ETSI GR PDL 001 V1.1.1 (2020-03)

Permissioned Distributed Ledger (PDL); Landscape of Standards and Technologies

Disclaimer

The present document has been produced and approved by the Permissioned Distributed Ledger ETSI Industry Specification Group (ISG) and represents the views of those members who participated in this ISG.
It does not necessarily represent the views of the entire ETSI membership.

Reference
DGR/PDL-001_Landscape

Keywords
blockchain, gap analysis, state of the art, survey

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Contents

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (https://ipr.etsi.org/).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

Foreword

This Group Report (GR) has been produced by ETSI Industry Specification Group (ISG) Permissioned Distributed Ledger (PDL).

Modal verbs terminology

In the present document "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Introduction

Standards are everywhere and are playing a key role to protect consumers, workers and environment. Blockchain and Distributed Ledger Technologies represent a key performance indicator for the Standardization Bodies and Organizations worldwide. First initiative was launched by ISO in 2016, as an initiative from Australian mirror Committee which conformed the Committee ISO/TC 307 [i.1] with the Scope "Standardisation of Blockchain technologies and distributed ledger technologies".

Following the aim of standardization at the European level, CEN-CENELEC conformed a Focus Group [i.2] for Blockchain and Distributed ledger technologies in 2017 which is under liaison with ISO TC307 and a White Paper "Recommendations for Successful Adoption in Europe of Emerging Technical Standards on Distributed Ledger/Blockchain Technologies" [i.2] was approved and published by CEN-CENELEC in 2018.

At United Nations level, the International Telecommunication Union is working very efficient with various Study Groups and related materials and it is relevant the Focus Group [i.5] on Application of Distributed Ledger Technology in May 2017.

There are also initiatives and programs which are focus on standardization like the Joint Initiative on Standardization under the Single Market Strategy [i.3] which is a voluntary collaborative effort and does not establish any new legal commitments whereby Standards are key for innovation and progress within the European competitiveness. Basically, this Joint Initiative on Standardization sets out a shared vision for European standards in order to take steps to better prioritize and to modernize the current European Standardization system, as well as to strive for the timely delivery of standardization deliverables. It supports the relevant aspects of the ten European Commission's Priorities and other policy objectives, while clearly respecting the distribution of different competences between the EU and the Member States.

The European Blockchain Observatory and Forum (https://www.eublockchainforum.eu/) is an open project to create most comprehensive map of the European Blockchain ecosystem and as European Commission Initiative to accelerate blockchain innovation and the development of blockchain ecosystem within the EU and so help cement Europe's position as a global leader in this transformative new technology.

There are also other alternative efforts related to the standardization of some properties that DLTs can provide which are considered within the present document like W3C (https://www.w3.org/) or https://opentimestamps.org/.

1 Scope

The present document will identify current activities in standardization and in research which are particularly relevant to PDL, with the goal of identifying applicable solutions, required enhancements and recommendations for further collaboration. As appropriate, activities of professional or non-profit initiatives will also be considered.

2 References

2.1 Normative references

Normative references are not applicable in the present document.

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] ISO/TC 307: "Blockchain and distributed ledger technologies".

NOTE: Available at https://www.iso.org/committee/6266604.html.

[i.2] CEN-CENELEC Focus Group on Blockchain and Distributed Ledger Technologies: "Recommendations for Successful Adoption in Europe of Emerging Technical Standards on Distributed Ledger/Blockchain Technologies".

NOTE: Available at ftp://ftp.cencenelec.eu/EN/EuropeanStandardization/Sectors/ICT/Blockchain%20+%20DLT/FG-BDLT-White%20paper-Version1.2.pdf.

[i.3] European Commission: "The Single Market Strategy".

NOTE: Available at https://ec.europa.eu/growth/single-market/strategy_en.

[i.4] ISO/TR 23455:2019: "Blockchain and distributed ledger technologies -- Overview of and interactions between smart contracts in blockchain and distributed ledger technology systems".

NOTE: Available at https://www.iso.org/standard/75624.html.

[i.5] ITU Focus Group on Application of Distributed Ledger Technology.

NOTE: Available at https://www.itu.int/en/ITU-T/focusgroups/dlt/Pages/default.aspx.

[i.6] W3C Recommendation 19 November 2019: "Verifiable Credentials Data Model 1.0".

NOTE: Available at https://www.w3.org/TR/vc-data-model/

[i.7] Directive 2000/31/EC of the European Parliament and of the Council of 8 June 2000 on certain legal aspects of information society services, in particular electronic commerce, in the Internal Market.

[i.8] European Commission JRC Science for Policy Report: "Licensing Terms of Standard Essential Patents".

NOTE: Available at https://publications.jrc.ec.europa.eu/repository/bitstream/JRC104068/jrc104068%20online.pdf

[i.9] European Commission Internal Market, Industry, Entrepreneurship and SMEs: "Landscaping study of standard essential patents in Europe".

NOTE: Available at http://ec.europa.eu/growth/content/landscaping-study-standard-essential-patents-europe-0_en.

[i.10] Regulation (EU) No 1025/2012 of the European Parliament and of the Council of 25 October 2012 on European standardisation, amending Council Directives 89/686/EEC and 93/15/EEC and Directives 94/9/EC, 94/25/EC, 95/16/EC, 97/23/EC, 98/34/EC, 2004/22/EC, 2007/23/EC, 2009/23/EC and 2009/105/EC of the European Parliament and of the Council and repealing Council Decision 87/95/EEC and Decision No 1673/2006/EC of the European Parliament and of the Council.

[i.11] Geospatial Standardization of Distributed Ledger Technologies.

3 Definition of terms, symbols and abbreviations

3.1 Terms

Void.

3.2 Symbols

Void.

3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

AI	Artificial Intelligence
AML	Anti-Money Laundering
API	Application Programming Interface
CEN	European Committee for Standardization
CENELEC	European Committee for Electrotechnical Standardization
CFT	Counter-Financing of Terrorism or Combating the financing terrorism
CLC	CENELEC
CTN	Technical Committee of Standardization (Comité Técnico de Normalización)
DAO	Decentralized Autonomous Organization
DIN	Decentralized Internet Infrastructure
DINRG	Decentralized Internet Infrastructure Research Group
DLT	Distributed Ledger Technology
EBP	European Blockchain Partnership
EBSI	European Blockchain Service Infrastructure
EC	European Commission
EEA	Enterprise Ethereum Alliance
EFTA	European Free Trade Association
eIDAS	Electronic Identification, Authentication and Trust Services
EIRA	European Interoperability Reference Architecture
ESSIF	European Self Sovereign Identity Framework
ETSI	European Telecommunication Standards Institute
EU	European Union
FG	Focus Group

FIG	International Federation of Surveyors
FRAND	Fair, Reasonable and Non-Discriminatory
GDPR	General Data Protection Regulation
H2020	Horizon 2020
HE	Horizon Europe
ICO	Initial Coin Offering
ICT	Information and Communications Technology
INATBA	International Association for Trusted Blockchain Applications
IoT	Internet of Things
IRTF	Internet Research Task Force
ISO	International Standards Organization
ITU	International Telecommunication Union
ITU-T	International Telecommunication Union-Telecommunications standardization sector.
JTC	Joint Technical Committee
KYC	Know Your Customer
OECD	Organization for Economic Co-operation and Development
OGC	Open Geospatial Consortium
OMA	Open Mobile Alliance
PDL	Permissioned Distributed Ledger
PIA	Privacy Impact Assessment
PKI	Public Key Infrastructure
PR	Property Rights
RG	Research Group
SBS	Small Business Standards
SC11	Sub-Committee 11.
SDO	Standard Developing Organization
SEP	Standards-Essential Patents
SG	Study Group.
SME	Small and Medium Enterprise
STO	Security Token Offering
TOOP	The Once-Only Principle
TSAG	Telecommunication Standardization Advisory Group
UN/CEFACT	United Nations Centre for Trade Facilitation and Electronic Business
UNCITRAL	United Nations Commission on International Trade Law
UNE	Spanish Association for Standardization
WS	Work-Shop

4 Introduction to main areas of application of PDL technologies and role of standards

Distributed Ledgers Technology is categorized as a General Purpose Technology and as such can provide benefits to a large number of applications across most industries. Applications that use PDL technologies will benefit from distributed trusted databases with recorded verifiable transactions which can be automated to increase efficiency and reduce costs.

Typical applications, industrialized and emerging, may be divided into horizontal applications which provide common functions, and vertical applications that serves a more specific industry application typically leveraging one or more horizontal application. Some examples below.

Table 1: Main Areas of PDL Applications

HORIZONTAL DOMAIN	VERTICAL DOMAIN
Identity Management: individuals, objects, legal entities and processes	eGovernment: Properties, benefits records
Data Management: data sharing	Healthcare: Health records, Prescriptions
Logistics and Supply-Chain	Industries: Manufacturing distribution
Security Management	Automotive and IoT: Supply chain, data integrity, Autonomous vehicles
Digital Evidence	Commerce, digital evidence admissible in court
Invoicing Management	Finance: securities trading, Trade finance, Micro-credits and remitance, insurance
Crypto-structures and DAO	Utilities: Share records and trading, Energy Sector, Smart-Metering, Smart-grids, Telecommunications, Water and Waste management.
Contract Management: Smart Contracts	Media and Social Media: Intellectual Properties management, e-Sport, Culture, Art, Advertisement
Commodity Management	Yield management, Agriculture
Decision Management: A.I.-decision traceability	Education: e-learning, Diplomas validation
Privacy management	Healthcare, Automotive and IoT, Commerce, Finance-securities trading, Utilities
Infrastructure Management	ICT: Internet resource management, Trust infrastructure (e.g. PKI), Network security

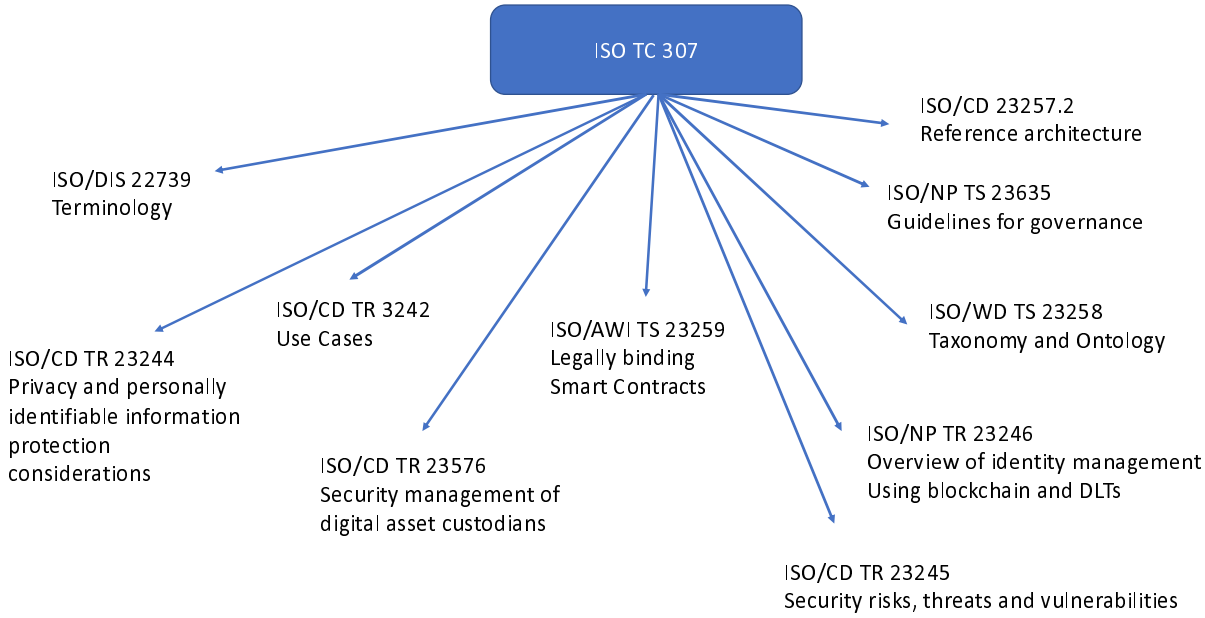
The many initiatives have created a fragmented market and many reports states the lack of standards as a significant barrier to adoption. Several initiatives are ongoing and examples of where standards can help include terminology, interoperability, security, privacy and data management.

AI- data traceability: AI is a number of technologies of data processing nature that may assist decision making. The use of AI may be validated and enhanced by traceability. The traceability of a number of data management processes involving machine, scripting and human processing may be enhanced with the use of AI and its functionality.

5 Current activities in standardization

5.1 International Standards Organization (ISO TC-307)

ISO/TC 307 [i.1] Blockchain and Distributed Ledger Technologies since 2016 has 43 participating members and 13 observing members. It has liaisons committees to ISO/TC 307 and from ISO/ TC307. And it is relevant the Joint Working Groups ISO/TC46/SC11/JWG1 with title Joint ISO/TC46/SC 11-ISO/TC 307 WG: Blockchain. There are also organizations in liaison like European Commission, Enterprise Ethereum Alliance Inc, Institute of Electrical and Electronic Engineers Inc, ITU, OECD, SWIFT, UNECE and International Federation of Surveyors.



NOTE: ISO/TR 23455:2019 [i.4] overview of and interactions between Smart Contracts and DLT systems is published already.

Figure 1: ISO TC307 - Standards under development

5.2 CEN-CENELEC FGBDLT

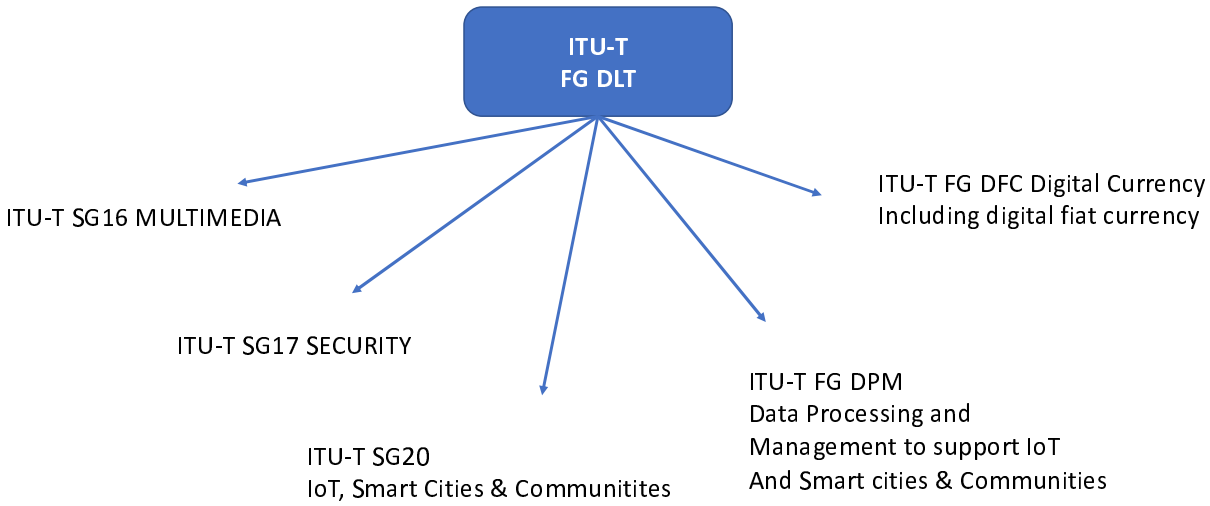
CEN-CENELEC: CEN (European Committee for Standardization) and CENELEC (European Committee for Electrotechnical Standardization) are recognized by the EU and EFTA as European Standardization Organizations responsible for developing standards at European level. These standards set out specifications and procedures in relation to a wide range of materials, processes, products and services. The members of CEN-CENELEC are the National Standardization Bodies and National Electrotechnical Committees of 34 European countries. European Standards and other standardization deliverables adopted by CEN-CENELEC are accepted and recognized in all these countries. For Blockchain and Distributed Ledger Technologies the Focus Group in 2019 will identify specific European needs and release a new version of its technical white paper for the successful implementation of Blockchain and DLT in Europe.

There are numerous standards under development within CEN-CENELEC and the strategy which is public consider between their pivotal highlights' Digital transformation, International cooperation like task force with Gulf, India, Japan, China and Africa; seminars and workshops. Some of the interesting standards under development are: For Digital Society, CEN/WS 084 Self-Sovereign Identifier for Personal Data Ownership and Usage Control, CEN/CLC/WS SEP2 Industry Best Practices and Industry Code of Conduct for Licensing of Standard Essential Patents in the field of 5G and Internet of Things, CLC/TC108X Safety of electronic equipment within the fields of Audio/Video, Information Technology and Communication Technology, CLC/TC 209 Cable networks for television signals, sound signals and interactive services. For Mechanical and machinery mainly focus for safety and segments like entertainment technology and amusement park machinery and structures. For services CEN/TC 445 Digital Information Interchange in the Insurance Industry, CEN/TC 278 Intelligent transport systems. Recently CEN-CENELEC has approved liaison with ETSI ISG PDL and a new TC will act as mirror with ISO/TC 307 [i.1].

This Focus Group has decided to continue as a technical committee CEN/CLC JTC19.

5.3 ITU-T FG-DLT

ITU The Focus Group for Distributed ledger technologies (DLT) was established in May 2017 and concluded August 2019. A parent group is TSAG (Telecommunication Standardization Advisory group) the participation in FG DLT is open. Deliverables of the FGDLT can be found at [i.5]. The deliverables have been transferred to SG16 and SG17, which have established new Questions for further study of DLT.



NOTE: There are other Study Groups which are related to DLTs like SG 13 of ITU-T about Future Internet, the Work Item is Decentralized Network Infrastructure. The interaction with the SG 16 about Multimedia has launched three new areas of exploration for the ITU-T FG DLT.

Figure 2: Related standards

5.4 IEEE Standards Association

IEEE Standards Association is doing prospection in some areas with some projects for Blockchain and Distributed ledger with some report and documents that can be found herein https://blockchain.ieee.org/standards.

5.5 ETSI

European Telecommunication Standards Institute: ETSI ISG PDL is the unique Working Group specifically working on DLT however there are others standards from ETSI that are usefully elements for DLT considerations.

6 Current activities in research

The research community is actively working on the evolution of PDLs and the list of on-going projects in this area is exhaustive. Over the Multi-Annual Financial Framework (2014-2020), the EU has allocated an amount of funds (i.e. €80 billion) for the over-all research and innovation through H2020 programme. Mainly because of the interest of the research community more than €180 million is allocated to Research & Innovation is linked to blockchain. The H2020 - a seven-year (2014-2020) programme is the EU's biggest Research and innovation programme ever, which involves many projects related to PDLs; a list with information on some of these research projects can be found in annex B.

In order to strengthen the European commission strategy on blockchain, there has been additionally a H2020 Call ICT-54-2020 - Blockchain for the next generation Internet (https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/ict-54-2020) that was opened in July 2019 and closed in January 2020 where the European Commission is funding research and innovation activities in Blockchain and DLT with an overall budget of 20 million euros that will be distributed on the following three main topics: Advancing research on Blockchain and Distributed Ledger Technologies; Fostering trust in internet information exchange and content with blockchain; and Bringing forward the emergence of collective intelligence on the internet.

Further funding is expected in HE (Horizon Europe) which will take place in the next Multi-Annual Financial Framework (2021-2028).

7 Activities of professional initiatives and alliances

7.1 Opentimestamps

This is a relevant jointly initiative for a Timestamping Proof Standard, accordingly with their focus to prove that some data existed prior to some point in time. Opentimestamps defines a set of operations for creating provable timestamps and later independently verifying them.

The exploration of this open source initiative is bringing to a key attribute for trust on the DLT system which is very easily compatible for hybrid and permissioned distributed ledger systems, a variety of tools on JAVA, RUST, PYTHON and JAVASCRIPT, https://opentimestamps.org/.

7.2 W3C

World Wide Web Consortium: W3C (https://www.w3.org/) is a well-known international community where a diverse of members deploy together Web Standards, between other initiatives within this organization, last version about Verifiable Credentials Data Model [i.6] is published which is a standardization effort with relevant commonalities for identity management on distributed ledger technologies. There is also an open repository for technical specifications at github herein https://github.com/w3c/vc-data-model/issues.

7.3 Alastria

Alastria is a non-profit association that promotes the digital economy. It is a framework for networks based on Public Permissioned Distributed Ledgers. Public and Private sector and governmental administrative bodies are composing a whole economic coverage on Distributed Ledger Initiatives which compete and cooperate between their members to help the harmonization of Standards and regulation with their Use Cases. The Association has presented at UNE a proposal of "de-facto" standard implemented on Alastria, the new work item was accepted and it is under revision by UNE CTN 71/SC 307/GT1 for a Decentralized Model of Identity, https://alastria.io/en/.

7.4 Dutch Blockchain Coalition (Private Public Partnership Netherlands)

The efforts of this Private Public Partnership is to build a reliable blockchain infrastructure in Netherlands, the coalition contains Banks, supervisory bodies such as Netherlands Authority for Financial Markets and Royal Dutch Association of Civil-law Notaries, government ministries, legal organizations, knowledge institutions and Academic Institutions.

At the European level the coalition holds talks with EU and at country level with Belgium, Luxemburg and Germany, https://dutchblockchaincoalition.org/en.

7.5 Hyperledger Project™

Hyperledger is the leader of private permissioned distributed ledger initiatives with Hyperledger Fabric but it is also a combination with other tools and functionalities which are impacting for interoperability with Permissionless Distributed Ledgers and Public Permissioned Distributed Ledgers. It is a well-organized charter by Linux Foundation. It has got a variety of projects available which incubates and promotes for a business blockchain technologies industry, in Permissioned Distributed Ledgers: Burrow for permissionable smart contracts machine, Fabric with a range of use cases from finance to supply-chain, Indy for a decentralized identity management, Iroha a consensus with multi-signature support or Swatooth with a Proof of Elapse Time with the aim of a minimal resource consumption. It is also noted their libraries like Aries, Quilt or Transact between others and some tools for ledger independent implementation, https://www.hyperledger.org/.

7.6 EEA

Enterprise Ethereum Alliance: (Enterprise Ethereum Alliance Inc) is a member-driven standards organization whose charter is developing open, blockchain specifications that facilitate harmonisation and interoperability for business and consumers worldwide. It is a complete community with key players in the industry cooperating on specifications under working groups leadership and some of their publications are interesting like Telecommunications Use cases, Real Estate Use Case Overview and a Token Taxonomy Initiative Flyer.

7.7 SEP: Common denominator with SEP (Standards Essential Patent) Landscape

https://publications.jrc.ec.europa.eu/repository/bitstream/JRC104068/jrc104068%20online.pdf [i.8].

A patent that is necessarily practiced by any implementation of a technology standard. The prospect of licensing patents that are essential to standards on an industry-wide scale is a major incentive for companies to invest in standardization activities. Most Standard Development Organizations (SDOs) have defined Intellectual Property Rights (IPR) policies whereby SDO members have to commit to licensing their Standard-Essential Patents (SEPs) on Fair, Reasonable and Non-Discriminatory (FRAND) terms. SEPs have a higher value and large family size than other patents: http://ec.europa.eu/growth/content/landscaping-study-standard-essential-patents-europe-0_en [i.9].

7.8 INATBA

The International Association for Trusted Blockchain Applications (https://inatba.org/) was founded in April 2019 and is organically under coordination and establishment of various Working Groups and liaisons with Standards Developing Bodies. It is well organized and closely connected in this inception with the European Commission and European Blockchain Observatory and Forum perspective. It is actively promoting the dialogue with policy makers and public administrative bodies, and connected the private sector envisioned for the European Blockchain Service Infrastructure.

7.9 Alliance for Internet of Things Innovation

The AIOTI "Alliance on IoT Innovation" (https://aioti.eu/) is an industrial partner of the European Commission. The alliance is representing the European industry around the Internet of Things. Fostering Research and Innovation from within its 14 working groups (https://aioti.eu/working-groups/).

The AIOTI working group on Distributed Ledger Technologies is working on mapping current DLT and Blockchain implementations on IoT, rate the models towards legal compliance (including GDPR), assist existing AIOTI WG's on the development of sustainable ecosystems across verticals while including startups and SMEs, gather evidences and market obstacles for DLT as enabling technology on the Digital Single Market and assist to shape research and innovation policy to foster experimentation, replication and deployments.

7.10 Industrial Internet Consortium®

It is a Global Not-For Profit Partnership of industry, government and Academia, it was founded in March 2014 to bring the organizations and technologies necessary to accelerate the growth of the industrial internet by identifying assembling, testing and promoting best practices, https://www.iiconsortium.org/.

7.11 Internet Society (ISoc) IRTF

A Research Group is in formation in the IRTF on the topic of Decentralized Internet Infrastructure (DIN). The Decentralized Internet Infrastructure Research Group (DINRG) will investigate open research issues in decentralizing infrastructure services such as trust management, identity management, name resolution, resource/asset ownership management and resource discovery. The focus of DINRG is on infrastructure services that can benefit from decentralization or that are difficult to realize in local, potentially connectivity-constrained networks. Other topics of interest are the investigation of economic drivers and incentives and the development and operation of experimental platforms. DINRG will operate in a technology- and solution-neutral manner, i.e. while the RG has an interest in distributed ledger technologies, it is not limited to specific technologies or implementation aspects. More details of the DIN RG are available: https://trac.ietf.org/trac/iab/wiki/Multi-Stake-Holder-Platform#Ledger.

7.12 OASIS

OASIS (https://www.oasis-open.org/standards) is a non-profit consortium that drives the development, convergence and adoption of open standards for the global information society. The consortium has more than 2 000 participants representing over 600 organizations and individual members in more than 65 countries.

Existing OASIS standards projects with e-commerce applications are being applied to define blockchain-based serialization methods, as alternative representations of their content (such as e-invoices).

7.13 SBS

Small Business Standards (https://www.sbs-sme.eu/): was established on 25th October 2013 and it is an international non-profit association, in line with Regulation 1025/2012 on the European Standardization [i.10] System. Its mission is representing the interest of 12 million SMEs in the standardization process, raise their-awareness about standardization and facilitating their uptake of standards, and motivate them to engage in the standardization process.

7.14 OGC®

Open Geospatial Consortium (OGC): announced the creation of a new Domain Working Group for Blockchain and Distributed Ledger Technologies. In October 2018, OGC published a Discussion Paper "Geospatial Standardization of Distributed Ledger Technologies" [i.11] with the purpose of improving the understanding of Blockchain and distributed ledger technologies (http://www.opengeospatial.org/projects/groups/bdltdwg).

7.15 FIG

International Federation of Geomatics (FIG). It is the international organization representing the interests of surveyors worldwide. It is a federation of the national member associations and covers the whole range of professional fields within the global surveying, geomatics, geodesy and geo-information community. It wants to keep and even improve, its role as the premier non-governmental organization that represents the interests of surveyors worldwide. Members are associations, affiliates, corporate members and academic members. It is structurally organized on Commissions.

FIG Commission 9 on Valuation and Management of Real Estate and FIG Commission 7 on Cadastre and Land Management are the two groups looking into implications on Blockchain and DLTs, http://www.fig.net/.

7.16 oneM2M™

oneM2M, it deploys standards for Machine-to-Machine and the Internet of Things, it is almost 200 members. The purpose and goal is to develop technical specifications which for a common M2M Service Layer that can be embedded within various hardware and software, and relied upon to connect the devices in the field with M2M application servers worldwide, http://www.onem2m.org/.

7.17 OMA™

Open Mobile Alliance™, it deploys specification and promoting standards in mobile and internet of things technology development, in particular APIs it is a part of components with DLT's scenarios, and OMA has got an interesting API Inventory, https://www.openmobilealliance.org/wp/API_Inventory.html.

8 Highlights of PDL solutions and needs

8.1 Regulatory Aspects

There are a number of existing laws that are applicable to DLT like KYC (Know Your Customer) and AMl (Anti-Money Laundering) requirements, at the same time there are initiatives from countries to include exemptions or benefit to startups using DLT like Switzerland or the sandbox rule in Swiss banking law. France and Germany proposed to introduce a uniform regulation of DLT in 2018 at G20 summit but did not convince the G20 for a suitable law. A number of countries are running recommendations from their central banks and other regulatory authorities which increase the proliferation of needs for a legal framework with no uncertainty. For pioneering countries which start DLT-specific legislation. Legislators are more focus on ICOs and STOs and financial regulation. CFT (Counter-Financing of Terrorism or Combating the financing terrorism) involves investigating, analysing, deterring and preventing sources of funding activities for political achievement, religious or ideological goals thru violence. For financial industry there are a number of risks identified mainly for Cryptocurrencies.

On regards on the Node operators and within telecommunication law the instrument called "provider privilege" in Europe it has been defined as per Directive 2000/31/EC [i.7] in particular with the liability of intermediary service providers in Section 4, article 12:

"Mere conduit"

1) *Where an information society service is provided that consists of the transmission in a communication network of information provided by a recipient of the service, or the provision of access to a communication network, Member States shall ensure that the service provider is not liable for the information transmitted, on condition that the provider:*

   a) *does not initiate the transmission;*

   b) *does not select the receiver of the transmission; and*

   c) *does not select or modify the information contained in the transmission.*

Legal liability within permissioned and access restricted DLT systems, to preserve the trust in the immutability, a node operator should not be forced to delete some part of a DLT system even when it is known to be in conflict with the law. Conflicts arise for copyrights, trademarks, privacy, antitrust or unfair competition which in public blockchains these are conflicts indeed. There are some existing laws for instance in Data protection for personal data like GDPR and other countries It is a recommended practice to deal a PIA, Privacy Impact Assessment to assists organizations in identifying and minimizing the privacy risks.

In trade and logistic it is relevant the UN/CEFACT which is preparing a White Paper on Blockchain, and UNCITRAL environment is ideal to conferred multijurisdictional approach.

Government services are increasingly utilizing DLT to provide trust services, e-government initiatives are enhancing their frameworks, for instance in Europe exists TOOP which is a pilot for interoperability. Anticipation is a relevant factor a new design with Policy Enforcement Points that are distributed among governed network. These areas can harmonize better data minimization and use limitation of data.

Regulation on electronic identification and trust services, there are a number of laws for digital signatures, electronic certificates and identification which sometimes are not neutral or consolidate a common denominator globally. eIDAS is a proper framework which is extensively improving these aspects.

Smart Contracts enforceability is other back-bone in permissioned distributed ledger systems.

Competition Law and Anti-Trust policies are a relevant part for regulatory areas and policy makers.

Conformance and compatible chip-sets and other components are also a compliance needs for a multijurisdictional framework. Hybrid ecosystems brings even new challenges in this sense, where multiple actors with different components can interoperate between them, safety of human beings is a public good that implies at many industries the perseverance in controlling and stewardship gives some ability to resolve clearance.

It is also of importance the common evolving of Sandboxes in different countries to granted a secured testing environment with the allowance of discoverability and improving the legal innovation and experimentation.

8.2 Ecosystem and EU-Market aspects

European Blockchain Partnership (EBP) (https://ec.europa.eu/digital-single-market/en/news/european-countries-join-blockchain-partnership) was launched on the 10th April 2018. With the aim to develop a trusted, secure and resilient European Blockchain Services Infrastructure (EBSI) meeting the highest standards in terms of privacy, cybersecurity, interoperability and energy efficiency, as well as fully complaint with the EU law.

The European Blockchain Partnership develops a set of Guiding Principles and Specifications for the EBSI (European Blockchain Service Infrastructure) to enhance and recognize a reference for development of Blockchain infrastructures and will propose a model to describe the overall policy and technical governance of the EBSI.

EBSI currently has 4 use cases these are: self-sovereign identity, diploma, verification and trusted data sharing. In the future this is likely to increase. The goal of EBSI infrastructure in cross-boarder interactions, make national projects interoperable, enhance identity frameworks (e.g. eIDAS). Pilot development has started in 2019; large scale implementation is planned in 2021-2022.

Some pilots are in deployment; various organic development are managing different aspects like EIRA (European Interoperability Reference Architecture) and ESSIF (European Self-Sovereign Identify Framework).

ICT Standardization priorities for the Digital Single Market is an indicator to overview the EU-Market development: https://ec.europa.eu/digital-single-market/en/news/communication-ict-standardisation-priorities-digital-single-market.

eIDAS regulation is the framework of preeminent success in Europe and an intrinsic part of the European Ecosystem.

9 Enhancements and recommendations for further collaboration

Technical collaborations to be considered: CEN-CENELEC, ISO TC307, ITU-T, W3C, IEEE Policy and ecosystem collaborations needed: OECD (focus on public sectors), EBP, EBSI, ESSIF, EIRA, INATBA, UN/CEFACT and UNCITRAL, Timelines of external organizations/events and their impact on collaborations: https://www.gsma.com/, http://www.opengeospatial.org/.

Annex A:
Ledger Data Structures:

ITU-T FG DLT, previously described within in clause 5.3 of the present document, has published their recommendations and deliverables are published. The deliverables listed above and the documents described in table A.1 are part of the detailed study of the Focus Group on Distributed Ledger Technologies and their Applications as an overview for the ledger data structures in use.

Table A.1: Common families of ledger data structures in use or development as of August 2019

Name	Structure	Storage size and growth for a validating node	Availability requirements for running a validating node	Availability requirements for transaction creation	Strength of ordering
Bitcoin blockchain	Hash-chained blocks of transactions	All transactions grow linearly	Block headers, Full UTXO set	Relevant unspent transaction outputs	Total, all transactions are ordered
Ethereum blockchain	Hash-chained blocks of transactions	All transactions grow linearly	Block headers, full state structure	State sub-structure relevant for transition	Total, all transactions are ordered
Tangle	DAG of blocks	All transactions grow linearly	All transactions. You can partially validate with partial data	Two older valid transactions, although for rapid transmission and verification, these should be in the "heaviest" branch	Partial, based on which transactions are "ancestors"
Fixed-length	Account table and fixed verification string	Accounts only, grows by # of accounts (not TXs)	Fixed verification string, UTXO set	Relevant unspent transaction outputs	Total (In most implementations)
Sharded / parachains	Multiple hash-chained blocks of transactions with some relationships	All transactions grow linearly	As required by shard type, most nodes validate only a subset of all shards.	As required by shard type, only "shards" or "chains" participating in transaction	Total for each chain, with "cross-links" to create ordering between chains
Block lattice	Per-account hash-chained transactions	All transactions grow linearly	Nodes validate certain accounts only, and only need the relevant history for that account and accounts it interacted with	Consensus state for accounts participating in transaction	Partial - Accounts have total order, unrelated accounts unordered
HashGraph	DAG of blocks	All transactions grow linearly	All transactions	Two older valid transactions	Total, all transactions are ordered

NOTE: Table published by ITU-T Focus Group on Application of DLT within its Technical Report FG DLT D5 OUTLOOK on Distributed Ledger Technologies [i.5].

Annex B:
List of EU funded H2020 Research Projects on DLT

ETSI ISG PDL 001 - List of EU funded Horizon 2020 Research and Innovation Projects on Blockchain and/or Distributed Ledger Technologies in alphabetical order.

Source: The Community Research and Development Information Service (CORDIS): https://cordis.europa.eu/projects/en.

NOTE: No guarantee can be given for the completeness, correctness and topicality of the information and contents compiled here.

Table B.1: List of EU funded Horizon 2020 Research and Innovation Projects on Blockchain and/or Distributed Ledger Technologies in alphabetical order

Project			Duration		Horizon 2020		Coordinated		Funding	Sector
Acronym	Name	Factsheet (CORDIS)	Start	End	Topic(s)	Programme(s)	By	Country	Scheme	Field of Research
5G-DIVE	eDge Intelligence for Vertical Experimentation	https://cordis.europa.eu/project/id/859881	2019-10-01	2021-09-30	ICT-23-2019-EU-Taiwa	nH2020-EU.2.1.1. - IN	UNIVERSIDAD CARLOS III DE MADRID	Spain	RIA	5G
AEGIS	Advanced Big Data Value Chain for Public Safety and Personal Security	https://cordis.europa.eu/project/id/732189	2017-01-01	2019-06-30	ICT-14-2016-2017-BigDa	H2020-EU.2.1.1. - IN	FRAUNHOFER GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V.	Germany	IA	Big Data
AMable	AdditiveManufacturABLE	https://cordis.europa.eu/project/id/768775	2017-09-01	2021-08-31	FOF-12-2017 - ICT Innovat	H2020-EU.2.1.1. - IN	FRAUNHOFER GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V.	Germany	IA	Manufacturing
ANITA	Advanced tools for fighting oNline Illegal TrAfficking	https://cordis.europa.eu/project/id/787061	2018-05-01	2021-04-30	SEC-12-FCT-2016-2017 - T	H2020-EU.3.7.6. - En	ENGINEERING - INGEGNERIA INFORMATICA SPA	Italy	RIA	CyberSecurity
ARTICONF	smART soclal media eCOsytstem in a blockchaiN Federated environment	https://cordis.europa.eu/project/id/825134	2019-01-01	2020-12-31	ICT-28-2018 - Future Hype	H2020-EU.2.1.1. - IN	UNIVERSITAET KLAGENFURT	Austria	RIA	Media
B4CM	Blockchains as a Distributed Ledger for Attribution of RCM Data in Rail	https://cordis.europa.eu/project/id/826156	2018-12-01	2021-11-30	S2R-OC-IPX-03-2018 - Inn	oH2020-EU.3.4.8. - Shi	THE UNIVERSITY OF BIRMINGHAM	United Kingdom	CSA	Mobility
B4TDM	Making Contracts Digital with Civilised Blockchain	https://cordis.europa.eu/project/id/858630	2019-05-01	2021-04-30	EIC-SMEInst-2018-2020	SH2020-EU.3. - PRIORI	BILLON DIGITAL SERVICES SPOLKA Z OGRANICZONA ODPOWIEDZIALNOSCIA	Poland	SME-2	Digital Economy
BEACON	Boosting Agricultural Insurance based on Earth Observation data	https://cordis.europa.eu/project/id/821964	2019-01-01	2022-01-31	DT-SPACE-01-EO-2018-20	H2020-EU.2.1.6.1. - E	KARAVIAS MESITES ASFALISEON KAI SYMVOULOI ASFALISEON ANONYMI ETAIRIA	Greece	IA	Space Data
BILLON	Disrupting the economy - FinTech blockchain solution revolutionises direct payments. Secure, low-cost and simple bank-free payments for everyone	https://cordis.europa.eu/project/id/783861	2017-08-01	2019-11-30	SMEInst-01-2016-2017 - O	H2020-EU.2.1.6.3. - E	BILLON SPOLKA Z OGRANICZONA ODPOWIEDZIALNOSCIA	Poland	SME-2	FinTech
BitBox	Enterprise - Enterprise-grade Solution for Digital Assets Custody	https://cordis.europa.eu/project/id/855049	2019-03-01	2019-06-30	EIC-SMEInst-2018-2020	SH2020-EU.3. - PRIORI	SHIFT DEVICES AG	Switzerland	SME-1	CyberSecurity
Bitwala	Next generation banking tools for the blockchain economy	https://cordis.europa.eu/project/id/854346	2019-02-01	2019-05-31	EIC-SMEInst-2018-2020	SH2020-EU.3. - PRIORI	BITWALA GMBH	Germany	SME-1	FinTech

Project			Duration		Horizon 2020		Coordinated		Funding	Sector
Acronym	Name	Factsheet (CORDIS)	Start	End	Topic(s)	Programme(s)	By	Country	Scheme	Field of Research
Bitztribution	Towards a fully decentralized distribution for next generation of travel and tourism distribution	https://cordis.europa.eu/project/id/876748	2019-08-01	2019-11-30	EIC-SMEInst-2018-2020	SH2020-EU.3. - PRIORI	BUSINESS DISTRIBUTION BLOCKCHAIN SOLUTIONS S.L.	Spain	SME-1	Digital Economy
Block.IS	Blockchain Innovation Spaces	https://cordis.europa.eu/project/id/824509	2019-05-01	2021-12-31	INNOSUP-01-2018-2020	H2020-EU.2.3.2.2. - E	F6S NETWORK LIMITED	United Kingdom	IA	Circular Economy
BlockchainKYC	Blockchain-based, 100 % automated KYC (Know Your Customer) service	https://cordis.europa.eu/project/id/774802	2017-07-01	2017-11-30	SMEInst-13-2016-2017 - E	H2020-EU.3.7. - Secu	AUTHENTEQ EHF	Iceland	SME-1	Secure Societies
BLOCKCHERS	BLOCKCHAIN TECHNOLOGIES FOR SMEs	https://cordis.europa.eu/project/id/828840	2019-02-01	2021-01-31	INNOSUP-03-2018 - Block	H2020-EU.2.3.2.2. - E	ZABALA INNOVATION CONSULTING, S.A.	Spain	CSA	Big Data
Blocknetwork	Fusing Big Data and Implementing Novel Cyber Security Solutions	https://cordis.europa.eu/project/id/827457	2018-09-01	2019-02-28	EIC-SMEInst-2018-2020	SH2020-EU.3. - PRIORI	DATAUNITOR AS	Norway	SME-1	Big Data
BLOCKPOOL	Pooling SME adoption and deployment of Blockchain and other DLTs	https://cordis.europa.eu/project/id/828888	2019-07-01	2021-06-30	INNOSUP-03-2018 - Block	H2020-EU.2.3.2.2. - E	FRANKFURT SCHOOL OF FINANCE & MANAGEMENT GEMEINNUTZIGE GMBH	Germany	CSA	Education
BlockStart	Helping SMEs take the first steps into the Blockchain	https://cordis.europa.eu/project/id/828853	2019-09-01	2022-02-28	INNOSUP-03-2018 - Block	H2020-EU.2.3.2.2. - E	BRIGHT DEVELOPMENT STUDIO SA	Portugal	CSA	Education
BLOOMEN	Blockchains in the new era of participatory media experience	https://cordis.europa.eu/project/id/762091	2017-09-01	2020-08-31	ICT-19-2017 - Media and c	H2020-EU.2.1.1. - IN	WORLDLINE IBERIA SA	Spain	IA	Media
BodyPass	API-ecosystem for cross-sectorial exchange of 3D personal data	https://cordis.europa.eu/project/id/779780	2018-01-01	2020-12-31	ICT-14-2016-2017 - Big Da	H2020-EU.2.1.1. - IN	NSTITUTO DE BIOMECANICA DE VALENCIA	Spain	IA	Healthcare
BRAIN-IoT	model-Based fRamework for dependable sensing and Actuation in INtelligent decentralized IoT systems	https://cordis.europa.eu/project/id/780089	2018-01-01	2020-12-31	IoT-03-2017 - R&I on IoT i	nH2020-EU.2.1.1. - IN	FONDAZIONE LINKS - LEADING INNOVATION & KNOWLEDGE FOR SOCIETY	Italy	RIA	IoT
BrainPatch	BrainPatch – Breakthrough non-invasive brain stimulation using AI	https://cordis.europa.eu/project/id/867386	2019-06-01	2019-11-30	EIC-SMEInst-2018-2020	SH2020-EU.3. - PRIORI	BRAINPATCH LTD	United Kingdom	SME-1	Healthcare
C4IIoT	Cyber security 4.0: protecting the Industrial Internet Of Things	https://cordis.europa.eu/project/id/833828	2019-06-01	2022-05-31	SU-ICT-01-2018 - Dynamic	H2020-EU.2.1.1. - IN	IDRYMA TECHNOLOGIAS KAI EREVNAS	Greece	IA	CyberSecurity
CATALYST	Converting DCs in Energy Flexibility Ecosystems (CATALYST)	https://cordis.europa.eu/project/id/768739	2017-10-01	2020-09-30	EE-20-2017 - Bringing to m	H2020-EU.3.3.1. - Re	ENGINEERING - INGEGNERIA INFORMATICA SPA	Italy	IA	Circular Economy
CATTLECHAIN 4.0	Enhancing farm productivity and guaranteeing CATTLE traceability and welfare with blockCHAIN	https://cordis.europa.eu/project/id/853864	2019-04-01	2022-03-31	EIC-FTI-2018-2020 - Fast T	H2020-EU.3. - PRIORI	MANAGEMENT, CONSTRUCTION AND TRADE, INNOVATIVE SOLUTIONS INTERNATIONAL SL	Spain	IA	IoT
CHARIOT	Cognitive Heterogeneous Architecture for Industrial IoT	https://cordis.europa.eu/project/id/780075	2018-01-01	2020-12-31	IoT-03-2017 - R&I on IoT i	nH2020-EU.2.1.1. - IN	INLECOM SYSTEMS LTD	United Kingdom	RIA	IoT
ChemChain	Blockchain Platform to Track Chemicals along the Value Chain	https://cordis.europa.eu/project/id/875783	2019-08-01	2020-01-31	EIC-SMEInst-2018-2020	SH2020-EU.3. - PRIORI	MY CHEMICAL MONITORING BV	Netherlands	SME-1	Circular Economy
CO3	Digital Disruptive Technologies to Co-create, Co-produce and Comanage Open Public Services along with Citizens	https://cordis.europa.eu/project/id/822615	2019-01-01	2021-12-31	DT-TRANSFORMATIONS-0	H2020-EU.3.6.2.2. - E	UNIVERSITA DEGLI STUDI DI TORINO	Italy	RIA	Digital Society

Project			Duration		Horizon 2020		Coordinated		Funding	Sector
Acronym	Name	Factsheet (CORDIS)	Start	End	Topic(s)	Programme(s)	By	Country	Scheme	Field of Research
COBAFRA	Combatting Banking Fraud with SiS-id: A unique solution for preventing corporate payments fraud using AI and blockchain	https://cordis.europa.eu/project/id/835813	2019-01-01	2019-06-30	EIC-SMEInst-2018-2020	SH2020-EU.3. - PRIORI	SIS	France	SME-1	Digital Economy
CONNECARE	Personalised Connected Care for Complex Chronic Patients	https://cordis.europa.eu/project/id/689802	2016-04-01	2019-12-31	PHC-25-2015 - Advanced I	H2020-EU.3.1.6. - He	FUNDACIO EURECAT	Spain	RIA	Healthcare
COOL-SENS	Advanced monitoring solution to prevent losses and assure full transparency along the cold chain	https://cordis.europa.eu/project/id/855554	2019-03-01	2019-07-31	EIC-SMEInst-2018-2020	SH2020-EU.3. - PRIORI	ANSERLOG S.A.	Spain	SME-1	IoT
CoordiNet	Large scale campaigns to demonstrate how TSO-DSO shall act in a coordinated manner to procure grid services in the most reliable and efficient way	https://cordis.europa.eu/project/id/824414	2019-01-01	2022-06-30	LC-SC3-ES-5-2018-2020T	H2020-EU.3.3.4. - A s	ENDESA DISTRIBUCION ELECTRICA S.L	Spain	IA	Smart Grid
CREST	Fighting Crime and TerroRism with an IoT-enabled Autonomous Platform based on an Ecosystem of Advanced IntelligEnce, Operations, and InveStigation Technologies	https://cordis.europa.eu/project/id/833464	2019-09-01	2022-08-31	SU-FCT02-2018-2019-202	0H2020-EU.3.7.1. - Fig	SERVICIUL DE PROTECTIE SI PAZA	Romania	RIA	Secure Societies
CRITICAL-CHAINS	IOT- & Blockchain-Enabled Security Framework for New Generation Critical Cyber-Physical Systems In Finance Sector	https://cordis.europa.eu/project/id/833326	2019-07-01	2022-06-30	SU-DS05-2018-2019 - Digi	H2020-EU.3.7.6. - En	THE UNIVERSITY OF READING	United Kingdom	IA	CyberSecurity
CUREX	seCUre and pRivate hEalth data eXchange	https://cordis.europa.eu/project/id/826404	2018-12-01	2021-11-30	SU-TDS-02-2018 - Toolkit	fH2020-EU.3.1.5.1. - I	UNIVERSITY OF PIRAEUS RESEARCH CENTER	Greece	RIA	Healthcare
CYBER-TRUST	Advanced Cyber-Threat Intelligence, Detection, and Mitigation Platform for a Trusted Internet of Things	https://cordis.europa.eu/project/id/786698	2018-05-01	2021-04-30	DS-07-2017 - Cybersecurit	H2020-EU.3.7.4. - Im	KENTRO MELETON ASFALEIAS	Greece	RIA	CyberSecurity
D4FLY	Detecting Document frauD and iDentity on the fly	https://cordis.europa.eu/project/id/833704	2019-09-01	2022-08-31	SU-BES02-2018-2019-202	0H2020-EU.3.7.3. - Str	VERIDOS GMBH	Germany	RIA	Secure Societies
DECENTER	Decentralised technologies for orchestrated cloud-to-edge intelligence	https://cordis.europa.eu/project/id/815141	2018-07-01	2012-06-30	EUK-01-2018 - Cloud, IoT	aH2020-EU.2.1.1. - IN	FONDAZIONE BRUNO KESSLER	Italy	RIA	Cloud/IoT/AI
DECODE	Decentralised Citizens Owned Data Ecosystem	https://cordis.europa.eu/project/id/732546	2016-12-01	2019-12-31	ICT-12-2016 - Net Innovat	H2020-EU.2.1.1. - IN	INSTITUT MUNICIPAL D'INFORMATICA DE BARCELONA	Spain	RIA	IoT
DEFENDER	Defending the European Energy Infrastructures	https://cordis.europa.eu/project/id/740898	2017-05-01	2020-04-30	CIP-01-2016-2017 - Preve	nH2020-EU.3.7.4. - Im	ENGINEERING - INGEGNERIA INFORMATICA SPA	Italy	IA	CyberSecurity
DFS	Democratized Financial Services	https://cordis.europa.eu/project/id/865430	2019-05-01	2019-10-31	EIC-SMEInst-2018-2020	SH2020-EU.3. - PRIORI	BLOCKSTATE AG	Switzerland	SME-1	FinTech
DLInnociate	DLInnociate Innovation Associate knowledgeable in blockchain technology for real time economy platform business development	https://cordis.europa.eu/project/id/739782	2017-09-01	2018-08-31	INNOSUP-02-2016 - Europ	H2020-EU.2.3.2.2. - E	DIGITAL LIVING INTERNATIONAL OY	Finland	CSA	Digital Economy
DRIVE	Demand Response Integration tEchnologies: unlocking the demand response potential in the distribution grid	https://cordis.europa.eu/project/id/774431	2017-12-01	2020-11-30	LCE-01-2016-2017 - Next	gH2020-EU.3.3.4. - A s	R2M SOLUTION SPAIN SL	Spain	RIA	Smart Grid
EBSIS	Event Based Systems in Iaşi - A Twinning between Universitatea Alexandru Ioan Cuza din Iaşi, Université de Neuchâtel and Technische Universität Dresden	https://cordis.europa.eu/project/id/692178	2016-01-01	2018-12-31	H2020-TWINN-2015 - Twi	H2020-EU.4.b. - Twin	UNIVERSITATEA ALEXANDRU IOAN CUZA DIN IASI	Romania	CSA	Big Data
eDREAM	enabling new Demand REsponse Advanced, Market oriented and Secure technologies, solutions and business models	https://cordis.europa.eu/project/id/774478	2018-01-01	2020-12-31	LCE-01-2016-2017 - Next	gH2020-EU.3.3.4. - A s	ENGINEERING - INGEGNERIA INFORMATICA SPA	Italy	RIA	Smart Grid
EENVEST	Risk reduction for Building Energy Efficiency investments	https://cordis.europa.eu/project/id/833112	2019-07-01	2022-06-30	LC-SC3-EE-10-2018-2019	2H2020-EU.3.3.7. - Ma	ACCADEMIA EUROPEA DI BOLZANO	Italy	CSA	Circular Economy
EKOFOLIO	Expanding Key Opportunities in FOrest Investments: Liquidity, Impact and Ownership through Blockchain	https://cordis.europa.eu/project/id/876676	2019-10-01	2019-12-31	EIC-SMEInst-2018-2020	SH2020-EU.3. - PRIORI	EKOFOLIO SARL	Luxembourg	SME-1	Circular Economy
ENHANCE	Building an Excellency Network for Heightening Agricultural ecoNomic researCh and Education in Romania	https://cordis.europa.eu/project/id/691681	2016-01-01	2018-12-31	H2020-TWINN-2015 - Twi	H2020-EU.4.b. - Twin	UNIVERSITATEA DE STIINTE AGRONOMICE SI MEDICINA VETERINARA DIN BUCURESTI	Romania	CSA	Education
euCANSHare	An EU-Canada joint infrastructure for next-generation multi-Study Heart research	https://cordis.europa.eu/project/id/825903	2018-12-01	2022-11-30	SC1-BHC-05-2018 - Intern	H2020-EU.3.1.5. - Me	UNIVERSITAT DE BARCELONA	Spain	RIA	Healthcare
EUNOMIA	User-oriented, secure, trustful & decentralised social media	https://cordis.europa.eu/project/id/825171	2018-12-01	2021-11-30	ICT-28-2018 - Future Hype	H2020-EU.2.1.1. - IN	UNIVERSITY OF GREENWICH	United Kingdom	IA	Media
FAR-EDGE	Factory Automation Edge Computing Operating System Reference Implementation	https://cordis.europa.eu/project/id/723094	2016-10-01	2019-10-31	FOF-11-2016 - Digital auto	H2020-EU.2.1.1. - IN	ENGINEERING - INGEGNERIA INFORMATICA SPA	Italy	RIA	Manufacturing

Project			Duration		Horizon 2020		Coordinated		Funding	Sector
Acronym	Name	Factsheet (CORDIS)	Start	End	Topic(s)	Programme(s)	By	Country	Scheme	Field of Research
FeatureCloud	Privacy preserving federated machine learning and blockchaining for reduced cyber risks in a world of distributed healthcare	https://cordis.europa.eu/project/id/826078	2019-01-01	2023-12-31	SU-TDS-02-2018 - Toolkit	fH2020-EU.3.1.5.1. - I	TECHNISCHE UNIVERSITAET MUENCHEN	Germany	RIA	Healthcare
FINSEC	Integrated Framework for Predictive and Collaborative Security of Financial Infrastructures	https://cordis.europa.eu/project/id/786727	2018-05-01	2021-04-30	CIP-01-2016-2017 - Preve	nH2020-EU.3.7.4. - Im	GFT ITALIA SRL	Italy	IA	CyberSecurity
FIN-TECH	A FINancial supervision and TECHnology compliance training programme	https://cordis.europa.eu/project/id/825215	2019-01-01	2020-12-31	ICT-35-2018 - Fintech: Sup	H2020-EU.2.1.1. - IN	UNIVERSITA DEGLI STUDI DI PAVIA	Italy	CSA	FinTech
FOrLedger	A Blockchain-based Middleware Platform for Food Tracking Ledger Builder	https://cordis.europa.eu/project/id/856065	2019-04-01	2019-07-31	EIC-SMEInst-2018-2020	SH2020-EU.3. - PRIORI	OPEN CANARIAS SL	Spain	SME-1	Digital Economy
GASTEJO	Decentralized Travel Apartment Distribution Platform	https://cordis.europa.eu/project/id/832537	2018-12-01	2019-05-31	EIC-SMEInst-2018-2020	SH2020-EU.3. - PRIORI	ARTEEVO TECHNOLOGIES LTD	Israel	SME-1	Digital Economy
GET	Green Energy Tracker. The international tracking system for guarantees of origin, green energy certificates and green labels	https://cordis.europa.eu/project/id/775225	2017-05-01	2017-08-31	SMEInst-09-2016-2017 - S	H2020-EU.3.3. - SOCI	MEGAVATIO CONTROL SL	Spain	SME-1	Circular Economy
GHOST	Safe-Guarding Home IoT Environments with Personalised Realtime Risk Control	https://cordis.europa.eu/project/id/740923	2017-05-01	2020-04-30	DS-02-2016 - Cyber Securi	H2020-EU.3.7.4. - Im	TELEVES SA	Spain	IA	CyberSecurity
I Go Slow	BLOCKCHAIN BASED PLATFORM FOR BRINGING SLOW FOOD IDEAS AND FAMILY OWNED FARMING TO CYBERSPACE	https://cordis.europa.eu/project/id/868842	2019-06-01	2019-11-30	EIC-SMEInst-2018-2020	SH2020-EU.3. - PRIORI	VOVERE IR RIESUTAS, MB	Lithuania	SME-1	Digital Economy
ICARUS	Aviation-driven Data Value Chain for Diversified Global and Local Operations	https://cordis.europa.eu/project/id/780792	2018-01-01	2020-12-31	ICT-14-2016-2017 - Big Da	H2020-EU.2.1.1. - IN	GIOUMPITEK MELETI SCHEDIASMOS YLOPOIISI KAI POLISI ERGON PLIROFORIKIS ETAIREIA PERIORISMENIS EFTHYNIS	Greece	IA	Big Data
INFINITECH	Tailored IoT & BigData Sandboxes and Testbeds for Smart, Autonomous and Personalized Services in the European Finance and Insurance Services Ecosystem	https://cordis.europa.eu/project/id/856632	2019-10-01	2022-12-31	ICT-11-2018-2019 - HPC a	H2020-EU.2.1.1. - IN	GFT ITALIA SRL	Italy	IA	Big Data
INSPECTO	INSPECTO: A disruptive portable device with an innovative Method for Pesticides and contaminants Detection in Food	https://cordis.europa.eu/project/id/808038	2017-12-01	2018-04-30	SMEInst-07-2016-2017 - S	H2020-EU.3.2.4. - Sus	INSPECTO SOLUTIONS LTD	Israel	SME-1	Digital Economy
INSPECTr	Intelligence Network and Secure Platform for Evidence Correlation and Transfer (INSPECTr)	https://cordis.europa.eu/project/id/833276	2019-09-01	2022-08-31	SU-FCT02-2018-2019-202	0H2020-EU.3.7.1. - Fig	UNIVERSITY COLLEGE DUBLIN, NATIONAL UNIVERSITY OF IRELAND, DUBLIN	Ireland	RIA	Secure Societies
INTERFACE	TSO-DSO-Consumer INTERFACE aRchitecture to provide innovative grid services for an efficient power system	https://cordis.europa.eu/project/id/824330	2019-01-01	2022-12-31	LC-SC3-ES-5-2018-2020 - T	H2020-EU.3.3.4. - A s	EUROPEAN DYNAMICS LUXEMBOURG SA	Luxembourg	IA	Smart Grid
INTERLACE	INTERLACE Interacting Decentralized Transactional and Ledger Architecture for Mutual Credit	https://cordis.europa.eu/project/id/754494	2017-05-01	2018-10-31	FETOPEN-04-2016-2017	H2020-EU.1.2.1. - FET	SARDEX SPA	Italy	CSA	FinTech
IoTCrawler	IoTCrawler	https://cordis.europa.eu/project/id/779852	2018-02-01	2021-12-31	IoT-03-2017 - R&I on IoT i	nH2020-EU.2.1.1. - IN	UNIVERSIDAD DE MURCIA	Spain	RIA	IoT
JUMP2Excel	Joint Universal activities for Mediterranean PV integration Excellence	https://cordis.europa.eu/project/id/810809	2018-10-01	2021-09-30	WIDESPREAD-05-2017 - T	wH2020-EU.4.b. - Twin	MALTA COLLEGE OF ARTS SCIENCE AND TECHNOLOGY	Malta	CSA	Smart Grid
KONFIDO	Secure and Trusted Paradigm for Interoperable eHealth Services	https://cordis.europa.eu/project/id/727528	2016-11-01	2019-10-31	DS-03-2016 - Increasing d	iDS-03-2016 - Increasi	EXUS SOFTWARE LTD	United Kingdom	RIA	Healthcare
LEDGER	decentraLizEd Data Governance for nExt geneRation internet	https://cordis.europa.eu/project/id/825268	2018-11-01	2021-06-30	ICT-24-2018-2019 - Next G	H2020-EU.2.1.1. - IN	FUNDINGBOX ACCELERATOR SP ZOO	Poland	RIA	NGI
LOCARD	LOCARD Lawful evidence collecting and continuity platform development	https://cordis.europa.eu/project/id/832735	2019-05-01	2022-04-30	SU-FCT02-2018-2019-202	0H2020-EU.3.7.1. - Fig	ATHINA-EREVNITIKO KENTRO KAINOTOMIAS STIS TECHNOLOGIES TIS PLIROFORIAS, TON EPIKOINONION KAI TIS GNOSIS	Greece	RIA	Secure Societies
MANTIS	Cyber Physical System based Proactive Collaborative Maintenance	https://cordis.europa.eu/project/id/662189	2015-05-01	2018-07-31	ECSEL-01-2014 - ECSEL Ke	H2020-EU.2.1.1.7. - E	MONDRAGON GOI ESKOLA POLITEKNIKOA JOSE MARIA ARIZMENDIARRIETA S COOP	Spain	RIA	CyberSecurity
MARCO	Modern framework for Blockchain applications of corporate use	https://cordis.europa.eu/project/id/832468	2018-12-01	2019-05-31	EIC-SMEInst-2018-2020	SH2020-EU.3. - PRIORI	FINBOOT TECH SL	Spain	SME-1	Digital Economy
MARKET4.0	A Multi-Sided Business Platform for Plug and Produce Industrial Product Service Systems	https://cordis.europa.eu/project/id/822064	2018-11-01	2022-04-30	DT-NMBP-20-2018 - A dig	H2020-EU.2.1.3. - IN	INTRASOFT INTERNATIONAL	Belgium	IA	Manufacturing

Project			Duration		Horizon 2020		Coordinated		Funding	Sector
Acronym	Name	Factsheet (CORDIS)	Start	End	Topic(s)	Programme(s)	By	Country	Scheme	Field of Research
MERWIS	Melanoma Early Warning System	https://cordis.europa.eu/project/id/878237	2019-08-01	2019-12-31	EIC-SMEInst-2018-2020	SH2020-EU.3. - PRIORI	NEXCON TECHNOLOGIAI TANACSADO ES SZOLGALTATO KFT	Hungary	SME-1	Healthcare
MH-MD	My Health - My Data	https://cordis.europa.eu/project/id/732907	2016-11-01	2019-12-31	ICT-18-2016 - Big data PP	PH2020-EU.2.1.1. - IN	LYNKEUS	Italy	RIA	Healthcare
Minespider	Blockchain protocol for responsible mineral sourcing	https://cordis.europa.eu/project/id/835775	2018-12-01	2019-05-31	EIC-SMEInst-2018-2020	SH2020-EU.3. - PRIORI	MINESPIDER GMBH	Switzerland	SME-1	Digital Economy
M-Sec	Multi-layered Security technologies to ensure hyper connected smart cities with Blockchain, BigData, Cloud and IoT	https://cordis.europa.eu/project/id/814917	2018-07-01	2021-06-30	EUJ-01-2018 - Advanced t	H2020-EU.2.1.1. - IN	WORLDLINE IBERIA SA	Spain	RIA	Smart City
netCommons	network infrastructure as commons	https://cordis.europa.eu/project/id/688768	2016-01-01	2018-12-31	ICT-10-2015 - Collective A	H2020-EU.2.1.1. - IN	UNIVERSITA DEGLI STUDI DI TRENTO	Italy	RIA	Digital Society
NewTREND	New integrated methodology and Tools for Retrofit design towards a next generation of ENergy efficient and sustainable buildings and Districts	https://cordis.europa.eu/project/id/680474	2015-09-01	2018-08-31	EeB-05-2015 - Innovative	H2020-EU.2.1.5.2. - T	INTEGRATED ENVIRONMENTAL SOLUTIONS LIMITED	United Kingdom	IA	Circular Economy
NGI_TRUST	Partnership for innovative technological solutions to ensure privacy and enhance trust for the human-centric Internet	https://cordis.europa.eu/project/id/825618	2018-12-01	2021-12-30	ICT-24-2018-2019 - Next G	H2020-EU.2.1.1. - IN	EUROPEAN FUTURE INNOVATION SYSTEM CENTRE	Belgium	RIA	IoT
P2B	PEERS TO BLOCKCHAIN	https://cordis.europa.eu/project/id/851033	2019-04-15	2020-04-14	INNOSUP-05-2018-2020	H2020-EU.2.3.2.2. - E	PARQUE TECNOLOGICO DE ANDALUCIA SA-PTA	Spain	CSA	Digital Society
PANACEA	Protection and privAcy of hospital and health iNfrastructures with smArt Cyber sEcurity and cyber threat toolkit for dAta and people	https://cordis.europa.eu/project/id/826293	2019-01-01	2021-12-31	SU-TDS-02-2018 - Toolkit	fH2020-EU.3.1.5.1. - I	UNIVERSITA CATTOLICA DEL SACRO CUORE	Italy	RIA	CyberSecurity
PANORAMIX	Privacy and Accountability in Networks via Optimized Randomized Mix-nets	https://cordis.europa.eu/project/id/653497	2015-09-01	2019-01-31	DS-01-2014 - Privacy	H2020-EU.3.7. - Secu	THE UNIVERSITY OF EDINBURGH	United Kingdom	IA	Secure Societies
PHOENIX	Electrical Power System's Shield against complex incidents and extensive cyber and privacy attacks	https://cordis.europa.eu/project/id/832989	2019-09-01	2022-08-31	SU-DS04-2018-2020 - Cyb	H2020-EU.3.7.4. - Im	CAPGEMINI TECHNOLOGY SERVICES	France	IA	CyberSecurity
Place to Plug	THE COLLABORATIVE BLOCKCHAIN BACKED PLATFORM BRINGING TOGETHER DISPERSE PUBLIC AND PRIVATE EV CHARGING POINT PROVIDERS AND DRIVERS	https://cordis.europa.eu/project/id/868489	2019-04-01	2019-07-31	EIC-SMEInst-2018-2020	SH2020-EU.3. - PRIORI	PLACE TO PLUG SL	Spain	SME-1	Smart Grid
PlatOne	PLATform for Operation of distribution NEtworks	https://cordis.europa.eu/project/id/864300	2019-09-01	2023-08-31	LC-SC3-ES-1-2019 - Flexibi	H2020-EU.3.3.4. - A s	RHEINISCH-WESTFAELISCHE TECHNISCHE HOCHSCHULE AACHEN	Germany	IA	Smart Grid
Pop-Machina	Collaborative production for the circular economy; a community approach	https://cordis.europa.eu/project/id/821479	2019-06-01	2023-05-31	CE-SC5-03-2018 - Demons	H2020-EU.3.5.4. - En	KATHOLIEKE UNIVERSITEIT LEUVEN	Belgium	IA	Circular Economy
PoSeID-on	Protection and control of Secured Information by means of a privacy enhanced Dashboard	https://cordis.europa.eu/project/id/786713	2018-05-01	2020-10-31	DS-08-2017 - Cybersecurit	H2020-EU.3.7.6. - En	MINISTERO DELL'ECONOMIA E DELLE FINANZE	Italy	IA	CyberSecurity
PRIViLEDGE	Privacy-Enhancing Cryptography in Distributed Ledgers	https://cordis.europa.eu/project/id/780477	2018-01-01	2020-12-31	DS-06-2017 - Cybersecurit	H2020-EU.3.7.4. - Im	GUARDTIME AS	Estonia	RIA	CyberSecurity
Productive4.0	Electronics and ICT as enabler for digital industry and optimized supply chain management covering the entire product lifecycle	https://cordis.europa.eu/project/id/737459	2017-05-01	2020-06-30	ECSEL-2016-2 - ECSEL Key	H2020-EU.2.1.1.7. - E	INFINEON TECHNOLOGIES AG	Germany	IA	Digital Economy
PROTECTIVE	Proactive Risk Management through Improved Cyber Situational Awareness	https://cordis.europa.eu/project/id/700071	2016-11-01	2019-08-31	DS-04-2015 - Information	H2020-EU.3.7. - Secu	ATHLONE INSTITUTE OF TECHNOLOGY	Ireland	IA	Secure Societies
ProtonSuite	The most secure collaboration suite in the world	https://cordis.europa.eu/project/id/848554	2019-04-01	2021-03-31	EIC-SMEInst-2018-2020	SH2020-EU.3. - PRIORI	PROTON TECHNOLOGIES AG	Switzerland	SME-2	Secure Societies
PROVENANCE	Providing Verification Assistance for New Content	https://cordis.europa.eu/project/id/825227	2018-12-01	2021-11-30	ICT-28-2018 - Future Hype	H2020-EU.2.1.1. - IN	DUBLIN CITY UNIVERSITY	Ireland	IA	Media
PTwist	An open platform for plastics lifecycle awareness, monetization, and sustainable innovation	https://cordis.europa.eu/project/id/780121	2018-01-01	2019-12-31	ICT-11-2017 - Collective A	H2020-EU.2.1.1. - IN	ARISTOTELIO PANEPISTIMIO THESSALONIKIS	Greece	IA	Circular Economy
QualiChain	Decentralised Qualifications' Verification and Management for Learner Empowerment, Education Reengineering and Public Sector Transformation	https://cordis.europa.eu/project/id/822404	2019-01-01	2021-12-31	DT-TRANSFORMATIONS-0	H2020-EU.3.6.2.2. - E	NATIONAL TECHNICAL UNIVERSITY OF ATHENS - NTUA	Greece	RIA	Digital Society
QuidProQuo	True digitalisation of all transactional administration in the trade value chain through smart legal contracts	https://cordis.europa.eu/project/id/855945	2018-12-01	2019-05-31	EIC-SMEInst-2018-2020	SH2020-EU.3. - PRIORI	QPQ LIMITED	Ireland	SME-1	Digital Economy
REFLOW	constRuctive mEtabolic processes For materiaL flOWs in urban and peri-urban environments across Europe	https://cordis.europa.eu/project/id/820937	2019-06-01	2022-05-31	CE-SC5-03-2018 - Demons	H2020-EU.3.5.4. - En	COPENHAGEN BUSINESS SCHOOL	Denmark	IA	Circular Economy
ResearchProof	An online digital logbook to protect and prove authorship, and to share scientific results	https://cordis.europa.eu/project/id/782642	2017-08-01	2017-12-31	SMEInst-01-2016-2017 - O	H2020-EU.2.1.1. - IN	INNOVAETICA SOCIETA A RESPONSABILITA LIMITATA	Italy	SME-1	Digital Economy

Project			Duration		Horizon 2020		Coordinated		Funding	Sector
Acronym	Name	Factsheet (CORDIS)	Start	End	Topic(s)	Programme(s)	By	Country	Scheme	Field of Research
RESISTO	RESIlience enhancement and risk control platform for communication infraSTructure Operators	https://cordis.europa.eu/project/id/786409	2018-05-01	2021-04-30	CIP-01-2016-2017 - Preve	nH2020-EU.3.7.4. - Im	LEONARDO - SOCIETA PER AZIONI	Italy	IA	CyberSecurity
Roksnet	e-Society Interconnections Software	https://cordis.europa.eu/project/id/816731	2018-06-01	2018-09-30	EIC-SMEInst-2018-2020	SH2020-EU.3. - PRIORI	ROKSNET SOLUTIONS OU	Estonia	SME-1	Digital Economy
SCOTT	Secure COnnected Trustable Things	https://cordis.europa.eu/project/id/737422	2017-05-01	2020-06-30	ECSEL-2016-2 - ECSEL Key	H2020-EU.2.1.1.7. - E	KOMPETENZZENTRUM DAS VIRTUELLE FAHRZEUG FORSCHUNGSGESELLSCHAFT MBH	Austria	IA	5G
SeafoodTrace	Intelligent Traceability Platform enabling full transparency in the Seafood supply chain	https://cordis.europa.eu/project/id/816070	2018-05-01	2018-08-31	EIC-SMEInst-2018-2020	SH2020-EU.3. - PRIORI	SKYNJAR TECHNOLOGIES EHF	Iceland	SME-1	IoT
SecureCloud	Secure Big Data Processing in Untrusted Clouds	https://cordis.europa.eu/project/id/690111	2016-01-01	2018-12-31	EUB-1-2015 - Cloud Comp	H2020-EU.2.1.1. - IN	TECHNISCHE UNIVERSITAET DRESDEN	Germany	RIA	Cloud
SerIoT	Secure and Safe Internet of Things	https://cordis.europa.eu/project/id/780139	2018-01-01	2020-12-31	IoT-03-2017 - R&I on IoT i	nH2020-EU.2.1.1. - IN	INSTYTUT INFORMATYKI TEORETYCZNEJ ISTOSOWANEJ POLSKIEJ AKADEMII NAUK	Poland	RIA	IoT
SettleMint	The distributed Blockchain middleware that allows business worldwide to build business solutions with Blockchain technology	https://cordis.europa.eu/project/id/849969	2019-03-01	2021-02-28	EIC-SMEInst-2018-2020	SH2020-EU.3. - PRIORI	SETTLEMINT	Belgium	SME-2	Digital Economy
SHOGANAI	World's first real-time solution for controlling airplane operating costs	https://cordis.europa.eu/project/id/806470	2018-04-01	2020-03-31	SMEInst-10-2016-2017 - S	H2020-EU.3.4. - SOCI	AIRPLANE SOLUTIONS SL	Spain	SME-2	Digital Economy
Signa2.0	Signaturit	https://cordis.europa.eu/project/id/778550	2018-01-01	2019-12-31	SMEInst-13-2016-2017 - E	H2020-EU.3.7. - Secu	SIGNATURIT SOLUTIONS SL	Spain	SME-2	Secure Societies
SKIN	Short supply chain Knowledge and Innovation Network	https://cordis.europa.eu/project/id/728055	2016-11-01	2019-10-31	RUR-10-2016-2017 - Them	H2020-EU.3.2.4. - Sus	UNIVERSITA DEGLI STUDI DI FOGGIA	Italy	CSA	Digital Economy
SlideWiki	Large-scale pilots for collaborative OpenCourseWare authoring, multiplatform delivery and Learning Analytics	https://cordis.europa.eu/project/id/688095	2016-01-01	2018-12-31	ICT-20-2015 - Technologie	H2020-EU.2.1.1. - IN	FRAUNHOFER GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V.	Germany	IA	Education
SMark2.0	our next level product authentication, anti-counterfeiting and track and trace system	https://cordis.europa.eu/project/id/878178	2019-08-01	2019-12-31	EIC-SMEInst-2018-2020	SH2020-EU.3. - PRIORI	SMARK TECHNOLOGY ZARTKORUEN MUKODO RESZVENYTARSASAG	Hungary	SME-1	Manufacturing
SmartCertificate	The trusted solution for issuing certified documents to the blockchain, checkable in just a click	https://cordis.europa.eu/project/id/837292	2018-12-01	2019-03-31	EIC-SMEInst-2018-2020	SH2020-EU.3. - PRIORI	CVTRUST	Belgium	SME-1	Secure Societies
Smart-Trust	Secure Mobile ID for Trusted Smart Borders	https://cordis.europa.eu/project/id/778571	2018-01-01	2019-12-31	SMEInst-13-2016-2017 - E	H2020-EU.3.7. - Secu	VISION BOX - SOLUCOES DE VISAO PORCOMPUTADOR SA	Portugal	SME-2	Secure Societies
Social Digital Lab	Gamified and collaborative digital learning open-source platform with a blockchain-based system to facilitate crowdsourced learning and the implementation of personalized education strategies	https://cordis.europa.eu/project/id/817456	2018-06-01	2018-09-30	EIC-SMEInst-2018-2020	SH2020-EU.3. - PRIORI	FREMEN CORP	France	SME-1	Education
SocialTruth	Open Distributed Digital Content Verification for Hyperconnected Sociality	https://cordis.europa.eu/project/id/825477	2018-12-01	2021-11-30	ICT-28-2018 - Future Hype	H2020-EU.2.1.1. - IN	INSTITUTE OF COMMUNICATION AND COMPUTER SYSTEMS	Greece	IA	Media
SOFIE	Secure Open Federation for Internet Everywhere	https://cordis.europa.eu/project/id/779984	2018-01-01	2020-12-31	IoT-03-2017 - R&I on IoT i	nH2020-EU.2.1.1. - IN	AALTO KORKEAKOULUSAATIO SR	Finland	RIA	IoT
SOTER	cyberSecurity Optimization and Training for Enhanced Resilience in finance	https://cordis.europa.eu/project/id/833923	2019-07-01	2021-10-31	SU-DS05-2018-2019 - Digi	H2020-EU.3.7.6. - En	EVERIS SPAIN SL	Spain	IA	CyberSecurity
SpecEMS	Spectral Energy Management System for appliance-level analytics, control, and microgrid renewables trading.	https://cordis.europa.eu/project/id/856213	2019-03-01	2019-08-31	EIC-SMEInst-2018-2020	SH2020-EU.3. - PRIORI	LINCLAB NETWORK SL	Spain	SME-1	Digital Economy
STOP-IT	Strategic, Tactical, Operational Protection of water Infrastructure against cyber-physical Threats	https://cordis.europa.eu/project/id/740610	2017-06-01	2021-05-31	CIP-01-2016-2017 - Preve	nH2020-EU.3.7.4. - Im	SINTEF AS	Norway	IA	CyberSecurity
STOPTHEFRAUDINOLIVEO	Fighting counterfeiting in Olive Oil with blockchain - a working product has arrived	https://cordis.europa.eu/project/id/866703	2019-05-01	2019-10-31	EIC-SMEInst-2018-2020	SH2020-EU.3. - PRIORI	HASHED BLOCKTAC SL	Spain	SME-1	Digital Economy
SUNFISH	SecUre iNFormation SHaring in federated heterogeneous private clouds	https://cordis.europa.eu/project/id/644666	2015-01-01	2017-12-31	ICT-07-2014 - Advanced C	H2020-EU.2.1.1.3. - F	MINISTERO DELL'ECONOMIA E DELLE FINANZE	Italy	RIA	Cloud
symbIoTe	Symbiosis of smart objects across IoT environments	https://cordis.europa.eu/project/id/688156	2016-01-01	2018-12-31	ICT-30-2015 - Internet of	TH2020-EU.2.1.1. - IN	INTRACOM SA TELECOM SOLUTIONS	Greece	RIA	IoT
System EYE	cutting-edge innovation to make your drive safer, collect and monetize automotive data	https://cordis.europa.eu/project/id/837186	2018-01-01	2019-03-31	EIC-SMEInst-2018-2020	SH2020-EU.3. - PRIORI	DISCOPERI UKRAINE LLC	Ukraine	SME-1	IoT
TALENT SWARM 7D	Collaborative Work Environment for Project Lifecycle Management (PLM) of Complex Industrial Assets	https://cordis.europa.eu/project/id/816333	2018-06-01	2018-11-30	EIC-SMEInst-2018-2020	SH2020-EU.3. - PRIORI	DYNATEC S.A.	Spain	SME-1	IoT

Project			Duration		Horizon 2020		Coordinated		Funding	Sector
Acronym	Name	Factsheet (CORDIS)	Start	End	Topic(s)	Programme(s)	By	Country	Scheme	Field of Research
TITANIUM	Tools for the Investigation of Transactions in Underground Markets	https://cordis.europa.eu/project/id/740558	2017-05-01	2020-04-30	SEC-12-FCT-2016-2017 - T	H2020-EU.3.7.6. - En	AIT AUSTRIAN INSTITUTE OF TECHNOLOGY GMBH	Austria	RIA	CyberSecurity
TXpp	A technological solution for the 50 billion EUR VAT fraud problem	https://cordis.europa.eu/project/id/835042	2018-12-01	2019-05-31	EIC-SMEInst-2018-2020	SH2020-EU.3. - PRIORI	SUMMITTO B.V.	Netherlands	SME-1	Digital Economy
WaMos	Wastewater Treatment Monitoring and Advisory System	https://cordis.europa.eu/project/id/868462	2019-05-01	2019-10-31	EIC-SMEInst-2018-2020	SH2020-EU.3. - PRIORI	BIA PODJETJE ZA LABORATORIJSKO IN P	Slovenia	SME-1	IoT
WeldGalaxy	Digital Dynamic Knowledge Platform for Welding in Manufacturing Industries	https://cordis.europa.eu/project/id/822106	2018-10-01	2022-03-31	DT-NMBP-20-2018 - A dig	H2020-EU.2.1.3. - IN	TWI Limited	United Kingdom	IA	Manufacturing
WeVerify	WIDER AND ENHANCED VERIFICATION FOR YOU	https://cordis.europa.eu/project/id/825297	2018-12-01	2021-11-30	ICT-28-2018 - Future Hype	H2020-EU.2.1.1. - IN	ONTOTEXT AD	Bulgaria	IA	Media

Abbreviations

Funding Scheme:

CSA	Coordination and Support Actions
IA	Innovation Actions
RIA	Research and Innovation Actions
SME-1	Small- and Medium-sized Enterprise Instrument Phase 1
SME-2	Small- and Medium-sized Enterprise Instrument Phase 2

Sector/Field of Research:

AI	Artificial Intelligence
IoT	Internet of Things
NGI	Next Generation Internet

History

Document history		
V1.1.1	March 2020	Publication