



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA



HYPERMODELEX



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JURIX 2023

AI4Legs-II:2nd Workshop on AI for Legislation

Blockchain technology for legislation: preliminary considerations

18 December 2023

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Outline



- **Brief introduction to blockchain and smart contracts**
- **Blockchain in the public sector**
- **Moving from the general to the specific:
blockchain applications in legislation**
- **Evaluating blockchain advantages and disadvantages**



Outline



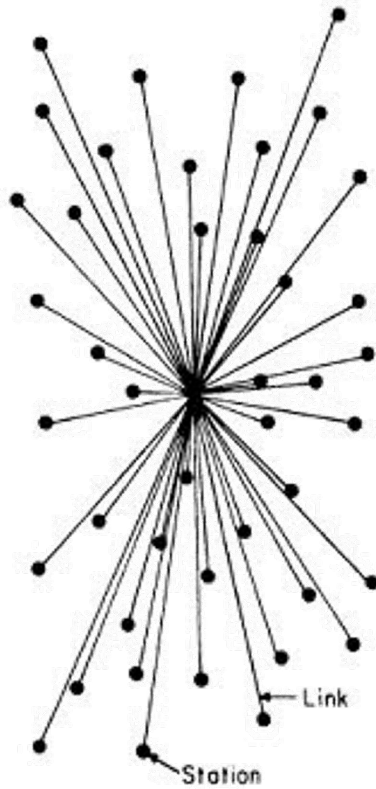
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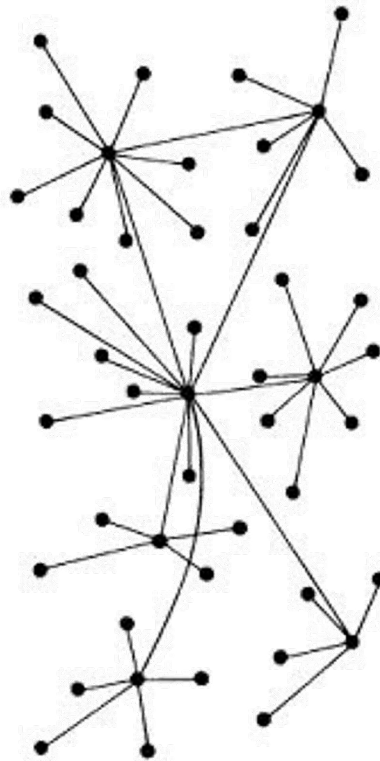


“Blockchains are decentralised databases,
maintained by a distributed network of
computers”

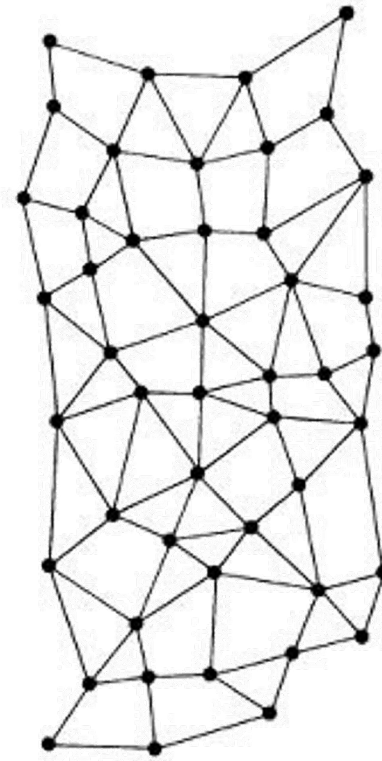




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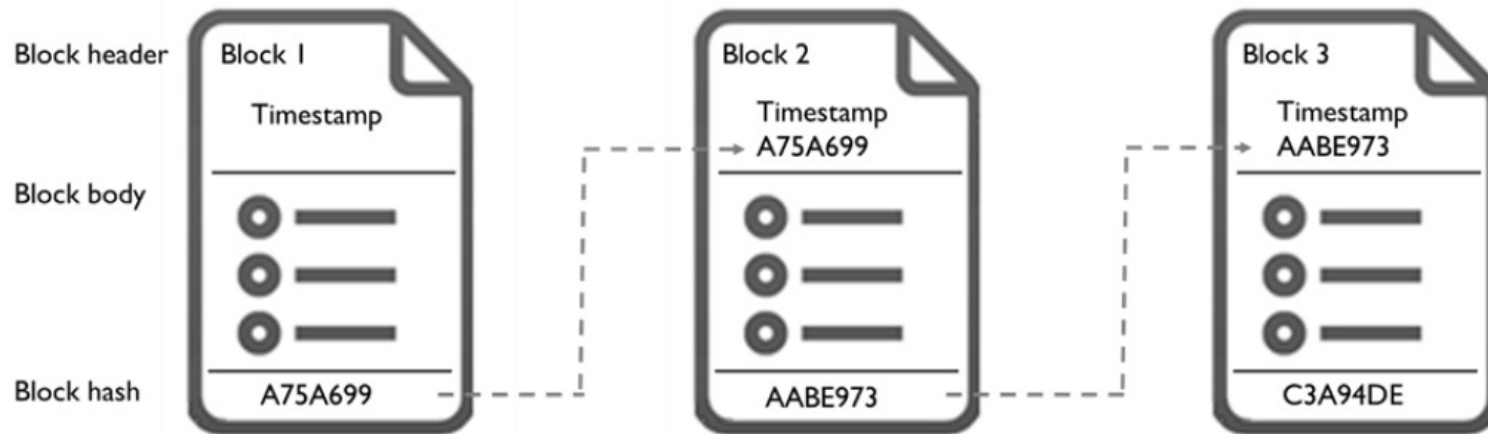
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(B)



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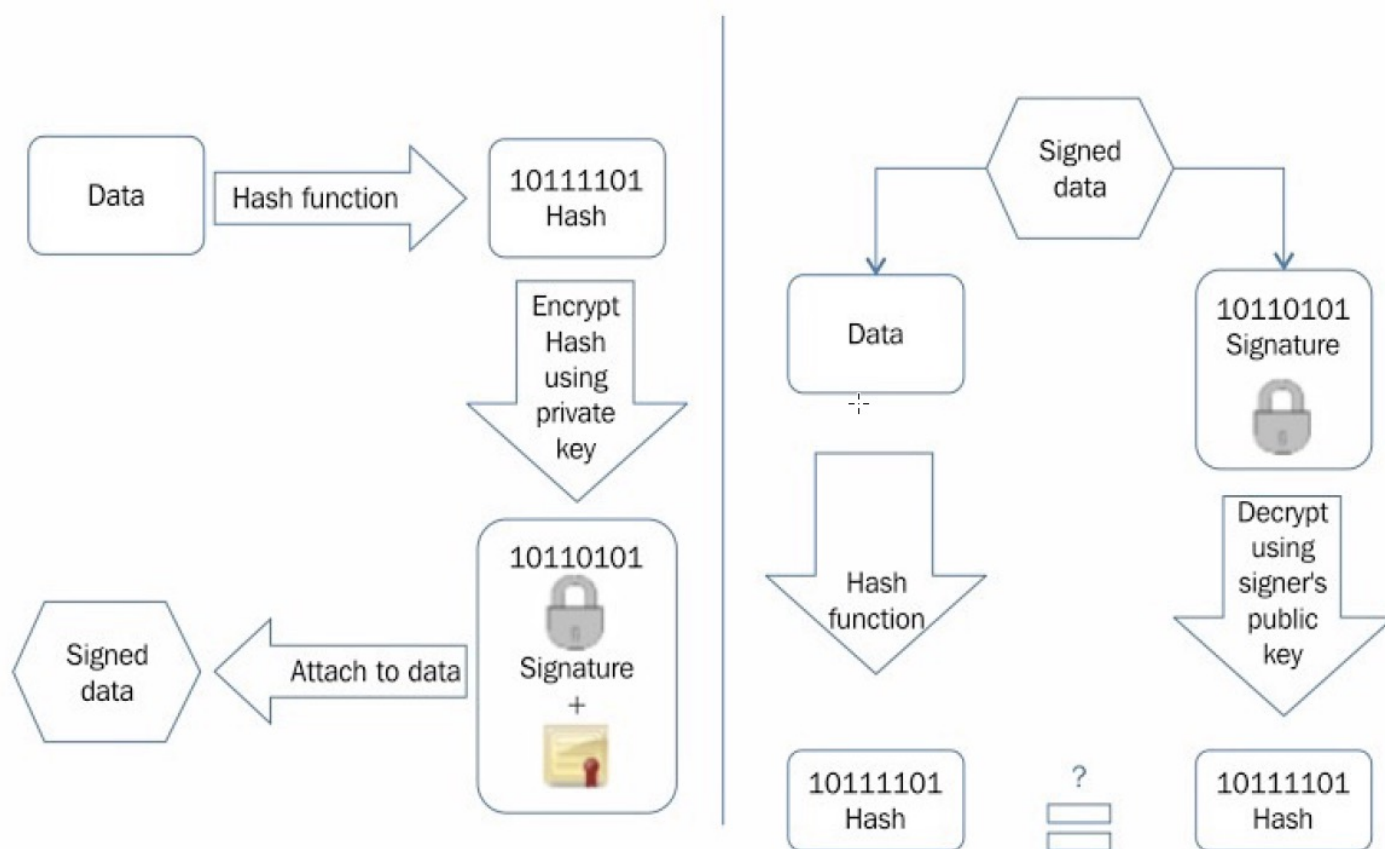


Hash and blocks





Asymmetric cryptography





Smart contract

So what do we mean by the term smart contract? In the blockchain context, it generally means computer code that is stored on a blockchain and that can be accessed by one or more parties. These programs are often self-executing and make use of blockchain properties like tamper-resistance, decentralised processing, and the like.

Source: Legal and regulatory framework of blockchains and smart contracts – a thematic report prepared by the European Union Blockchain Observatory and Forum , 27 settembre 2019 (www.eublockchainforum.eu)



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OECD Working Papers on Public Governance No. 28

**Blockchains Unchained:
Blockchain Technology and
its Use in the Public Sector**

**Jamie Berryhill,
Théo Bourgery,
Angela Hanson**

<https://dx.doi.org/10.1787/3c32c429-en>

OECD

OECD Working Papers on Public Governance No. 43

**The uncertain promise of
blockchain for
government**

**Juho Lindman,
Jamie Berryhill,
Benjamin Welby,
Mariane Piccinin Barbieri**

<https://dx.doi.org/10.1787/d031cd67-en>

OECD BLOCKCHAIN POLICY SERIES

OECD





Tech

Japan to Test Blockchain for Government Contract System

Japan is reportedly looking to integrate blockchain into its online systems for accepting government contract bids.

By Chuan Tian ⌚ Jun 30, 2017 at 5:15 p.m. Updated Sep 11, 2021 at 3:30 p.m.





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DUBAI BLOCKCHAIN STRATEGY

The Dubai Blockchain Strategy will help Dubai achieve the vision of H.H. Sheikh Mohammed bin Rashid Al Maktoum by making "Dubai [will be] the first city fully powered by Blockchain by 2020" and make Dubai the happiest city on earth. The strategy will be using 3 strategic pillars Government Efficiency, Industry Creation, and International Leadership.

Dubai Blockchain Strategy
A CHAIN OF INFORMATION
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European Parliament

2014-2019



TEXTS ADOPTED

Provisional edition

P8_TA-PROV(2018)0373

Distributed ledger technologies and blockchains: building trust with disintermediation



European Parliament resolution of 3 October 2018 on distributed ledger technologies and blockchains: building trust with disintermediation (2017/2772(RSP))





BLOCKCHAIN FOR GOVERNMENT AND PUBLIC SERVICES

a thematic report prepared by
THE EUROPEAN UNION BLOCKCHAIN
OBSERVATORY & FORUM

 An initiative of the 



JRC SCIENCE FOR POLICY REPORT

Blockchain for digital government

An assessment of pioneering implementations in public services

Authors:
David Alessie
Maciej Sobolewski
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Editor:
Francesco Pignatelli

2019



 EUR 29677 EN





EBSI

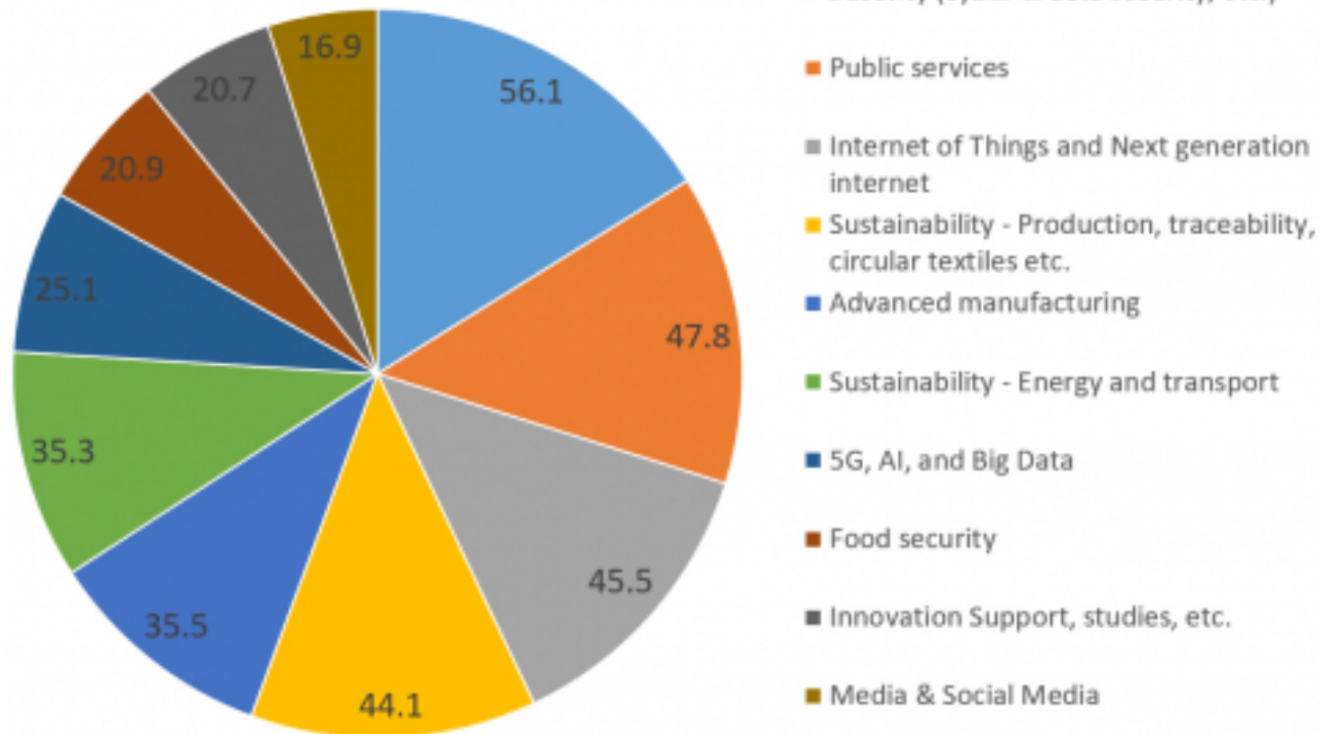
The **European Blockchain Services Infrastructure (EBSI)** was born in 2018 when **29 countries** (all EU members states, Norway and Liechtenstein) and the **EU Commission** have joined forces to create the **European Blockchain Partnership (EBP)**.

EBP's vision is to leverage blockchain to create cross-border services for public administrations, businesses, citizens and their ecosystems to verify information and make services trustworthy.





Blockchain EU funding (€ 347 Mio) by sector



European Commission





MAIN POTENTIALS OF BLOCKCHAIN IN THE PUBLIC SECTOR

1. Creating trust in information and processes:

- Blockchain technology establishes trust in situations involving diverse stakeholders.
- Decentralised, shared databases are updated and verified on a peer-to-peer basis.





MAIN POTENTIALS OF BLOCKCHAIN IN THE PUBLIC SECTOR

2. Creating trusted audit trails:

- Blockchain simplifies the creation of trusted audit trails for data.
- It enables tracking of data entry, usage, and access.
- It increases transparency in data handling and processes.
- It makes it difficult to misuse or falsify information.





MAIN POTENTIALS OF BLOCKCHAIN IN THE PUBLIC SECTOR

3. Balancing data confidentiality and sharing:

- Blockchain maintains data privacy while allowing easy sharing thanks to complex permission schemes to control access and sharing.
- It is suitable for large and diverse groups without relying on a single entity.





MAIN POTENTIALS OF BLOCKCHAIN IN THE PUBLIC SECTOR

4. Efficiency and cost savings:

- Blockchain can bring substantial cost and time savings in data verification and reconciliation.
- It increases system robustness.



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BLOCKCHAIN COULD PROVIDE SUPPORT FOR THE LAW-MAKING PROCESS AND MANAGEMENT:

- 1. Tracking and optimisation of legislative procedures**
- 2. Automatic detection of mistakes and/or violations**
- 3. Indisputable proof of each law's state in time**
- 4. Monitoring the actions of the legislator**





BLOCKCHAIN COULD PROVIDE SUPPORT FOR THE LAW-MAKING PROCESS AND MANAGEMENT:

1. Tracking and optimisation of legislative procedures

- large number of actors involved in legislative production
- lengthy and complex procedures
- multiple steps
- significant exchange of documents, drafts, amendments and so forth





BLOCKCHAIN COULD PROVIDE SUPPORT FOR THE LAW-MAKING PROCESS AND MANAGEMENT:

2. Automatic detection of mistakes and/or violations

- procedural rules
- substantive rules





BLOCKCHAIN COULD PROVIDE SUPPORT FOR THE LAW-MAKING PROCESS AND MANAGEMENT:

3. Indisputable proof of each law's state in time

- updated legislation
- verifying the applicable version of the law





BLOCKCHAIN COULD PROVIDE SUPPORT FOR THE LAW-MAKING PROCESS AND MANAGEMENT:

4. Monitoring the actions of the legislator

- exercise popular sovereignty
- societal and political value



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Great interest, but limited implementation in the public sector (especially in this context)...

Source: Tan, E., Mahula, S., Cromptoets, J.: Blockchain governance in the public sector: A conceptual framework for public management. Government Information Quarterly 39, 101625 (2022)



The Estonian Electronic State Gazette (backed by blockchain technology)



State Gazette

The Electronic State Gazette is the central database and official online publication for Estonian legislation. Since 2010, all national legal acts are made public only in electronic form in Estonia. Access to the State Gazette and to all legal information services is open to and free of charge to everyone. The greatest advantage of the electronic State Gazette over the paper version is the possibility to publish whole and up to date texts of legislation.

Riigi Teataja

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Translation Authentic text

• Back to wordings Legend: Removed Added

Choose earlier wording Synchronize scrollbars Choose later wording Compare

Entry into force: 01.07.2014 Entry into force: 01.07.2015

Issuer: Riigikogu Type: act In force from: 01.07.2014 In force until: 28.02.2015 Translation published: 17.06.2014

**Chapter 1
GENERAL PROVISIONS**

§ 1. Scope of application of Act

(1) This Act provides the bases for the creation, functioning and administrative supervision of the professional qualifications system. [RT I, 13.03.2014, 4 - entry into force 01.07.2014]

(2) This Act does not apply to professions in the case of which the bases for the development of professional requirements and awarding of professional qualification are regulated by other Acts.

Issuer: Riigikogu Type: act In force from: 01.07.2015 In force until: In force Translation published: 01.07.2015

**Chapter 1
GENERAL PROVISIONS**

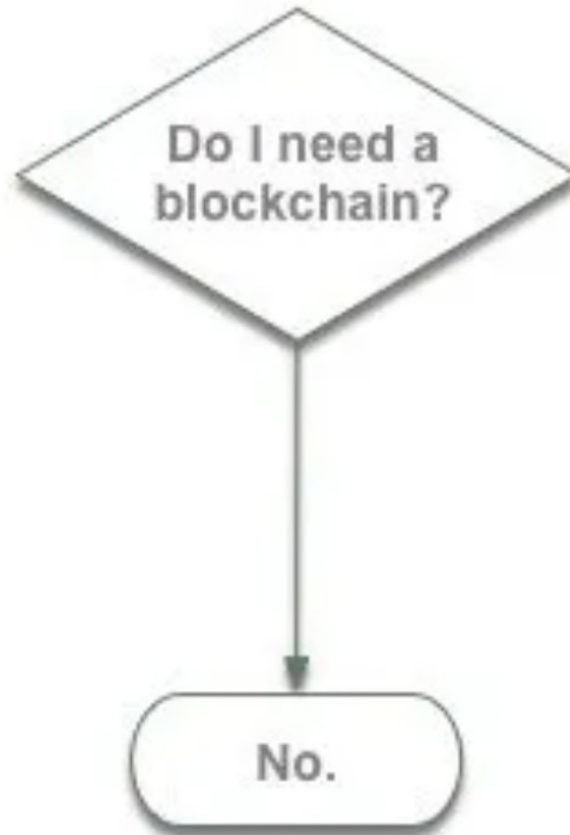
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The State Gazette offers consolidated texts, i.e. texts that are passed by the issuer of the legal instrument and contain all of the changes to the item of legislation in its current version. The consolidated texts are available in versions corresponding to any point in time, both past and present. The State Gazette also includes English translations of legal acts, public decisions of all courts, the times of court sessions and most important legal news, e.g. short summaries of new laws, information concerning draft legislation and competitions for finding judges and prosecutors. Visit the [Electronic State Gazette](#) page.







Considering the **effective properties** of blockchain and **its added value compared to other existing technologies**, free from false conditioning and misconceptions





Brussels, 3.6.2021
COM(2021) 281 final
2021/0136 (COD)

Proposal for a

REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
amending Regulation (EU) No 910/2014 as regards establishing a framework for a
European Digital Identity

{SEC(2021) 228 final} - {SWD(2021) 124 final} - {SWD(2021) 125 final}





Art. 3(1)(53):

‘electronic ledger’ means a **tamper proof** electronic record of data, providing **authenticity** and **integrity** of the data it contains, **accuracy of their date and time**, and of their **chronological ordering**’







BLOCKCHAIN CHALLENGES

- Scalability
- Interoperability
- Legal uncertainty
- Immutability
- Decentralisation





HOW TO OVERCOME CURRENT BOUNDARIES

- Technical solutions (under development)
- Appropriate rules and standards (eidas 2, Data Act, standard organisations, etc.)
- Accurate design choices (public/permissioned blockchains?)





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Thank you for your attention.

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