

EBSI

European Blockchain Services Infrastructure

11/2023

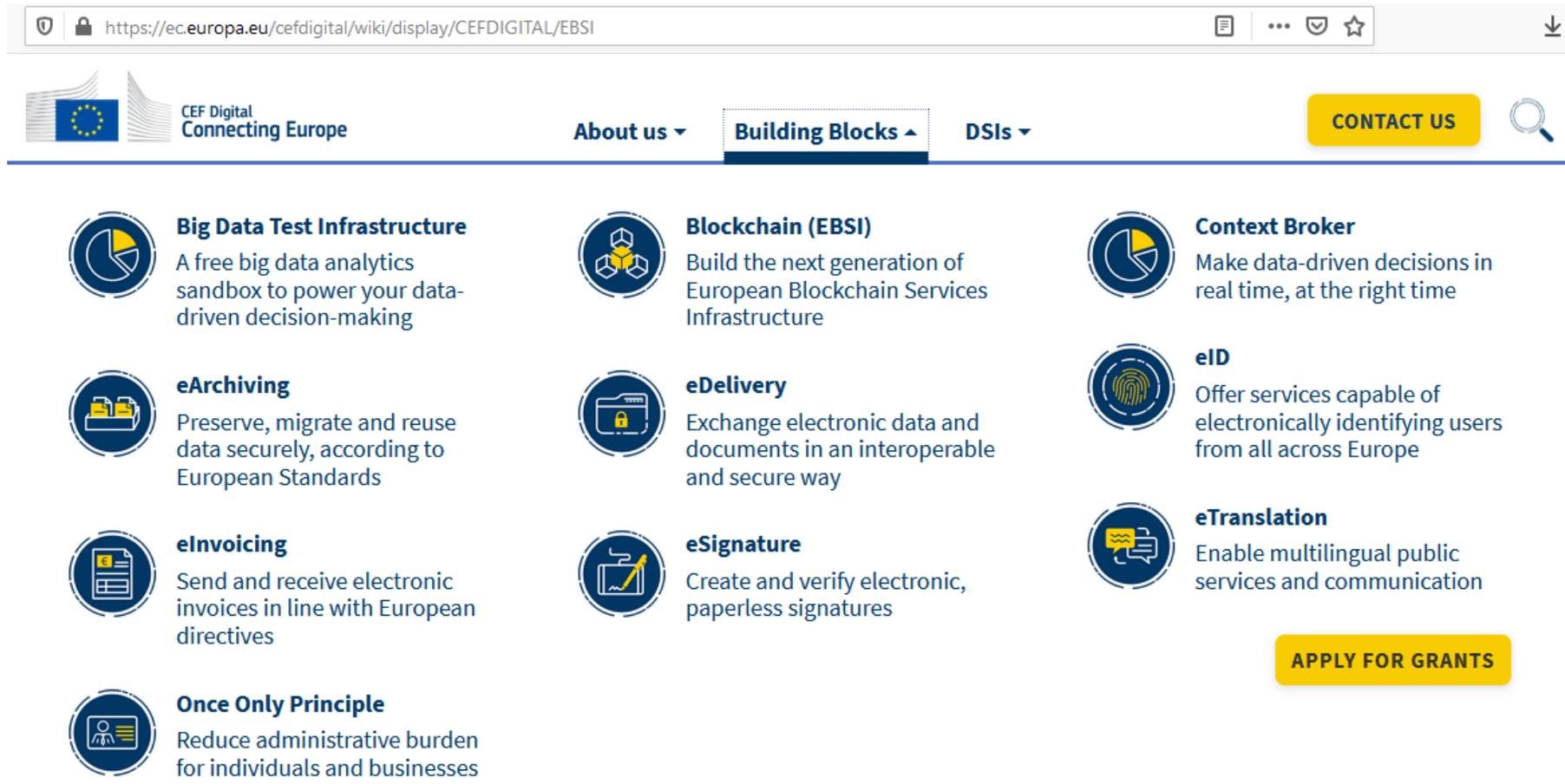
AUSTRIA/PRO

European Blockchain Services Infrastructure

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2020: EU hat(te) mehrere (digitale) „Building Blocks“



The screenshot shows the website <https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/EBSI>. The page features a navigation menu with 'About us', 'Building Blocks', and 'DSIs'. A yellow 'CONTACT US' button is visible in the top right. The main content area displays several digital building blocks, each with an icon and a brief description:

- Big Data Test Infrastructure**: A free big data analytics sandbox to power your data-driven decision-making
- Blockchain (EBSI)**: Build the next generation of European Blockchain Services Infrastructure
- Context Broker**: Make data-driven decisions in real time, at the right time
- eArchiving**: Preserve, migrate and reuse data securely, according to European Standards
- eDelivery**: Exchange electronic data and documents in an interoperable and secure way
- eID**: Offer services capable of electronically identifying users from all across Europe
- eInvoicing**: Send and receive electronic invoices in line with European directives
- eSignature**: Create and verify electronic, paperless signatures
- eTranslation**: Enable multilingual public services and communication
- Once Only Principle**: Reduce administrative burden for individuals and businesses

A yellow 'APPLY FOR GRANTS' button is located at the bottom right of the content area.

EBSI

What is EBSI?

The European Blockchain Services Infrastructure (EBSI) aims to leverage the power of blockchain for the public good. EBSI is an initiative of the European Commission and the European Blockchain Partnership.

Find out about:

- [Business: What can you do with EBSI?](#)
- [The technology: How does it work?](#)
- [The infrastructure: the pan-European node network](#)



„Three Pillars“

Understanding EBSI: three pillars

As the first pan-European, public-driven blockchain initiative of its kind, at EBSI we tap into blockchain's tamper-evident, immutable and decentralised properties to support better public services for all Europe. The blockchain ledger can be used to store information in a trusted, decentralised way, allowing for new forms of verification, traceability and transparency for citizens.



Business: What can you do with EBSI?

Several domains and industries can benefit from using blockchain in their business processes. Here we introduce EBSI's major Use Case families and domains, so you can find out how you can benefit from it.



Technology: How does it work?

Every transaction recorded on the EBSI ledger follows the same path. Here we explain the way in which EBSI's APIs, Smart Contracts and ledger work together to provide trusted information to its users.



Infrastructure: a pan-European network of nodes

EBSI's infrastructure is decentralised: instead of a unique database, there are many synchronised copies hosted in our network of European nodes. This is what makes EBSI tamper-proof.

1) Business: What can you do with EBSI?

- Use Case Families and domains
 - Verifiable Credentials
 - Education
 - Social Security
 - Track & Trace (coming soon)
 - Document Traceability
 - SMEs financing
 - Trusted Data Exchange (coming soon)
 - Asylum management
 - Trusted Data Exchange

2) The Technology: How does it work?

- All Use Cases make use of EBSI's core Technical Services
- The basic architecture of EBSI is composed of three main elements:
 - **APIs**, exposed on the public internet, which allow applications to connect;
 - **Smart Contracts**, which act as a go-between the outside world (APIs) and the
 - **EBSI Ledger**: decentralised database of information that can be accessed by actors looking to complete a business process.
- The Data Flow is the same across all EBSI Use Cases
 - When an actor is performing a business operation that falls in one of EBSI's use cases, they will use an application to connect to EBSI's APIs. This, in turn, allows them to read information stored on the ledger, or write transactions on the ledger (if they are permitted to do so). Based on the request of the user, the API will call a Smart Contract that will perform the operation and record transactions on the ledger. The ledger is immutable (meaning the information recorded on it can never be amended) and therefore functions as a trust anchor.

2.1) APIs

- EBSI makes available a set of APIs, or Application Programming Interfaces, on the public internet. This is what allows users to interface with EBSI and, ultimately, retrieve needed information from the blockchain ledger. Each API fulfills a specific function, associated with one or several use cases. Are you a developer looking to connect your software with EBSI? Discover our API catalogue and libraries here:
 - <https://hub-test.ebsi.eu/apis>
- Authorisation API
- DID Registry API
- Ledger API
- **Timestamp API**
 - EBSI Core Service enabling to interact with the TimeStamp SC to **timestamp hashes**, supports timestamping records/versions (and linking the timestamps), verify timestamps.
- ...

2.2) Smart Contracts

- Smart Contracts are a type of "digital contract" that only execute and perform an operation if certain conditions are met.
- In EBSI, the Smart Contracts are strictly controlled and cannot be deployed by anyone - they respond only to calls made to EBSI's APIs by conformant applications, and allow for transactions to be recorded on the ledger.

2.3) Ledger

- EBSI's ledger is a decentralised database keeping a record of all transactions written on it.
- The information is stored in blocks that are cryptographically linked to each other, forming a chain - hence "blockchain"- making the information almost impossible to tamper with.
- On our ledger, we make available specific registries that can be used by the Use Cases as a source of trust.
- For example, EBSI's Trusted Issuers registry can be used in the education domain to keep a tamper-evident record of all universities accredited by a national educational body, increasing trust and making verification of diploma credentials much easier.

3) Infrastructure: a pan-European network of nodes

- EBSI's infrastructure is fully decentralized
- All of EBSI's Core Technical Services - APIs, Smart Contracts, and the EBSI ledger - are hosted in a decentralised way ...
 - ... by a network of nodes all across Europe.
 - They synchronise their copies of the ledger, making it distributed, and all make EBSI's Core Technical Services available.
- Anyone can choose to operate an EBSI Node, but Node Operators must abide by EBSI's Governance rules and respect its General Conditions for Node Operators in order to ensure the integrity and stability of the network.

EBSI (current) Use Cases

- Identity
 - Self-Sovereign Identity Use Case; implement cross-border verification of identity credentials allowing users to create and control their own identity across borders.
- Diploma
 - Implement cross-border verification of educational credentials. This means that a diploma issued by Member State A can be verified by a university or third party, e.g. “employer” from Member State B.
- Document traceability
 - create trusted digital audit trails, automate compliance checks - for example in time-sensitive processes - and to prove data integrity. The intention is also to serve as generic registration and traceability capabilities for other EBSI Use cases.

EBSI Use Cases - coming soon

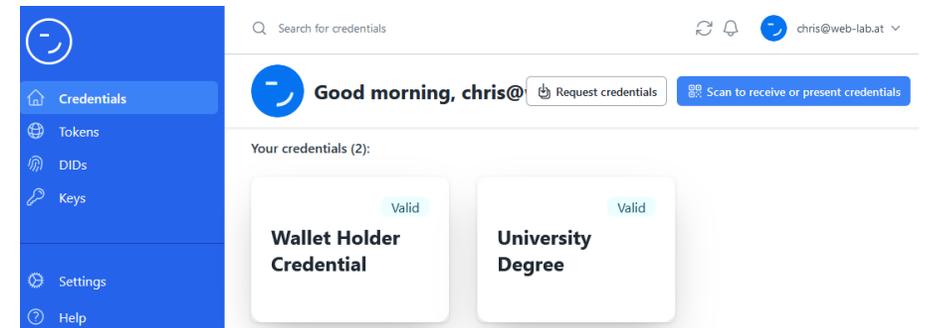
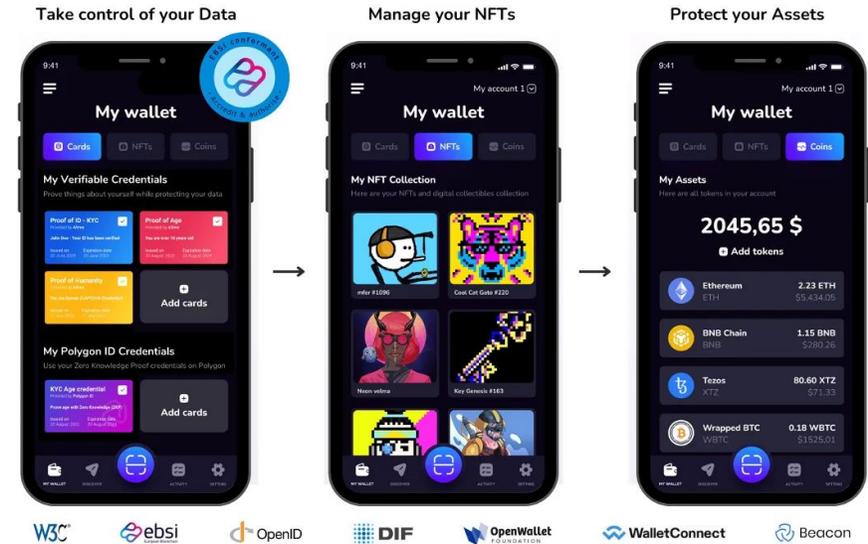
- Social Security
 - verification of social security coverage of posted workers, i.e. verification of the PDA-1 document. This means that a Social Security competent institution in a Member State issues the PDA-1 document as a verifiable attestation and an inspector in another Member State verifies it.
- Trust Data Sharing
- SME Financing
- Asylum Process Management

Wallets

- A digital wallet in the context of EBSI is a type of online storage that lets you **securely keep track of your digital assets** and information, like **digital certificates and digital identity information**. It's like a traditional wallet but storing digital information.
- A conformant wallet is a type of wallet that has successfully passed the Conformance Test.
- Types
 - For Holders
 - For Issuers
 - For Verifiers

Wallets

- Currently 14 providers
 - Mainly consulting / development companies
- Links direct to wallet
 - <https://altme.io/>
 - “First all-in-one wallet to manage your data and assets”
 - <https://walt.id/>
 - „One wallet for everything“: credentials, keys, NFTs, data storage ...
 - Web & App
 - Opensource -> developers



Available Repositories

- <https://code.europa.eu/ebsi>
- Aktiv
- Primär Demo-Code
- (Umstellung von altem Repo?)

The screenshot displays the EBSI code repository interface. On the left, a sidebar menu lists various navigation options: Gruppeninformation, Epics (0), Tickets (12), Merge Requests (5), Sicherheit und Compliance, Pakete und Registrierungen, Analysen, and Wiki. The main content area shows the EBSI group page with a search bar and tabs for 'Untergruppen und Projekte', 'Geteilte Projekte', and 'Archivierte Projekte'. A list of subgroups is shown, including 'Technical Office' (4 projects), 'arch' (0 projects), 'bb' (10 projects), and 'dev' (8 projects). Under the 'dev' subgroup, several projects are listed, including 'demo-tdl-source1', 'demo-tdl-source2', 'demo-tdl-source3', 'demo-tdl-trusted-keys1', 'demo-tdl-trusted-keys2', 'demo-tdl-trusted-keys3', 'Monorepo', and 'Wallet P2P testing'. Each project entry includes a star icon for favorites and a timestamp indicating when it was last updated.

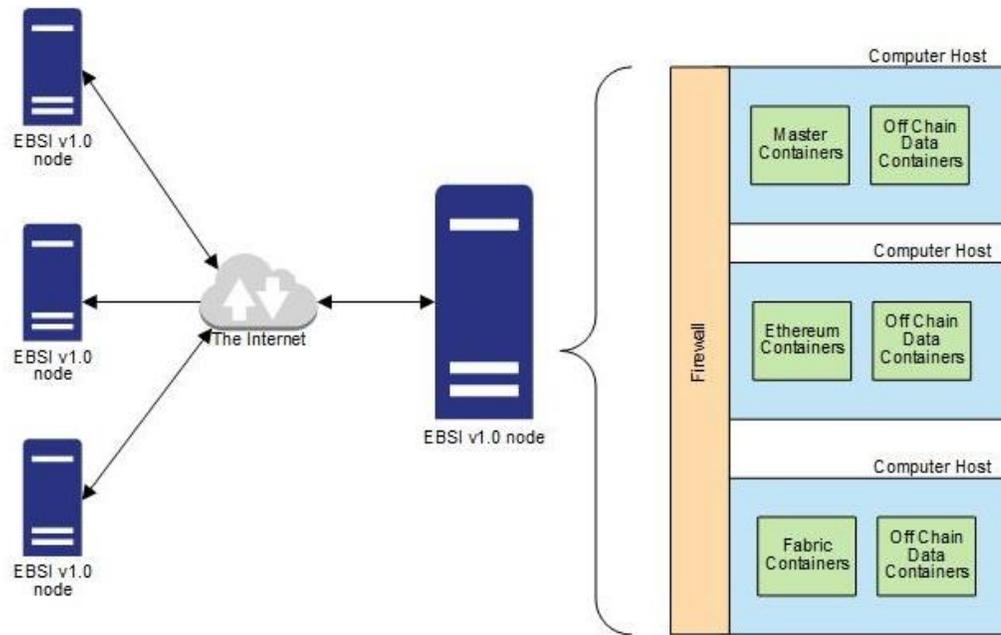
Subgroup	Project Name	Favorites	Last Updated
Technical Office		4	1
arch		0	2
bb		0	10
dev		0	8
dev	demo-tdl-source1	0	vor 5 Tagen
dev	demo-tdl-source2	0	vor 5 Tagen
dev	demo-tdl-source3	0	vor 5 Tagen
dev	demo-tdl-trusted-keys1	0	vor 5 Tagen
dev	demo-tdl-trusted-keys2	0	vor 5 Tagen
dev	demo-tdl-trusted-keys3	0	vor 5 Tagen
dev	Monorepo	0	vor 2 Monaten
dev	Wallet P2P testing	0	vor 4 Tagen

Become a node Operator?

- Each EBSI Node can deploy one or several of EBSI's environments:
 - Pilot environment: user testing purposes
 - Pre-Production: acceptance testing
 - Production environments: live EBSI network
- There are minimum technical requirements and SLAs to be met, all outlined in the EBSI Node Operator General Conditions
 - <https://ec.europa.eu/digital-building-blocks/wikis/display/EBSI/Node+Operators>
- Quite complex process ...

Node Architecture (update?)

- 3 Hosts mit ca. 14 Services ...



BESU	EBSI Nodes (All)	MS EBSI Node	TCP 48745	Ethereum (Besu) ledger (RPC Service)
BESU	EBSI Nodes (All)	MS EBSI Node	TCP+UDP 48733	Ethereum (Besu) ledger (Syncro Service)
Master/Application	EBSI Nodes (All)	MS EBSI Node	TCP + UDP 24007, 24008 & TCP 49152	GlusterFS (not used in V1.0)
Master/Application, BESU, FABRIC	EBSI Nodes (All)	MS EBSI Node	TCP 27017	Mongo DB (Redundancy Option) (not used in V1.0)
Master/Application, BESU, FABRIC	MS management network OR internet	MS EBSI Node	TCP 48790	Cockpit
FABRIC	EBSI Nodes (All)	MS EBSI Node	TCP 7054	Fabric CA Service
FABRIC	EBSI Nodes (All)	MS EBSI Node	TCP 7053	Fabric Peer External (Even Notification)
FABRIC	EBSI Nodes (All)	MS EBSI Node	TCP 7051	Fabric Peer Internal (GRPC)
FABRIC	EBSI Nodes (All)	MS EBSI Node	TCP 7050	Fabric Orderer Service
FABRIC	Internet	MS EBSI Node	TCP 48780	Fabric Block Explorer
Master/Application	EBSI Nodes (All)	MS EBSI Node	TCP 7000	Cassandra DB
Master/Application, BESU, FABRIC	Internet	MS EBSI Node	TCP 443	NGINX (HTTPS Traffic)
Master/Application, BESU, FABRIC	MS management network OR Internet	MS EBSI Node	TCP 48722	SSH (for Node Computer Unit admin)
Master/Application, BESU, FABRIC	infra.ebsi.xyz	MS EBSI Node	TCP 8140	For configuration management

EBSI in AT?

- **EBSI4Austria is a CEF funded project that will focus on hosting the Austrian EBSI node and supporting Austrian stakeholders to participate in EBSI.** Besides the two participating universities, namely Graz University of Technology and Vienna University of Economics, is the third stakeholder a company (DanubeTech).
 - <https://www.a-sit.at/ebsi4austria-at/>
 - <https://medium.com/@markus.sabadello/report-from-ebsi4austria-b79c0ed8ab8d>
 - <https://github.com/danubetech/ebsi4austria-examples>
- A-Sit (Dr. Peter Teufl) contacted
- EBP (European Blockchain Partnership) federal representative
 - Federal Ministry for Digital and Economic Affairs
 - Alexander Banfield-Mumb

Status / Vergleich

- EBSI
 - „Eierlegende Wollmilchsau“
 - Hohe Komplexität: technisch, organisatorisch
 - Teilnahme erfordert hohen Aufwand: Kosten, Zeit
 - Diverse Prototypen seit 2019/2020
 - Nur wenige Usecases in Echtbetrieb
- Vergleich mit APSB?
 - Schwer!
 - Aufwand EBSI (Nodes, Implementierungen ...) min. Faktor 10 komplexer/teurer
 - APSB Infrastruktur seit Ende 2019 in Echtbetrieb
 - Usecase: Datenzertifizierung (Notarisierung)
- EBSI: „Top-Down“ / APSB: „Bottom-Up“

Konnex zu AustriaPro?

- Weitere Beobachtung des Projektes
 - U.a. im Rahmen der AG Technik & Lab
- Definition next steps?
 - Mögliche Koppelung APSB zu EBSI
 - Notarisierung
 - z.B. in Form von Anchoring
 - Ggf. Node betreiben und Umsetzung von weiteren Usecases überlegen?
- Abhängig von
 - Interesse von Stakeholdern?
 - Finanzierung?