical interoperability among heterogeneous information systems

**ENABLING SERVICES**
enable the adoption of the core services

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<td>Service Metadata Publisher (DomiSMP)</td>
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**ENHANCING SERVICES**
enhance customer experience

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**STANDARDS OF SOs**

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EU Digital Identity Wallet
Part of the ongoing eIDAS Revision
Coming soon
EBSI Framework

A pan-European blockchain services infrastructure that makes information hard to fake but easy to verify using W3C Verifiable Credentials.
What is EBSI?
A pan-European blockchain services infrastructure that makes information hard to fake but easy to verify using W3C Verifiable Credentials.

**Cross-border friendly format.**
With our standardised Verifiable Credentials data model, information’s format and structure is unified across borders and domains – making it less costly for an ecosystem to form.

**Self-sovereignty, privacy & usability.**
Holders of data are in control of what data they share, and when, with verifiers, thanks to their digital wallets. They can also prove that the information they share belongs to them.

**Easier & faster verification.**
The Verifiable Credentials model allows verifiers to trust the data without needing to trust the source of it and to easily identify holders.
How does it work?
Three-step self-sovereign information exchange enables holders to share their information with anyone they want.
EBSI provides the elements of a Web 3.0 trust model for sharing of Verifiable Credentials between Public Administrations, Citizens and Businesses.

Exchanging information using Verifiable Credentials Framework

Applied to Use Cases in different Sectors

- Self-sovereign Identity
- Social Security
- Education

Digitalizing trust using Trust Model of Issuers

TAO

Issuer

Issuer

Achieving interoperability using Conformance Testing Service of Digital Wallets

EBSI Verifiable Credentials Playbook

EBSI DID methods for Natural and Legal Persons

Highly available and resilient source of information using permissioned Trust Registers deployed on EBSI’s Blockchain supported by EBSI’s Smart Contracts
## EBSI Service Offering

### EBSI Service Offering Canvas

#### Core Services

*facilitate cross-border/cross-sector technical interoperability among heterogeneous information systems*

#### Enabling Services

*enable the adoption of the core services*

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#### Enhancing Services

*enhance customer experience*

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<td>This category of service is provided (or will be in the future)</td>
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<td>Other international standards</td>
<td>This category of service is not (and will not be) provided</td>
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<td></td>
<td>Minimum Technical Requirements, SLAs &amp; operational guidelines</td>
<td>This service will be provided in the future</td>
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TESTA Network
To be completed

Ready-to-use  Standards based  Support services  Sample software
What is TESTA?

TESTA connects more than 750 public entities in the EU and abroad. It is meant for sensitive pan-European information exchanges between public authorities requiring guaranteed service levels for network availability, performance and/or security, including confidentiality, integrity, authentication and availability.

Benefits for a public authority

TESTA allows the Member States to work together more effectively. It supports cross-border and cross-sectoral interoperability, it creates interoperability at the EU level, offers significant reduction in complexity in terms of setup and guarantees the same overall service level between all administrations,

Financial benefits

This solution consolidates existing networks, prevents a proliferation of parallel network infrastructures, allows economy of scale, promotes synergies and a reduction in time to market and delivers greater efficiency and reduces transaction costs.

Make life easier for your users

EU institutions & agencies, national, regional or local public administrations located in the MS, EFTA & candidate countries rely on TESTA as a dedicated and private infrastructure with a proven and mature secured infrastructure offering dedicated services, a central helpdesk and project management & service management.
How does it work?

01. Get access to

End users located within the EU, EFTA & candidate or acceding countries can get access to a number of added-value services such as secure video conferencing, secure email, secure SMS, secure FTP, Mail relay, NTP, DNS, web portal, PKI.

02. Auditability / QoS / Support

- Relies on the ITIL best practices
- Full compliance with international information security standard ISO 27001.
- 24/7 and 365 days support with personalised communication, handling incident and reporting.
- Guaranteed & stringent SLAs.

03. Security & Level of confidentiality

- Higher availability, security and reliability
- Information confidentially and integrity through traffic encryption.
- Can handle a level of confidentiality up to EU Restricted.
- Level of security depends on the classification of the end-points behind the gateway.

04. Short time-to-market and Easy connect

- By sharing and reusing you ensure economy of scale, synergy and you reduce the time to market at no cost for the IS owners.
- Centrally regulated by the EC which manages the FwC. No further agreements required with TESTA to operate additional data exchange.
## TESTA Service Offering

### TESTA Service Offering Canvas

#### Enabling Services

**Enable the adoption of the core services**

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- Network services
- Security related services (e.g., PKI services)
- Mail relay services and Secured mail services
- Secured FTP, NTP and DNS services
- Web portal services and cooperation tools
- Hosting services

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#### Legend

- This category of service is provided (or will be in the future)
- This category of service is not (and will not be) provided
- This service will be provided in the future

#### Core Services

**Facilitate cross-border/ cross-sector technical interoperability among heterogeneous information systems**

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*European Commission*
Analytics
Data Advisory Services

Data expertise on

- Data architecture
- Linked data, knowledge graph
- Data quality and pipelines creation
- Data visualisation
- Innovative solutions using AI: Machine learning, NLP, speech to text

Use case: data space advisory service for the Public Procurement Data Space

Contact: DIGIT-DATA-SERVICES@ec.europa.eu
Big Data Test Infrastructure (BDTI)

Set of services in sandbox mode to help the public sector derive insights from its data and accelerate transition towards data-driven decision making.

- Six months free of charge service for the EU public sector
- Ready-to-use data analytics stack and support
- Cloud platform based on open-source tools
Who can request BDTI?

**European Public Administrations**
All European Public Administrations at *local, regional and national level* can independently apply for a BDTI pilot project.

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**Ecosystem with academia and private sector**
Academia, spin-off, startups can apply for develop pilot projects if there is a *clear collaboration* with a Public Administration/European Agency that will represent the main point of contact for the project.

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**Open-source code available for all**
BDTI artefacts will be available as open-source elements in code.europa.eu.
Where

Reaching out to us through a single entry point
Contact us

Find more information and contact us through a single entry point:

Thank you!