



Blockchain
for the Next
Generation
Internet



**IMPACT CREATION OF
ONTOCHAIN FOUNDATIONS
(OPEN CALL 3)**

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ABSTRACT	This deliverable presents the impact of the 14 projects selected in the ONTOCHAIN Open Call 3 and summarizes the keys results, the innovation, the possibles evolution and the most relevant KPIs achieved for each project.
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EXECUTIVE SUMMARY

This document is the deliverable "D4.9 Impact creation of ONTOCHAIN Foundations (Call#3)" funded under the Horizon 2020 Research & Innovation program "ONTOCHAIN - Trusted, traceable and transparent ontological knowledge on blockchain".

This deliverable summarizes the impact of fourteen projects for a 10-month period, selected during the Open Call 3. These projects have been funded and executed from October 2022.

The objectives of this deliverable are to measure the benefits of exploiting the ONTOCHAIN solution offered by the Open Call 1 and Open Call 2 third parties for real life use cases, which have been developed by the selected Open Call 3 projects.

This deliverable is based on the results produced by Open Call 3 projects and their D3 and D4 deliverables that are partially used in this document.

For each project, the deliverable provides:

- The key functional results and the most relevant KPIs.
- The innovations achieved the possible future improvements.

The last section summarizes the KPI regarding the whole ONTOCHAIN project.

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ABBREVIATIONS

AI	Artificial Intelligence
API	Application Programming Interface
AWS	Amazon Web Services
DAO	Decentralized Autonomous Organization
DApp	Decentralized Application
DID	Decentralized Identity
DLT	Distributed Ledger Technology
EVM	Ethereum Virtual Machine
HR	Human Resources
IoT	Internet of Things
IPFS	InterPlanetary File System
KPI	Key Performance Indicators
NGI	Next Generation Internet
NFT	Non-Fungible Token
PM	Personnel Management
SDK	Software development KIT
SSI	Self-Sovereign Identity
VC	Verifiable Credentials
W3C	World Wide Web Consortium

1 INTRODUCTION

Throughout the ONTOCHAIN project¹, three open calls have been initiated to financially support projects focused on the development of the ONTOCHAIN ecosystem. The first two calls are aimed to create new functionalities, while the final call is dedicated to expanding the range of applications within the ecosystem.

This deliverable presents the impact creation of projects selected during the Open Call 3 (OC3) carrying out during the third year (from the 1st of October 2022 till the 31st of July 2023) of the ONTOCHAIN project. The OC3 includes two specific objectives comprising fifteen topics. Fourteen projects have been funded and executed from October 2022 for a 10-month period.

The objective is to provide the evaluation of results issued by OC3 projects in terms of functional and non-functional requirements in order to measure the benefits and the limits of using the ONTOCHAIN framework in real use cases.

This deliverable is based on material provided in the D4 and D3 deliverables of the OC3 selected projects. The rest of this deliverable is organized as follows:

- Chapter 2 presents the different topics and the methodology used to identify the added value of the OC3.
- Chapter 3 details the keys results, the innovation, the possible evolutions and the most relevant KPIs achieved of each OC3 project.
- Chapter 4 summarizes the impacts created by the OC2 third parties and provides results for the expected impacts of the ONTOCHAIN project.
- Chapter 5 concludes this deliverable.

2 ONTOCHAIN OPEN CALL 3

In this section, we recall the specific objectives, topics and results of the ONTOCHAIN Open Call 3 (OC3). We also present the different KPIs that are detailed for each project in Section 3.

¹<https://ontochain.ngi.eu>

2.1 TOPICS AND RESULTS

The objective of OC3 is to use the ONTOCHAIN solution that was developed during OC1 and OC2 for real-life practical applications and use cases.

Indeed, the outcomes delivered by the projects selected in OC3 can serve as a mean to evaluate the advantages of employing the ONTOCHAIN framework and to identify any potential limitations it may have. These results can provide valuable insights into the practical applications and effectiveness of the ONTOCHAIN ecosystem, helping to assess its benefits and identify areas for improvement.

To this end, the OC3 includes these two specific objectives:

- **Objective A:** To complete the missing blocks of the ONTOCHAIN infrastructure in particular those related to
 - Service Integration (Gateways/APIs) for ONTOCHAIN applications,
 - Semantic Matching and Reasoning,
 - Energy-efficient and sustainable hosting infrastructure for the ONTOCHAIN software ecosystem and services.
- **Objective B:** To exploit the ONTOCHAIN infrastructure designed and implemented respectively through ONTOCHAIN OC1 and ONTOCHAIN OC2 for real life use cases that cover real need of individuals in terms of trustworthy data/services exchange and trustworthy content handling from various vertical domains/vital sectors of the European economy.

Applicants had to submit their proposal for one topic of OC3 objective A or for one topic of OC3 objective B. They are not limited to these topics and have been encouraged to propose innovative ideas in any domain that align with the ONTOCHAIN vision and objectives: *"Develop scalable blockchain, decentralized reputation systems and semantic web technologies, in order to achieve trustworthy content handling and information exchange as well as trustworthy service exchange in the next generation Internet/social networks for vital sectors of the European economy."*

Among the 105 proposals submitted to ONTOCHAIN Open Call 3, only 94 of them were eligible and evaluated. After the evaluation process, 14 proposals for a period of 10 months were selected.

Table 1 and Table 2 summarize the results of ONTOCHAIN OC3 by providing the number of projects submitted and selected per topics, the selected third parties profile and the countries of these third parties. Table 3 presents the selected projects per topics.

ONTOCHAIN OPEN CALL 3

Total number of project selected	14
Total number of projects selected by Objectives and respective topics	
Objective A	
Topic A1: Service Integration (Gateways APIs) for ONTOCHAIN applications	1
Topic A2: Semantic Matching and Reasoning	0
Topic A3: Energy-efficient and sustainable hosting infrastructure for the ONTOCHAIN software ecosystem and services	1
Objective B	
Topic B1: Semantic Digital Logbooks for Companies, Buildings, Cars or similar	1
Topic B2: Decentralised Fact Checking and Data Credibility for Social Content	1
Topic B3: Decentralized Online Semantic Social Networks	0
Topic B4: Semantic energy data management	1
Topic B5: Smart City Applications Relying on Trustworthy Semantic Metadata	0
Topic B6: Automotive, e.g., electric vehicle charging, road side management, car insurance, communication interoperability	1
Topic B7: Distribution Logistics/ Supply Chains Using Trustworthy Semantic Data	2
Topic B8: Data/Digital content/Multimedia marketplace, including social media	1
Topic B9: Semantics-based DAO	0
Topic B10: Decentralised Public Services & Common Goods	2
Topic B11: Remote Presence/Working and Metaverse	0
Topic B12: Open Topic	3

TABLE 1: NUMBER OF SELECTED PROJECTS PER TOPICS OF ONTOCHAIN OPEN CALL 3.

2.2 ADDED VALUE FROM ONTOCHAIN OPEN CALL 3

This deliverable summarizes the key results of the fourteen projects that have been selected during the OC3. The results are extracted from the D3 and D4 deliverables of each project.

For each OC3 project, the following information are provided:

- The key functional results and the most relevant KPIs.
- The innovations achieved and the possible future improvements.

Selected third parties profile		
Group of individual(s) and organization(s)	1	
Group of individuals (team)	1	
Group of organizations (consortium)	3	
Single organization (legal entity)	9	
Countries represented among the third parties selected		
France	3	21%
Estonia	2	14%
Italy	2	14%
UK	2	14%
Austria	1	1%
Finland	1	1%
Netherland	1	1%
Serbia	1	1%
Spain	1	1%

TABLE 2: PROFILE AND COUNTRIES OF THIRD PARTIES SELECTED TO ONTOCHAIN OPEN CALL 3.

The most relevant results of each project are described in relation to KPIs that are categorized as follows:

- KPIs related to interoperability and standardization, including the use of standards in the solutions, the possibility to propose new standards from the solutions.
- KPIs related to the innovation in semantics and blockchain, including the eventual patentability of new innovative proposals.
- KPIs related to a more human-centric evolution of the Internet, including the privacy / anonymity of the solution.
- KPIs related to a more decentralized NGI, from the application point of view or from the data point of view.
- KPIs related to new forms of interaction and immersive environments for NGI users, including new interaction paradigms and new kind of applications.
- KPIs related to the implementation, including code simplicity and testability coverage.

Topic	Selected projects
Objective A	
Topic A1: Service Integration (Gateways APIs) for ONTOCHAIN applications	○ BABELFISH - Service Integration in Heterogeneous Environments
Topic A2: Semantic Matching and Reasoning	None
Topic A3: Energy-efficient and sustainable hosting infrastructure for the ONTOCHAIN software ecosystem and services	○ Convex Global DLT - Convex hosting infrastructure and decentralised ledger for the Next Generation Internet
Objective B	
Topic B1: Semantic Digital Logbooks for Companies, Buildings, Cars or similar	○ ReCheck Green Box - A digital building logbook to store, secure, share and extract value from Real Estate data
Topic B2: Decentralised Fact Checking and Data Credibility for Social Content	○ My3Sec - The Ultimate PM & HR Suite by Smart Workers for Smart Workers
Topic B3: Decentralized Online Semantic Social Networks	None
Topic B4: Semantic energy data management	○ ecOS - Energy Community Operating System
Topic B5: Smart City Applications relying on Trustworthy Semantic Metadata	None
Topic B6: Automotive, e.g., electric vehicle charging, road side management, car insurance, communication interoperability	○ DEFev - DLT Ecosystem For Electric Vehicle Charging
Topic B7: Distribution Logistics / Supply Chains Using Trustworthy Semantic Data	○ OTCnLNG - Bridging Carbon Neutral LNG with the Energy Market - A Novel Ontochain Application ○ DLMD - Decentralised Last Mile Delivery
Topic B8: Data/Digital content /Multimedia marketplace, including social media	○ CREATE - UNITT Content Registry And Tokenized Exchange
Topic B9: Semantics-based DAO	None
Topic B10: Decentralised Public Services & Common Goods	○ DAOstar - Semantic API Standards for DAOs ○ INGRESS - Gateway to financial inclusion
Topic B12: Open Topic	○ CAPS-CO - Carbon Accounting of Product Supply Chains using ONTOCHAIN ○ Low-code app builder - Low-code app builder on top of ONTOCHAIN infrastructure ○ TRUSSIHEALTH - Decentralized Trustworthy Health Information Exchange for Patient's Self- Sovereign Medical Records.

TABLE 3: SELECTED PROJECTS PER TOPICS OF ONTOCHAIN OPEN CALL 3.

3 DETAILED IMPACT CREATED BY OPEN CALL 3 RESULTS

In this section, we present the key results and the most relevant KPIs of each project, as well as their main innovation and the possible future improvements.

3.1 BABELFISH

Funded in: Open Call 3 - Topic A1

Duration: 10 months

Description: BABELFISH proposes to describe services on a technical, semantic, and governance layer and will implement a component that uses such descriptions to translate interfaces (APIs), data, and data agreements from a foreign (and maybe proprietary format) to an interoperable format understood by the recipient. A registry maintains a list of all services and thus spans up an interoperable data space.

3.1.1 Key results and Relevant KPIs

The keys results and relevant KPIs of the BABELFISH project are the following:

- Related to the interoperability and standardization

a) *Interledger APIs*

The BABELFISH project uses the Bellecour Sidechain or the Convex decentralised ledger for on-chain data storage.

b) *Allow for different consensus protocols and smart contract implementations*

The BABELFISH project employs either the Bellecour Sidechain or the Convex decentralized ledger to facilitate on-chain data storage.

c) *Standards/drafts proposed or could/will be proposed*

The did:oyd Method (OYDID) for identity management and handling VCs is used in the BABELFISH solution.

d) *International events on standardisation activities*

The team participated in the Data Agreements meetings in DIF and proposed DASC Tutorial.

- Related to the innovation

a) *Implementation of new innovative ONTOCHAIN use cases*
The Data Agreement mapping has been implemented.

b) *Other new approaches implementing immutable semantics and reasoning*
A Semantic Overlay Architecture (SOyA), a lightweight semantic-web based approach to describe data structures in simple terminology³, has been implemented.

- Related to a more human-centric evolution of the internet

a) *The Trust Assessment Effectiveness*

Two ontologies have been implemented: a) Data Agreements for data intermediation and 2) Ontology authoring with SOyA for data model management.

b) *The number of applications deployed*

Three applications have been deployed: Validation service, Transformation service and Honey Use Case.

- Related to a more decentralized NGI

a) *Implementation of new decentralised publishing platforms.*

SOyA provides a decentralised authoring platform for data models.

- Related to new forms of interactions

a) *Implementation of decentralized apps that involve human interactions*

Honey Use Case for Supply Chain has been implemented to demonstrate data exchanges along the value chain for Honey.

3.1.2 Innovation and Possible Evolutions

The **key innovations** of the BABELFISH are the following:

- Advancement of did:oyd: The capacity of their Decentralised Identifier method did:oyd to cover W3C Verifiable Credentials and Verifiable Presentations. This enhances the secure and trustworthy use of this DID method, offering digitally verifiable proof of qualifications, achievements, and other attributes.
- Extending Data Agreements for Supply Chain Management: Data Agreements has been extended from personal data use to the supply chain management domain. By introducing this functionality, businesses can now regulate the flow of information, ensuring transparency and security across the supply chain.

- Enhancements in SOyA: SOyA can now utilise alignment information for the automatic generation of transformation overlays. Furthermore, the system has been extended to visualise data models using HTML forms for data capture, enhancing the user experience and making data manipulation more straightforward and intuitive. Another milestone of our research was demonstrating SOyA's validation capabilities with the DID Lint service and it has quickly become a well-established tool within the DIF community.

Some of the **possible evolutions** of BABELFISH include:

- Development of Gateway API: As a pivotal tool, the Gateway API can be evolved into a full-fledged open-source implementation of a Data Intermediation Service. By expanding its capabilities and making it freely accessible, we can facilitate seamless data exchange between systems, thereby fostering collaboration and interoperability among different software systems.
- Improvement of SOyA Documentation and Legacy Systems Integration: Its documentation can be enhanced, making it more comprehensive and user-friendly. Further, continuous work on the integration of legacy systems with SOyA could be a powerful tool to showcase its capabilities and potential. This would help elucidate SOyA's effectiveness in bridging the gap between old and new technologies, making transition smoother and more efficient.
- Extension of did:oyd: It would be highly beneficial to develop did:oyd into a reference implementation of a fully compliant non-blockchain based DID method that supports DID rotation. DID rotation is a crucial feature for maintaining security and control over digital identities, and by incorporating this into a non-blockchain based method, a versatile and robust tool for digital identity management can be provided.
- Continued Work on Data Agreements: As Data Agreements are becoming an emerging standard for data exchange, it is vital to continue refining and expanding this concept. This involves detailed exploration and standardisation of data agreement protocols, as well as ongoing collaboration with stakeholders to ensure these agreements meet real-world needs and challenges. This will contribute to the creation of safer, more efficient mechanisms for data exchange.

3.2 CONVEX GLOBAL DLT

Funded in: Open Call 3 - Topic A3

Duration: 10 months

Description: Convex provides an energy efficient and scalable decentralised ledger Technology (DLT) on a permissionless public network. It has been designed as a substrate for decentralised economic transactions and smart contracts for real-time value exchange. It supplies documentation, ecosystem services, training and API implementation support for selected ONTOCHAIN use-case partners. The network operates with any number of peer operators that confirm the global state in real time at thousands of transactions per second.

3.2.1 Key results and Relevant KPIs

The keys results and relevant KPIs of the Convex Global DLT project are the following:

- Related to the interoperability and standardization

a) *Interledger APIs*

The solution would be suitable for integration via cross-ledger APIs, they have not implemented in the scope of this project.

b) *Allow for different consensus protocols and smart contract implementation*

The solution deploys peers with a configurable consensus protocol and fully flexible smart contract implementations.

c) *Standards/drafts proposed or could/will be proposed*

Several aspects of the network or tooling may be suitable for standardisation. They have not focused on this aspect within this project. Some related drafts are at <https://github.com/Convex-Dev/design>.

- Related to the innovation

a) *Implementation of new innovative ONTOCHAIN use cases*

This is primarily an infrastructure research project, so use cases have not directly been implemented. However the infrastructure is well suited for future innovative ONTOCHAIN/NGI use cases.

b) *Implementation of new ways to serialise ontologies and semantics on blockchain*

The infrastructure is well suited for storage and serialisation of ontological and semantic data.

c) *Other new approaches implementing immutable semantics and reasoning*

The solutions uses analysis of significant immutable data structures

- Related to a more human-centric evolution of the internet

a) *Assessment of the privacy/anonymity of your solution*

Convex is a fully public network with pseudonymous user accounts. The information broadcast on the network is limited to a specific subset of data exposed by participants in public transactions. Participants (including peer operators) may collect and manage other data independently and at their own discretion.

b) *The size of decentralized storage, in GB*

Metrics collected by their solution include disk usage of peer nodes which depends on transaction complexity and overall load.

c) *The number of applications deployed*

9 different software modules provide scripting language functionality, inter-process communication, unit testing, data and load generation, peer deployment, simulation orchestration.

- Related to new forms of interactions

a) *Implementation of new human to Internet interaction paradigms*

While this was not a focus of the project, the infrastructure and tools can be regarded as providing trusted, decentralised public databases. These are important for future human to internet interaction.

b) *Implementation of decentralized apps that involve human interaction*

Although not a focus for this project, the deployed infrastructure is well suited for such applications, especially where low costs, low latency and large numbers of concurrent users are expected.

- Related to a more decentralized NGI

a) *Implementation of new decentralised computing technologies for storing and accessing data*

They have evaluated the performance of a new decentralised ledger Technology (DLT) that supports a permissionless public network with fast transaction finality, high transaction throughput using customer-grade hardware, negligible transaction cost for users, and overall energy efficiency.

b) *Implementation of new decentralised social networks*

While not covered in the scope of this project, the deployed infrastructure is extremely well suited for decentralised social networks.

c) *Implementation of new decentralised publishing platforms*

The infrastructure and tooling effectively supports decentralised publishing of public data.

d) *Implementation of new Digital Twin technologies*

The infrastructure deployed is well suited to digital twin technologies. Some specific related technologies (e.g. W3C DID registries) were automatically deployed, though this was not a focus of the project.

3.2.2 Innovation and Possible Evolutions

The **key innovations** of the Convex Global DLT project are the following:

- Cloud native, their solution is fully automated on top of AWS CloudFormation.
- Managed, their solution handles the full deployment and teardown of Convex networks, load generators, and the collection of all metrics assessing performance.
- Highly configurable, allowing the deployment of different network topologies across AWS regions and supporting a wide range of different peer configuration options.
- Reproducible, load scenarios used for generating test transactions were built using techniques from generative testing, ensuring that under the same conditions, the exact same transactions are created across simulations.

Some of the **possible evolutions** of Convex Global DLT include:

- To be extended to support deployment, management and monitoring of production networks.
- Greater control over the configuration of peers deployed in simulations.
- Deliberate deployment of faulty or adversarial nodes to simulate attacks upon the network.
- Improvements to monitoring capabilities including more fine grained observability of messages and network state changes.

3.3 RECHECK GREEN BOX

Funded in: Open Call 3 - Topic B1

Duration: 10 months

Description: The ReCheck Green Box is a digital building logbook that aggregates, normalizes and secures online and offline data about buildings. The solution aggregates different types of documents, certificates, etc, linked to the life cycle of a building starting with design plans, execution plans and reports and maintenance protocols. The data is stored in a semantic data lake for further usage and querying. The data origin, authenticity and its properties are protected by blockchain records.

3.3.1 Key results and Relevant KPIs

The keys results and relevant KPIs of the ReCheck Green Box project are the following:

- Related to the interoperability and standardization

a) *Interledger APIs*

DKG with their high-level API is used in the solution.

b) *Allow for different consensus protocols and smart contract implementations*

They are independent from the concrete DKG implementation as long as it follows the JSON-LD standard.

c) *Standards/drafts proposed or could/will be proposed*

They have extended the SAREF ontology.

- Related to the innovation

a) *Implementation of new innovative ONTOCHAIN use cases*

A transparent, cross-vendor, and granular building knowledge for the needs of CRE investors and owners has been implemented.

b) *Implementation of new innovative ONTOCHAIN reasoning technologies*

Based on SPARQL queries, stakeholders can reason on ESG readiness and plan for specific building interventions.

c) *Implementation of new ways to serialize ontologies and semantics on the blockchain*

DKG is storing ontology-related data and timestamps it on the basis of graph versions.

In their case, the data corresponds to their own SAREF extension.

d) *Other new approaches to implementing immutable semantics and reasoning*

DKG is utilizing ontology-related data storage and timestamping, which is based on graph versions. In this context, the data they are handling pertains to their own SAREF extension.

- Related to a more human-centric evolution of the internet

a) *The Trust Assessment Effectiveness*

They provide traceable data storage and immutable records based on graphs in DKG. Cryptographic evidence such as fingerprints of graph versions.

b) *Assessment of the privacy/anonymity of your solution*

They have user-based authentication and roles for access to different data types. The CRE data remains on our premises and no private data is saved on the blockchain.

c) *The size of decentralized storage, in GB*

It dynamically adjusted based on the data and its frequency, coming from data sources (sensors, APIs, etc).

d) *The number of applications deployed*

Two applications have been deployed: User-portal and report generator.

- Related to a more decentralized NGI

a) *Implementation of new decentralised computing technologies for storing and accessing data*

DKG offers decentralisation of graph data and blockchain security.

b) *Implementation of new Digital Twin technologies*

The digital building logbook provides an aspect of a digital building twin, modeled by the data coming from the sensors and the UOI structure identification.

- Related to new forms of interactions

a) *Implementation of decentralized apps that involve human interactions*

They are offering a new way of collecting and treating real-estate data. Human interaction is achieved through dashboards and reporting tools. The system offers a user-friendly interaction with the data.

- Additional KPIs

a) *Support interoperability for querying building data*

They enable querying of data, collected from multiple vendors, as a single SPARQL endpoint. This allows cross-vendor-tech deployments in buildings.

b) *Implementation of a new way of data organisation and visualisation in the field of real estate*

A combined approach for real-time and documental data in a single queryable interface and visualisation in a portal has been implemented.

3.3.2 Innovation and Possible Evolutions

The **key innovations** of the ReCheck Green Box project are the following:

- One single storage where real-time data and any other building documentation are stored, normalised, standardised, and easily accessible, readable, and shareable, by using a blockchain as a layer of trust, security, and traceability of the building data.
- A transparent, cross-vendor, and granular building knowledge for the needs of CRE investors and owners, by using DKG for storing ontology-related data and time-stamps it on the basis of graph versions.
- A way for stakeholders to use SPARQL queries in order to reason on ESG readiness and plan for specific building interventions .
- New frontiers for how the data can be consumed or even monetized thank to the combination of SAREF ontology extension with the open nature of Green Box that enables other applications to both push data and retrieve data in a secure and transparent way.

Some of the **possible evolutions** of ReCheck Green Box include:

- The integration and extension of a report generator that would allow users to easily generate comprehensive reports based on the data stored in the digital building logbook.
- The implementation of automatic customer configuration, aimed at providing easier support and automating the onboarding process for new customers, making it more efficient and seamless.
- To automate the creation of custom dashboards for each customer to reduce the time and effort required from developers and support teams and to ensure that each customer receives a tailored dashboard that aligns with their specific needs and requirements.
- To improve the dashboard functionalities and user interface by enhancing the visualizations, adding new widgets and interactive elements, and improving the overall user experience.
- To explore the use of Grafana APIs to customize dashboards programmatically.

3.4 MY3SEC

Funded in: Open Call 3 - Topic B2
Duration: 10 months
Description: My3Sec is a comprehensive solution designed to enhance the efficiency and transparency of remote work processes. Developed with a focus on the use cases of proving skills, seeking good candidates, and tracking workers' growth for a project, My3Sec is a fully decentralized, transparent, and efficient system for tracking people's career growth and improving employers' project management through a verified skill-oriented approach. With its user-friendly Web3 frontend, robust contract architecture, and democratic governance system, My3Sec is poised to revolutionize the way organizations and individuals approach skill verification, candidate search, and career progression.

3.4.1 Key results and Relevant KPIs

The keys results and relevant KPIs of the My3Sec project are the following:

- Related to the interoperability and standardization
 - a) *Allow for different consensus protocols and smart contract implementations*
The system is built on an EVM-compatible blockchain, but its abstract architecture allows for easy transfer to other environments.
- Related to the innovation
 - a) *Implementation of new innovative ONTOCHAIN reasoning technologie*
The following use cases have been implemented through a fully decentralized system that enhances transparency and efficiency in remote work processes: proving worker skills, seeking good candidates and tracking workers' growth for a project.
- Related to a more human-centric evolution of the internet
 - a) *The Trust Assessment Effectiveness*
My3Sec can significantly improve the accuracy of trust assessments for both subjects (workers) and content (tasks or projects).
 - b) *Assessment of the privacy/anonymity of your solution*
Users are represented by their wallet address.
 - c) *The size of decentralized storage, in GB*

It depends on the user base, currently around 10Kbs for entity are stored.

d) *The number of applications deployed*

8 smart contracts have been deployed and 1 frontend application.

- Related to a more decentralized NGI

a) *Implementation of new decentralised social networks*

An alternative solution to LinkedIn features has been implemented with a focus on career tracking and proving expertise in a particular technical area.

- Related to new forms of interactions

a) *Implementation of new human to Internet interaction paradigms*

In the context of remote work and career growth tracking. It uses blockchain technology to create a decentralized, transparent system where users can verify skills, seek candidates, and track career growth. This approach represents a shift from traditional, centralized systems to a more open, transparent, and user-centric model.

b) *Implementation of decentralized apps that involve human interactions*

My3Sec frontend application is a Decentralized web app that gives to users the ability to collaborate remotely in a working environment. The working efforts are tracked and shared across multiple companies so that users can retain the expertise seniority and companies have a mean to trustfully assess they employees.

3.4.2 Innovation and Possible Evolutions

The **key innovations** of the My3Sec project are the following:

- The verified skill-oriented approach that allows individuals to prove their skills and stand out in the job market. This is coupled with a system that enables employers to find workers who precisely match their desired skill profiles, streamlining the recruitment process.
- The ability to track workers' growth for projects, optimizing project management by monitoring individual progress and ensuring seamless collaboration. This is achieved through a transparent skill set building mechanism and mutual verification of hours spent on activities, both of which are recorded on the blockchain.
- The application of blockchain technology for tracking time spent on job activities. This feature provides a trusted, immutable log of hours spent on different tasks, which contributes to building a personal, verified set of skills based on reputation. This transparent and verifiable record of work hours and skills not only enhances individual credibility but also improves the efficiency of processes, talent retention,

and meritocracy in the job market. This innovation is particularly beneficial for remote and hybrid work models, where tracking time and productivity can be challenging.

- A decentralized autonomous organization (DAO), which ensures fairness, transparency, and accountability in the system. This DAO is a vibrant network of workers, employers, candidate seekers, and co-workers collaborating seamlessly on My3Sec, further enhancing the value of this innovative solution.

Some of the **possible evolutions** of My3Sec include:

- The development of the My3Sec Decentralized Autonomous Organization (DAO) with a user interface (UI) to interact with it via the integration of Tally, a front-end for on-chain DAOs.
- Integrating the DKG (Decentralized Knowledge Graph) service into My3Sec would have been a valuable addition to support the use case of searching and selecting good candidates by HR personnel. The benefits of DKG integration include:
 - Semantic Data Integration: this enablew My3Sec to connect and link diverse data sources across the decentralized network, enhancing the accuracy and relevance of candidate search results.
 - Efficient Querying: With DKG's SPARQL querying support, HR personnel can perform complex searches on linked data assets within the platform, improving the precision and user experience of candidate selection considering various criteria and qualifications.
- The data model used to describe metadata should be serialized with JSON-LD that could help HR personnel to easily perform a SPARQL query to search for candidates that match specific requirements.
- To design a scoring function with a sigmoid function that accurately represents the relationship between user experience, based on the amount of hours logged in the system, and Key Performance Indicators (KPIs) set by the manager.

3.5 ECOS

Funded in: Open Call 3 - Topic B4
Duration: 10 months
Description: ECOS is the full stack platform for the Energy Community, the platform enables a transparent, accountable system capable of creating economic value through Token Model for all the users involved in the energy community.

3.5.1 Key results and Relevant KPIs

The keys results and relevant KPIs of the ECOS project are the following:

- Related to the interoperability and standardization

a) *Allow for different consensus protocols and smart contract implementations*

They have implemented a smart contract feature that significantly reduces friction and issues related to gas fees, often a sticking point in blockchain transactions. Leveraging the power of MetaTRX and Signed Transactions, their system allows users to register and transfer tokens without the need to process individual transactions. This leads to a smoother user experience and reduces the overall costs associated with blockchain operations, making their platform more accessible and user-friendly.

- Related to the innovation

a) *Implementation of new innovative ONTOCHAIN use cases*

They have implemented a use case related to the application of blockchain in the energy market, focusing on one of the key themes in energy transition, the formation of energy communities. This approach enables them to provide a decentralized and transparent solution for energy transactions within these communities. It supports local energy generation and sharing, promoting sustainability and resilience in the face of changing energy landscapes.

- Related to a more human-centric evolution of the internet

a) *The Trust Assessment Effectiveness*

Their system is built upon an energy network and utilizes data directly from Smart Meters, devices that are part of the Internet of Things (IoT) ecosystem. These Smart Meters provide real-time, accurate measurements of energy consumption and production. Because the data is sourced directly from these devices, there is an inherent trust in the accuracy and reliability of the information. In other words, because the system relies on objective data directly from a trusted device, there is no need for a separate Trust Assessment process. This means that the integrity of our data is not based on subjective user input or data that could potentially be manipulated, but on clear, objective measurements from smart devices. This significantly reduces the risk of inaccurate or fraudulent data, thereby creating an inherently trustworthy environment.

b) *The number of applications deployed*

One mobile application for End Consumers that join an Energy Community has been deployed.

- Related to a more decentralized NGI

a) *Implementation of new Digital Twin technologies*

In their project, they are implementing a Digital Twin for the Energy Community.

- Related to new forms of interactions

a) *Implementation of decentralized apps that involve human interactions*

Their project is indeed centered on human interactions in the energy sector, with a particular emphasis on Energy Communities. These communities are collaborative networks of individuals, businesses, and organizations that collectively generate, distribute, and consume energy. Our blockchain-based solution aims to facilitate these interactions, making the processes transparent, secure, and efficient.

3.5.2 Innovation and Possible Evolutions

The **key innovations** of the ecOS project are the following:

- The full digitalization of energy communities and distributed energy resources through decentralized blockchain technologies.
- The token model underneath ecOS allows to convert energy contributions and virtuous energetic behaviour into tangible economic value, through transactions and through the Marketplace.
- a fully transparent and tamper proof way of tracking energy production and consumption among the members of an energy community, and, at the same time, it incentivizes the adoption of green energy sources.

Some of the **possible evolutions** of ecOS include:

- To increase the tooling available to the Community Manager.
- To improve the user experience on the management side of the community.
- To offer community managers tools to easily manage users, find new community members, and track closely the consumption of the Energy community.
- To build a higher level view of the community metrics.

3.6 DEFEV

Funded in: Open Call 3 - Topic B6

Duration: 10 months

Description: DEFEV project, with its blockchain-based solution, resolves interoperability and actor class complexity issues by providing a common infrastructure that integrates different parties into one unified ecosystem. The charging stations, through their IoT server, have a digital twin in the blockchain. This allows to manage a micro charging operator as easily as a user, opening the path to seamless peer-to-peer (P2P) charging. Furthermore, the on-chain data management ensures traceability of transactions in a manner that ensures trustworthiness and transparency and grows the reputation of each entity.

3.6.1 Key results and Relevant KPIs

The keys results and relevant KPIs of the DEFEV project are the following:

- Related to the innovation

a) *Implementation of new innovative ONTOCHAIN use cases*
They implement the first Electric Vehicle charging solution.

b) *Implementation of new innovative ONTOCHAIN reasoning technologies*
They implement the first participative monetized IoT platform.

- Related to a more human-centric evolution of the internet

a) *The Trust Assessment Effectiveness*
A reputation scoring has been implemented.

b) *Assessment of the privacy/anonymity of your solution*
All charging session data are anonymous. Nevertheless, the charging stations must be located on a map, which gives some level of information on the members of the network accounts. However the users and network members dont exist as named personas, only as wallets, ensuring a good level of privacy/anonymity

c) *The size of decentralized storage, in GB*
All the data are stored thanks to decentralized technologies. Less than 1k bytes in the blockchain per object, larger objects (pictures) are stored in file storage services.

d) *The number of applications deployed*

EV charging and Shared EVSE creator DApps have been implemented.

- Related to a more decentralized NGI

a) *Implementation of new Digital Twin technologies*

They create a digital twin of the EV charging network on the blockchain. Indeed they build a digital twin of each member charging equipment with its real time status synchronised in the blockchain.

- Related to new forms of interactions

a) *Implementation of decentralized apps that involve human interactions*

DEFev involves human interaction in mobility and can have also some social impacts such as providing a greater access to EV charging infrastructure, especially in areas where public charging stations are scarce or unavailable.

3.6.2 Innovation and Possible Evolutions

The **key innovations** of the DEFev project are the following:

- An innovative payment scheme: with the Ontochain utility token, the user can pay for several sub services in only one action.
- The digital twin of a physical device initiated in the Blockchain.
- Decentralized system: The decentralized nature of blockchain ensures that all transactions are secure, transparent, and tamper-proof, leading to more trust and reliability for both hosts and guests.
- Increased security: Blockchain technology can provide an extra layer of security to protect sensitive information such as personal details and payment information.
- Improved payments: With blockchain-based payments, Airbnb can eliminate intermediaries and reduce transaction fees, resulting in lower costs for both hosts and guests.
- Automated processes: Blockchain can automate several processes such as dispute resolution, identity verification, and payment processing, saving time and reducing the potential for errors.

Some of the **possible evolutions** of DEFev include:

- To populate more information to the digital twin of the EVSE. The richer the information is provided, the more the user wants to use the service.

- To improve the management of a fleet and allow a unique user to handle several EVSE, receive the payment on a unique wallet and have a screen to view the information of his whole fleet of items.

3.7 OTCnLNG

Funded in: Open Call 3 - Topic B7
Duration: 10 months
Description: The OTCnLNG solution offers new capabilities to tackle issues actors are dealing with by generating transparent, traceable, accountable, secure data management for LNG buyers and sellers, responsible sourcing, and green LNG products. It includes REST API based webservice, ontology-based data structures, smart contracts, and relies on the following external services: OriginTrail DKG for handling knowledge assets; and an EVM-compatible blockchain for deploying the OTCnLNG smart contracts.

3.7.1 Key results and Relevant KPIs

The keys results and relevant KPIs of the OTCnLNG project are the following:

- Related to the interoperability and standardization
 - Allow for different consensus protocols and smart contract implementations*
Solidity-based smart contracts, applicable to any EVM-compatible have been implemented.
 - International events on standardisation activities*
They contributed to OEO, preparing participation to IGU conference 2024, following new ISO initiative on carbon credit tokens (ISO/TC 307).
- Related to the innovation
 - Implementation of new innovative ONTOCHAIN use cases*
Supply chain and logistics use case OC3 B7, specific on liquified natural gas LNG supply chain and green claims verification, has been implemented.
 - Implementation of new ways to serialise ontologies and semantics on blockchain*
Ontology enforcement relies on Origintrail DKG.
- Related to a more human-centric evolution of the internet

a) *The size of decentralized storage, in GB*

To be provided on a complete test case.

b) *The number of applications deployed*

The carbon-neutral LNG application has been deployed.

- Related to a more decentralized NGI

a) *Implementation of new Digital Twin technologies*

A digital asset that is a virtual representation of a volume of non-fugible LNG with green attributes using enhanced ERC 3525 standard has been implemented.

- Related to new forms of interactions

a) *Implementation of decentralized apps that involve human interactions*

The decentralized applications of Energy (natural gas) and supply chain (LNG) have been implemented.

3.7.2 Innovation and Possible Evolutions

The **key innovations** of the OTCnLNG project are the following:

- To enhance capability to collaborate among the different actors and to ensure data exchanges with comprehensive models.
- A wide array of sophisticated features, including a REST API-based web service, ontology-based data structures, and smart contracts-based tokenization and compensation. These components work synergistically to streamline carbon credit management processes and significantly enhance the accuracy of emissions reporting.
- Aggregation of data from various data sources to provide emissions profiles to help users, consolidating their own statements.
- LNG domain-specific ontology and proposed to the Open Energy platform to enable knowledge sharing, data portability and interoperability
- A ontology-based data structure for emissions and compensation management with import/export capabilities based on the semantic modelling language OWL (Web Ontology Language)
- JSON-LD as the main interchange format for semantic data (preserving meaning and interoperability by utilizing our LNG-specific ontology and common external ontologies and vocabularies).

Some of the **possible evolutions** of OTCnLNG include:

- To leverage the existing HODLNG solution and to improve it further.
- To additionally incorporate AI and Machine Learning methods by 2024 for future features related to emissions analysis and anomalies detection.
- To integrate with other platforms for future advancements and developments, including sensors and IoT devices; including the integration of additional ONTOCHAIN applications as DESMO-LD.

3.8 DLMD

Funded in: Open Call 3 - Topic B7
Duration: 10 months
Description: The Decentralized Last-Mile Delivery (DLMD) solution revolutionizes the last-mile delivery ecosystem by integrating blockchain technology with a user-centered application. The solution is designed to enable efficient, transparent, and secure parcel transactions, utilizing parked vehicles as delivery points. This innovative approach addresses the challenges of conventional delivery systems, offering improved service for delivery companies, vehicle owners, and parcel senders and receivers. Through its unique NFT-based parcel identification and vehicle access system, DLMD ensures the seamless transfer of parcels while optimizing delivery times and costs.

3.8.1 Key results and Relevant KPIs

The keys results and relevant KPIs of the DLMD project are the following:

- Related to the interoperability and standardization
 - a) *Allow for different consensus protocols and smart contract implementations*
Smart contracts are EVM based, so they can work on any EVM supported chain.
- Related to the innovation
 - a) *Implementation of new innovative ONTOCHAIN use cases*
The solution uses blockchain in parcel delivery systems.
- Related to a more human-centric evolution of the internet
 - a) *Assessment of the privacy/anonymity of the solution*

The metadata attached to the parcel NFTs is encrypted and only decrypted by specific users.

b) *The number of applications deployed*

One system which consists 3 different self-contained modules.

- Related to a more decentralized NGI

a) *Implementation of new Digital Twin technologies*

The parcel NFT is a digital twin of actual parcel.

- Related to new forms of interactions

a) *Implementation of decentralized apps that involve human interactions*

DLMD is an app working on parcel delivery. It generally goes in the supply chain category.

3.8.2 Innovation and Possible Evolutions

The **key innovations** of the DLMD project are the following:

- A solution using blockchain and smart contracts to ensure transparent, reliable, and secure transactions and to address the issue of trust and accountability often associated with delivery processes.
- A mobile application to facilitate transparent transactions and real-time tracking and to provide users with a unique, trusted experience in last-mile delivery services.
- Privacy and security, achieved through the use of iExec SDK for data encryption for user confidence, paving the way for broader adoption.

Some of the **possible evolutions** of DLMD include:

- To implement additional scenarios, such as enabling clients to drop off parcels in their vehicles, and the couriers transport them directly to the recipients. This could provide a more convenient and efficient solution for both clients and couriers.
- To exploring the use of vans with multiple lockers, following the same decentralised principle. This approach could further scale our service and accommodate larger delivery volumes, catering to the needs of businesses and individuals alike.
- To empower users to earn revenue by lending their vehicles as drop-off points for parcels.
- To optimise routes, reduce costs, and gain deeper insights into customer behaviours,

enhancing the overall efficiency and value of the platform by leveraging advanced data analytics and machine learning algorithms.

- To integrate the project with major e-commerce platforms.
- To continuously update the system according to the evolution of blockchain technology landscape.

3.9 CREATE

Funded in: Open Call 3 - Topic B8
Duration: 10 months
Description: UNITT Content Registry And Tokenized Exchange (CREATE), is a digital content marketplace that enables creators to distribute and monetize their creations in a trustworthy and transparent manner while ensuring privacy. The marketplace will be a solution that is intended to work with the ONTOCHAIN infrastructure and software and its future token(s), enabling content creators to exchange content for tokens from other users on a pay-per-view basis.

3.9.1 Key results and Relevant KPIs

The keys results and relevant KPIs of the CREATE project are the following:

- Related to the interoperability and standardization
 - a) *Interledger APIs*
They would benefit from interledger APIs but their development is out of scope.
- Related to the innovation
 - a) *Implementation of new innovative ONTOCHAIN use cases*
CREATE project is the first and only ONTOCHAIN project that directly addresses the challenge of direct monetisation of digital content.
- Related to a more human-centric evolution of the internet
 - a) *Assessment of the privacy/anonymity of the solution*
CREATE does not contain a central database of users personal data, but currently a local wallet is created for each user during the onboarding of the app. This ensures privacy of every user.

b) *The size of decentralized storage, in GB*

CREATE does not contain a data depository, only a registry that points to where the data/content is held. This ensures (i) complete decentralisation of the data storage; and (ii) complete control by the owner of their own content. The data relating to the content and payment registry is estimated to amount to c. 1 GB per 10,000 users.

c) *The number of applications deployed*

The CREATE project has deployed one integration API and suite of smart contracts to handle the content and payment registries.

- Related to a more decentralized NGI

a) *Implementation of new decentralised social networks*

CREATE is an ecosystem where any user is able to register their content and exploit its distribution commercially. It therefore has the potential of creating a new decentralised social network, complementing the existing, platform-controlled networks.

b) *Implementation of new decentralised publishing platforms*

CREATE is not a publishing platform itself, but a payment gateway mechanism that enables creators to earn from the content they own, which ever publishing platform they use.

3.9.2 Innovation and Possible Evolutions

The **key innovations** of the CREATE project are the following:

- All things are tokenized to reflect inherent value (or cost) in digital transactions, while remaining neutral on the direction of value transfer. For instance, a news article reader should pay the journalist who authored it, whereas an advertiser could pay the reader to view their ads.
- Tokenization serves two purposes: it serves as evidence of transaction for information exchange and acts as the payment method, eliminating the need for centralized platforms managing financial transactions between content buyers and sellers.
- This pivotal innovation severs the connection between the predominant payment model for digital content advertising and the relationship between content creators and consumers, without requiring additional subscriptions for consumers. Creators earn tokens, which they can utilize within the system to consume content produced by others or sell for traditional currency.
- Tokenization fosters the development of an ecosystem consisting of independent applications catering to specific areas. These applications can leverage the same protocols that enable consumer interoperability.

Some of the **possible evolutions** of CREATE include:

- o Additional services and functionalities that provide the users with more tools to effectively exploit their own creations.

3.10 DAOSTAR

Funded in: Open Call 3 - Topic B10
Duration: 10 months
Description: DAOstar is a set of open, semantic API standards for DAOs and DAO service providers, including EIP-4824 and DAOIP-3, built by a coalition of major DAOs, DAO frameworks, and DAO tooling providers. The goal of the DAOstar project is to develop standards that will ensure interoperability between both DAOs and DAO service providers.

3.10.1 Key results and Relevant KPIs

The keys results and relevant KPIs of the DAOstar project are the following:

- o Related to the interoperability and standardization
 - Allow for different consensus protocols and smart contract implementations*
The solution is designed to be agnostic to different blockchains (and is used across multiple, e.g. Ethereum and Cosmos)
 - Standards/drafts proposed or could/will be proposed*
They proposed and updated DAOIP-3: Attestations for DAOs in the course of the project.
 - International events on standardisation activities*
They helped organize a workshop on DAOs at Harvard in April 2023.
 - o Related to the innovation
 - Implementation of new innovative ONTOCHAIN use cases*
They published REPUTABLE and connected it to two DAOstar-compliant services.
 - Implementation of new innovative ONTOCHAIN reasoning technologies*
They added additional logic to facilitate REPUTABLE adoption.
- B) *Implementation of new ways to serialize ontologies and semantics on the*

blockchain

issuerURI (via daoURI) allows discovery of new data from attestors.

- Related to a more human-centric evolution of the internet

a) *The Trust Assessment Effectiveness*

They have a high Trust Assessment Effectiveness.

b) *Assessment of the privacy/anonymity of your solution*

They assume pseudonymity, based on the pseudonymity of Ethereum addresses.

c) *The size of decentralized storage, in GB*

1 GB is used.

d) *The number of applications deployed*

One application has been deployed.

3.10.2 Innovation and Possible Evolutions

The **key innovations** of the DAOstar project are the following:

- The main standards body for DAOs: It is currently the only body defining off-chain data standards for the industry by leveraging the DAOIP-3: Attestations for DAOs framework that makes it a good fit for the intended REPUTABLE use-case.
- A way of providing consistent feedback and evaluations across multiple DAOstar-compliant services and tooling providers.
- It enables consumption of REPUTABLE scores in environments and services (e.g. Govrn) that may have never heard of REPUTABLE, via issuerURI. It is a channel through which REPUTABLEs services (and potentially other ONTOCHAIN services) can be deployed and become visible to more DAOs and DAO services.

Some of the **possible evolutions** of DAOstar include:

- To continue developing the DAOstar Attestations explorer, e.g. working with the Ethereum Attestation Service (EAS) to deploy their schemas in their format. This will support additional interoperability in the space and help extend the adoption of the standard.
- To invest additional resources into improving the backend infrastructure developed and tested in this deployment to more DAOs.

3.11 INGRESS

Funded in: Open Call 3 - Topic B10

Duration: 10 months

Description: INGRESS provides access to cryptographically secured credit history for microlending in crypto and fiat currencies. The solution addresses trust and security issues of digital economy using combination of biometric identification with asymmetric cryptography. This enables individuals possessing the private keys of re-issuing the credentials they own in unfortunate case of private key loss or compromise. INGRESS wallet connects the users to the marketplace of loans, provided by the lenders. Lenders compete among each other to win the users, which results in affordable credit for users with good credit histories.

3.11.1 Key results and Relevant KPIs

The key results and relevant KPIs of the INGRESS project are the following:

- Related to the interoperability and standardization
 - a) *Standards/drafts proposed or could/will be proposed*
Open standard for iris template generation registered with IBIA is related to their background IP and is currently in progress.
 - a) *International events on standardisation activities*
They participated in working meetings for P3167 Standard for Secure Biometrics Device Interface (IEEE Standard).
- Related to the innovation
 - a) *Implementation of new innovative ONTOCHAIN use cases*
INGRESS proposes utilizing biometric DIDs for identification of clients and building digital credit histories with ability to verify the transactions on the blockchain.
- Related to a more human-centric evolution of the internet
 - a) *The size of decentralized storage, in GB*
100 GB have been used.
 - b) *The number of applications deployed*
One application has been deployed.

- Related to new forms of interactions

a) *Implementation of decentralized apps that involve human interactions*

One application has been implemented as a tool for managing loans.

3.11.2 Innovation and Possible Evolutions

The **key innovations** of the INGRESS project are the following:

- New recovery of compromised or lost DIDs: issuing the DID by the Biometric Bureau, which can verify that the owner of given biometric traits possesses the given public key. Thus, users can verify their identity with great reliability in any required scenario.
- Utilizing biometric DIDs for identification of clients and building digital credit histories with ability to verify the transactions on the blockchain. This enables lenders to serve the great amount of currently financially excluded people and avoid risks of financial fraud.

Some of the **possible evolutions** of INGRESS include:

- For the biometric bureau: To add support for other biometrics apart from facial recognition (like fingerprint, iris, voice, etc.). This is useful because different environments have different requirements: you may need to add more security to the system and ask the user to provide more data or, vice versa, reduce the steps needed to complete loan application.
- For credit bureaus: To add more security and anonymity by adding homomorphic encryption to the credit data and user credit scoring. Also, this component can extend for other applications like car or house credits.
- To support different verifiable credentials and currencies.

3.12 CAPS-CO

Funded in: Open Call 3 - Topic B12

Duration: 10 months

Description: CAPS-CO has developed a practical application, a Carbon Accounting tool to calculate product carbon footprint (PCF) and implement a corporate carbon accounting (CCA) for manufacturers, resulting in transparent declared unit (DU) outputs based around the COP26 Pathfinder framework initiative (WBCSD, 2021). This tool delivers trusted, privacy-preserving, traceable, transparent, and legislation-compliant carbon accounting to European industry and incentivises emission-efficient operations.

3.12.1 Key results and Relevant KPIs

The keys results and relevant KPIs of the CAPS-CO project are the following:

- Related to the interoperability and standardization

a) *Interledger APIs*

There is no need to implement Interledger APIs in the CAPS-CO project. This latter is compatible with multiple systems and blockchains as it is EVM based.

b) *Allow for different consensus protocols and smart contract implementations*

The solution does not rely on any specific consensus protocol in its functionality. It will work on PoS, PoW and PoA chains. Their standard smart contract implementation is written in Solidity, however other implementations are possible.

c) *Standards/drafts proposed or could/will be proposed*

The confidential carbon accounting solution of the project could be proposed as a standard/draft.

- Related to the innovation

a) *Implementation of new innovative ONTOCHAIN use cases*

The secure and auditable Carbon Accounting use case has been implemented.

b) *Implementation of new ways to serialise ontologies and semantics on blockchain*

They have developed and implemented the approach allowing businesses and ecosystems to obtain the benefits of public Carbon Accounting whilst satisfying the confidentiality requirements of the businesses.

c) *Other new approaches to implementing immutable semantics and reasoning*

An approach that enables businesses and ecosystems to harness the advantages of public Carbon Accounting while also meeting the confidentiality requirements specific to those businesses has been implemented.

- Related to a more human-centric evolution of the internet

a) *Assessment of the privacy/anonymity of the solution*

Due to B2B use case, there is no personal data involved. Confidentiality of the business data is ensured via architecture where confidential data is stored off-chain under the control of the business.

b) *Implementation of zero knowledge proof protocols*

We have implemented a combination of (1) off-chain confidential storage and cryptographic hashing (Keccak256) with (2) on-chain reporting of calculation results along with auditable hashes. This approach is similar to zk proof, however unlike some decentralized zk solutions it doesn't offer automated verification by members of the public. This solution is optimal for the industry as it allows for a simple and cost-efficient implementation of on-chain Carbon Accounting for businesses. Audit verification process is enabled by cryptography and legislative support that is already in place in the industry.

c) *The size of decentralized storage, in GB*

Producing one Carbon Accounting record per hour, 1 Gb per month will be generated by around 2,020 business entities using CAPS-CO system if creating 1 Carbon Accounting record per hour by each entity.

d) *The number of applications deployed*

One application (dApp) deployed on Bellecour chain, however business may deploy their own applications.

- Related to a more decentralized NGI

a) *Implementation of new decentralised computing technologies for storing and accessing data*

Since our solution is business oriented, they have focused their efforts on providing a simpler and cost-efficient solution with an off-chain component under business control. Their solution can be enriched with OAI-PMH and similar technologies in later versions.

- Related to new forms of interactions

a) *Implementation of new human to Internet interaction paradigms*

The CAPS-CO solution allows a safe and confidential Carbon Accounting reporting under the control of the business which also benefits from logging the public results of

the calculation on-chain. This increase the trust and likelihood of businesses to adopt these novel and transparent technologies.

b) *Implementation of decentralized apps that involve human interactions*
 Their application relates to energy and supply chain industries.

3.12.2 Innovation and Possible Evolutions

The **key innovations** of the CAPS-CO project are the following:

- Blockchain-Based Carbon Accounting Solution: it utilizes distributed ledger technology to track and record carbon emissions and sustainability-related data while providing a reliable and tamper-proof record of carbon accounting.
- Auditability: by using cryptographic hash keys, they have allowed for the ability for secure external reviews of results by the relevant governmental bodies, thus mitigating the possibility of deliberate falsification.
- Useability: they allow for non-expert use of the tool to provide accurate and reliable carbon calculations.
- Modular and Interoperable Design: it allows other projects to use the entire implementation or select specific modules that suit their needs. This approach encourages interoperability between different blockchain-based carbon accounting solutions and promotes standardization within the industry.
- Addressing the Gap in Open-Source Carbon Accounting Solutions: it provides a full-cycle open software solution for on-chain carbon accounting purposes, benefitting the blockchain ecosystem as a whole.

Some of the **possible evolutions** of CAPS-CO include:

- To achieve marketability with a well-structured pilot study to be conducted with three hospitals or hospital systems to thoroughly test the tool in a real-life environment. This is in order to refine the tool both from a technical perspective and from a usability perspective.
- To integrate the most commonly used ERP/MES software, enabling automated calculations and mitigating the prevalent human errors often encountered in LCA studies.
- To venturing into sectoral expansion, particularly manufacturing or similar industries. Drawing insights from their prior development experiences will inform and expedite this expansion process.

3.13 LOW-CODE APP BUILDER

Funded in: Open Call 3 - Topic B12

Duration: 10 months

Description: The project within the ONTOCHAIN ecosystem consists of developing a low-code app builder to both ease the integration of different services of the ecosystem and make them more easily accessible to the end user by bundling them into an app. In other words, the solution can be thought of as the bridge between the different services of the ONTOCHAIN ecosystem and the end users. In more details, that bridge is an application builder to enable the different ONTOCHAIN services to be bundled and accessed via an app in a couple of clicks. To achieve this, they are partnering with a few projects of the ecosystem, namely Babelfish, Perun and PiSwap, in order to demonstrate how to integrate ones service into the low-code app builder.

3.13.1 Key results and Relevant KPIs

The keys results and relevant KPIs of the Low-code app builder project are the following:

- Related to the interoperability and standardization

a) *Interledger APIs*

They may integrate projects that do have interledger API within the app builder, but the builder itself doesn't.

b) *Allow for different consensus protocols and smart contract implementations*

They may integrate projects that allow for different consensus protocols and smart contract implementations within the app builder.

c) *Standards/drafts proposed or could/will be proposed*

They relied on existing standards, i.e. WebID-OIDC, Linked Data Platform, Linked Data Notifications, Web Components, WebACL.

d) *International events on standardisation activities*

They participated to multiple DataSpaces related events, such as the IDSA Architecture Working Group or GAIA-X Tech-X.

- Related to the innovation

a) *Implementation of new innovative ONTOCHAIN use cases*

Their app builder automates and normalizes a process that what exclusively manual and time consuming before.

b) *Implementation of new ways to serialise ontologies and semantics on blockchain*
They rely on LDP and the semantic web stack regarding ontologies and data serialisation.

- Related to a more human-centric evolution of the internet

a) *The Trust Assessment Effectiveness*

The accuracy of their apps relies completely on the accuracy of the different components sourced from the ONTOCHAIN ecosystem.

b) *Assessment of the privacy/anonymity of your solution*

They implement SSI by relying on the WebID-OIDC standards.

c) *The size of decentralized storage, in GB*

They only store the user accounts that choose their servers at identity providers as well as a registry of apps and components.

d) *The number of applications deployed*

They deployed 10 test applications on their dev environment.

- Related to a more decentralized NGI

a) *Implementation of new decentralised computing technologies for storing and accessing data*

They implement several standards of the Solid stack to achieve high reliability and availability of data by relying on a single source of truth.

b) *Implementation of new decentralised social networks*

Part of the pre-existing components of their app builder, such as a decentralized directory of users, a group chat or direct messages, have been used by their clients to build decentralized social networks for their users, and can be re-used by the developers intending to leverage the ONTOCHAIN ecosystem of services.

c) *Implementation of new decentralised publishing platforms*

Several of their pre-existing features, such as the decentralized calendar of events, collaborative intelligence or job board are used to publish content and spread it within a decentralized network.

- Related to new forms of interactions

a) *Implementation of new human to Internet interaction paradigm*

By working on the low-code app builder, they push forward a new web applications model where collaborating online is not synonymous of stoking the winner takes all

model.

b) *Implementation of decentralized apps that involve human interactions*

Their demo app implements tipping, that can be associated with the financial sector, as well as NFT crowdsourced pricing.

3.13.2 Innovation and Possible Evolutions

The **key innovations** of the Low-code app builder project are the following:

- The solution enables to trivially embed any service of the ONTOCHAIN ecosystem into any app that intends to make use of it.
- Propose a way to any ONTOCHAIN services to build functional components usable on the spot.
- Add an automatic registration mechanism to Babelfish for users and organisations.
- Being able to deploy a live application in just a few clicks.
- The team are currently working within several initiatives towards that goal of becoming a B2B interoperability facilitator.

Some of the **possible evolutions** of Low-code app builder include:

- To enable the different components to interact with the same data, which is not very encouraged nor organised today, although already technically possible.
- To provide a Solid POD to the end user in order to store off-chain data in it, under her control, as well as providing a set of ontologies components would need to comply with in order to guarantee the interoperability between the different components.

3.14 TRUSSIHEALTH

Funded in: Open Call 3 - Topic B12

Duration: 10 months

Description: The TRUSSIHEALTH project proposes a decentralized and trustworthy health information exchange system. It leverages the concepts of Self-Sovereign Identity (SSI) and related technologies. SSI refers to an innovative identity management system that empowers users to have control over their identities and associated data. Data portability and interoperability are fundamental principles of SSI.

In particular, TRUSSIHEALTH will develop a middle-ware that allows the conversation between health data in FL7 FHIR data format and the verifiable credential (VC) data format. VCs were specially designed to support SSIs by providing an open and lightweight data format used for storing and exchanging data. To add trust in the transformed health data, TRUSSIHEALTH will utilize the so-called eIDAS bridge, a tool that allows to apply qualified and advanced electronic signatures on VCs. This way, not only trust but also legal value is added to the transformed health data VC.

3.14.1 Key results and Relevant KPIs

The keys results and relevant KPIs of the TRUSSIHEALTH project are the following:

- Related to the innovation

a) *Implementation of new innovative ONTOCHAIN use cases*

TRUSSIHEALTH implements an innovative use use case of ONTOCHAIN namely the trustworthy information exchange. In particular, TRUSSIHEALTH ensures the trustworthy information exchange of health data of patients by enabling the import of these health data from a HIS using TRUSSIHEALTH service into an identity wallet namely VIDwallet. And the patients can share their health data with a party whichever they want.

- Related to a more human-centric evolution of the internet

a) *Trust Assessment Effectiveness*

They establish a trust chain between data source and verifier, so that the verifier can be sure that data coming from TRUSSIHEALTH are coming from a trustworthy resource and not a scammer.

b) *Assessment of the privacy/anonymity of your solution*

In TRUSSIHEALTH, the patient is in full control over their health data. Also when sharing the health data, the data source will not learn from this sharing process and it therefore enhances the patients privacy.

c) *The size of decentralized storage, in GB*

TRUSSIHEALTH utilizes IPFS for storing encrypted health objects. The storage is not limited and is able to grow dynamically.

d) *The number of applications deployed*

TRUSSIHEALTH consists of a middle-ware service used during the import as well as data sharing flow. Additionally, they implement a tool for the data receiving party to request, display, and verify health data shared by a patient.

- Related to new forms of interactions

a) *Implementation of new human to Internet interaction paradigms*

TRUSSIHEALTH implements a service using latest technology for identity management such as DIDs and VCs. An identity wallet is used for interaction with the user.

b) *Implementation of decentralized apps that involve human interactions*

The main service of TRUSSIHEALTH that is used for importing and sharing health data of patients was developed with Go programming language and can be run using Docker container. Per se, it is not a decentralized app but the Docker container could be deployed to Bellecour and run there.

3.14.2 Innovation and Possible Evolutions

The **key innovations** of the TRUSSIHEALTH project are the following:

- Implementation of self-sovereign identity that empowers individuals with control over their health data and personal information, ensuring privacy, security, and autonomy in the health industry.
- By leveraging advanced cryptographic techniques and decentralized technologies, it enables patients to securely manage and share their health-related data with healthcare provider. This transformative solution not only simplifies and streamlines the healthcare process but also promotes interoperability, allowing for seamless data exchange across various healthcare systems and stakeholders.
- it opens up new possibilities for personalized and patient-centric care, empowering individuals to actively participate in their own health management while ensuring the utmost privacy and data protection.

Some of the **possible evolutions** of TRUSSIHEALTH include:

- To have more piloting partners in place to uncover technical difficulties and tackle interoperability issues.
- To extend the JSON based HL7 and FHIR health documents to also XML or other document formats.

4 SUMMARY OF OPEN CALL 3 IMPACT

In this section, we summarize the impacts created by the OC3 third parties by updating the tables of the D4.8 deliverable, extracted from the Grant Agreement. These outcomes provide the final results for the expected impacts of the ONTOCHAIN project defined in the Grant Agreement. Table 4, Table 5, Table 6, Table 7, Table 8, Table 9, Table 10, Table 11 and Table 12 provide the values of these KPIs.

N°	KPI	Target	Current value
1.1	Trust Assessment Effectiveness, e.g. accuracy for subjects or for content.	Accuracy: 97%	Correctness and authenticity of data (CARECHAIN, NFTWATCH, ECOS, TRUSSIHEALTH), provable security (PXC, HIBI), 90% country-level classification capacity (GEONTOLOGY), trusted technology (KnowledgeX), standards, academic review (DKG), signature and legal basis of the data sources (PS-SDA, CREATE, CopyrightLY), ontologies implementation (BABELFISH, POC4COMMERCE), traceable and immutable records with DKG (ReCheck Green Box, My3Sec), reputation scoring (DEFev), components sourced from the ONTOCHAIN system (Low-code app builder)
1.2	Privacy/anonymity metrics, e.g. effective anonymity set size, entropy, inference probability, differential privacy guarantees.	Probabilistic Inference for Specific Subjects < 1/1000	Private data exchanges (MFSSIA, PS-SDA, PXC), user anonymity and/or authentication (PXC, DKG, Ontospace, ReCheck Green Box), no recording of private data (PXC, CARECHAIN, ReCheck Green Box), pseudonymous user accounts (Convex Global DLT, My3Sec, DEFev, CREATE, DAOstar), encrypting mechanism (DLMD), off-chain storage of data (CAPS-CO), user full control (CopyrightLY, KnowledgeX, Low-code app builder, TRUSSIHEALTH)
1.3	Number of of zero knowledge proof protocols	> 1	3 (PS-SDA, REPUTABLE, BABELFISH (similar approach))
1.4	User satisfaction from ONTOCHAIN fairness: right incentive to contribute and fair remunerations for resource contribution	high	A survey has been distributed to all third parties selected during the OC1, OC2 and OC3 to collect their feedback.
1.5	GBs of decentralized storage	> 50 TBs	Depend on TDD number (DESMO-LD), many for heavily diffusion (MFSSIA), 100s of agents each 0.5 GB in size (PS-SDA), 0.05 GB (NFTSWAP), depends on transaction complexity and overall load (Convex Global DLT), dynamically adjusted (Recheck Green Box), 10KB (My3Sec), 1KB per object (DEFev), 1 GB per 10,000 users (CREATE), 100 GB (INGRESS), 1 GB per month (CAPS-CO), 1GB (DAOstar)
1.6	Number of apps deployed, number of people employing decentralized services, number of people involved in ONTOCHAIN ecosystem	> 5, > 50, > 100 (until the end of the project)	63 applications, 34 OC teams using decentralized services, 38 teams (34 teams selected during the three ONTOCHAIN open calls, 4 hackathons' teams)

TABLE 4: IMPACT #1: SHAPE A MORE HUMAN-CENTRIC EVOLUTION OF THE INTERNET.

N°	KPI	Target	Current value
2.1	Trust assessment complexity	Scalable, i.e. Sublinear/Linear to the number of subjects evaluated and/or info involved, independent from blockchain ecosystem size	Scalable mechanisms: Ados for trustness from sensors (CARECHAIN), scoring system (NFT-WATCH, DEFev), classification for geolocalization (GEONTOLOGY), provable security (PXC), signature and legal basis of the data sources (PS-SDA), standard and academic review (DKG)
2.2	Identity Verification complexity	Independent from the blockchain ecosystem size.	Scalable mechanisms: blockchain-wallet address for authentication (PXC, DKG, Ontospace, Convex Global DLT, My3Sec, DEFev, CREATE, INGRESS, TRUSSIHEALTH, DAOstar, CopyrightLY), MFA (MFSSIA)
2.3	Privacy-aware and secure data exchange complexity	Secure/privacy/cryptographic protocols should not depend on the size of the distributed ledger.	Scalable mechanisms: Hash, encrypt or off-chain data exchanges (MFSSIA, PS-SDA, PXC, Recheck Green Box, DLMD), no recording of private data (PXC, CARECHAIN), blockchain-wallet address for anonymity (PXC, DKG, Ontospace, Convex Global DLT, My3Sec, DEFev, CREATE, INGRESS, TRUSSIHEALTH, DAOstar)

TABLE 5: IMPACT #2: SCALABLE BLOCKCHAIN BASED SOLUTIONS FOR ENSURING TRUSTWORTHY CONTENT AND INFORMATION EXCHANGE.

N°	KPI	Target	Current value
3.1	Interledger APIs	Provide	Web and mobile applications and cross-chain transactions (PXC), Bellecour and Convex (BABELFISH), DKG API (Recheck Green Box)
3.2	Allow for different consensus protocols and smart contract implementations	Allow	EVM-compatible (PXC, Ontospace, DKG, CARECHAIN, My3Sec, OTcNlNG, DLMD, CAPS-CO), several smart contract implementations (BOWLER), for several consensus protocols (PS-SDA), independent from the smart contract implementation (NFT-WATCH), Bellecour and Convex (BABELFISH), configurable and flexible through deployed peers (Convex Global DLT), the JSON-LD standard (ReCheck Green Box), blockchain agnostic (DAOstar); and (ongoing) being used in different blockchains (DKG, PRINGO), EVM-agnostic (NFTSWAP)
3.3	Number of proposed standards/drafts	>= 3	2 standard (PS-SDA, DAOstar), 22 standards/drafts (Convex Global DLT), (extended) 1 (ReCheck Green Box) and 6 ongoing (DKG, PXC, MFSSIA, Ontospace, DKG, NFTSWAP)

TABLE 6: IMPACT #3: PROMOTING INTEROPERABILITY AND STRENGTHENING THE ROLE OF EUROPE IN INTERNATIONAL STANDARDISATION.

N°	KPI	Target	Current value
4.1	Retention	Positive growth rate. D1, D7, D30 and so on above 10%	Between 15 and 20 OC1 people and between 23 and 32 OC2 people at each joint technical meeting
4.2	Daily, Weekly, and Monthly Active Users (DAU, WAU, MAU)	DAU, WAU, MAU growth rate increasing	DAU/MAU: 5.77%, DAU/WAU: 28.31%, WAU/MAU: 20.39%
4.3	Total number of engaged stakeholders within ONTOCHAIN events and activities	+1000	More than 1101 participants
4.4	User Generated Content (UGC)	>3 dapps that involve UGC, > 500 pieces of UGC, >100MB of UGC	3 DApp (PRINGO, CREATE, ECOS), 2 marketplaces (DEFev, CopyrightLY)
4.5	Cross-collaboration projects originated within the ONTOCHAIN ecosystem activities or sponsored by ONTOCHAIN team	+10	12 (ADOS used in CARECHAIN; DKG used in MFSSIA, ReCheck Green Box, OTcnLNG; REPUTABLE used in DAOstar; PXC, NFTSWAP, MFSSIA and REPUTABLE used in Low-code app builder; Gimly used in DEFev; Gimly used with CopyrightLY; GraphChain used with CopyrightLY)

TABLE 7: IMPACT #4: CREATE A EUROPEAN BLOCKCHAIN ECOSYSTEM INTEGRATING RESEARCH AND INNOVATION COMMUNITIES.

N°	KPI	Target	Current value
5.1	Number of demonstrator apps employing ONTOCHAIN building blocks	>4	14 (ADOS used in CARECHAIN; DKG used in MFSSIA, ReCheck Green Box, OTcnLNG; REPUTABLE used in DAOstar; PXC, NFTSWAP, MFSSIA and REPUTABLE used in Low-code app builder; Gimly used in DEFev; 4 hackathons' projects)
5.2	Number of investors/fund raisers interested in the ONTOCHAIN platform	>100	Several exchanges of interest have been made with: TEZOS, Blockstart, EU blockchain observatory and forum, Frankfurt School Blockchain Center, IOTA, BERCHAIN, Berlin Partner, INATBA, Streamr, FILECHAIN, SEEBLOCKS.eu, DIGITAL INNOVATION HUB BLOCKCHAIN FOR TRUSTED DATA ECOSYSTEMS.
5.3	Size of professional network engaged in the ONTOCHAIN platform	>100	38 (34 teams selected during the three ONTOCHAIN open calls, 4 hackathons' teams)
5.4	Number of of people following news from ONTOCHAIN platform	>1000	3355 social media followers (Twitter: 1471 followers, LinkedIn: 821 followers, Facebook: 95 followers, F6S: 968 followers)

TABLE 8: IMPACT #5: GENERATE NEW BUSINESS OPPORTUNITIES AND NEW INTERNET COMPANIES WITH MAXIMUM GROWTH AND IMPACT CHANCES.

N°	KPI	Target	Current value
A1.1	New innovative ONTOCHAIN use cases	20	27 (provided by the 13 OC2 projects and the 14 OC3 projects)
A1.2	New innovative ONTOCHAIN energy-efficient reasoning technologies	5	5 (PXC, Bowler, GraphChain, KUMO, ECOS)
A1.3	New ways to serialise ontologies and semantics on blockchain	5	12 (DESMO-LD, ADOS, DKG, BOWLER, BABELFISH, Convex Global DLT, POC4COMMERCE, CopyrightLY, CAPS-CO, Low-code app builder, Ontospace, DAOstar, GraphChain)
A1.4	Other (unimaginable) new approaches to implement immutable semantics and reasoning	10	10 (DKG, BOWLER, LCDP-ONT-APP, Convex Global DLT, CAPS-CO, GraphChain, Ontospace, ADOS, GEONTOLOGY, POC4COMMERCE)

TABLE 9: ADDITIONAL IMPACT #1: ONTOCHAIN WILL CONTRIBUTE TO THE CATCHING UP PROCESS AMONG EUROPEAN AND INTERNATIONAL INITIATIVES (I.E. BLOCKCHAIN OBSERVATORY, EC BLOCKCHAIN INITIATIVE, NGI, INATBA).

N°	KPI	Target	Current value
A2.1	Social welfare	positive social welfare	Preparation of a survey to collect this impact.
A2.2	Number of investors/fund raisers interested in the ONTOCHAIN platform	>100	Several exchanges of interest have been made with: TEZOS, Blockstart, EU blockchain observatory and forum, Frankfurt School Blockchain Center, IOTA, BERCHAIN, Berlin Partner, INATBA, Streamr, FILECHAIN, SEEBLOCKS.eu, DIGITAL INNOVATION HUB BLOCKCHAIN FOR TRUSTED DATA ECOSYSTEMS.
A2.3	Size of professional network engaged in the ONTOCHAIN platform	>100	38 (34 teams selected during the three ONTOCHAIN open calls, 4 hackathons' teams)
A2.4	Number of people following news from ONTOCHAIN platform	>1000	2974 social media followers (Twitter: 1320 followers, LinkedIn: 621 followers, Facebook: 65 followers, F6S: 968 followers)

TABLE 10: ADDITIONAL IMPACT #2: ONTOCHAIN WILL CONTRIBUTE TO THE DELIVERY OF A SUSTAINABLE AND SOCIETALLY-TRIGGERED NEXT GENERATION INTERNET FRAMEWORK TO ENSURE DIVERSITY, PLURALISM AND THE RIGHT TO CHOOSE.

N°	KPI	Target	Current value
A3.1	New decentralised computing technologies for storing and accessing data	3	12 (DESMO-LD, ADOS, PRINGO, CARECHAIN, MFSSIA, GEONTOLOGY, DKG, KnowledgeX, Convex Global DLT, CopyrightLY, CREATE, CAPS-CO, Low-code app builder, Bowler)
A3.2	New decentralised social networks	2-3	5 (My3Sec, CREATE, KnowledgeX, Low-code app builder, CopyrightLY)
A3.3	New decentralised publishing platforms	2-3	6 (PRINGO, BABELFISH, Convex Global DLT, CREATE, KnowledgeX, Low-code app builder)
A3.4	New Digital Twin technologies	2-3	10 (PRINGO, CARECHAIN, NFTWATCH, Recheck Green Box, ECOS, DEFev, OTcNLNG, DLMD, CopyrightLY, HIBI)

TABLE 11: ADDITIONAL IMPACT #3: ONTOCHAIN WILL ASSIST TOWARDS THE AVOIDANCE OF CONCENTRATION OF DATA AND INFORMATION IN A FEW PLATFORMS (FROM AN ECONOMIC AND SOCIETAL PERSPECTIVE).

N°	KPI	Target	Current value
A4.1	Number of new human to Internet interaction paradigms developed in the use cases of ONTOCHAIN	5	7 (CARECHAIN, GEONTOLOGY, My3Sec, CAPS-CO, Low-code app builder, TRUSSIHEALTH, CREATE)
A4.2	Number of of decentralized apps in ONTOCHAIN that involve human interactions in education, energy, finance, governance, healthcare, identity, interoperability, mobility, privacy, public sector, real estate, social impact, supply chain	10	18 (PRINGO, CARECHAIN, MFSSIA, DKG, PS-SDA, BABELFISH, Recheck Green Box, My3Sec, ECOS, DEFev, OTcNLNG, DLMD, CREATE, INGRESS, CAPS-CO, Low-code app builder, TRUSSIHEALTH, INGRESS)

TABLE 12: ADDITIONAL IMPACT #4: ONTOCHAIN WILL PROVIDE NEW FORMS OF INTERACTION AND IMMERSIVE ENVIRONMENTS FOR NEXT GENERATION INTERNET USERS.

5 CONCLUSIONS

The fourteen projects chosen in ONTOCHAIN Open Call 3 have yielded numerous significant impacts related to the interoperability, the innovation, a more human-centric evolution of the internet, a more decentralized NGI and new forms of interactions, while addressing the objectives of this call. Indeed,

- BABELFISH and Convex Global DLT successfully address two topics of the Objective A, the implementation of the Gateways APIs and an energy efficient and scalable DLT respectively. Thus, BABELFISH already lists several ONTOCHAIN projects. Regarding to Convex Global DLT, the project strengthens the decentralized aspect of the ONTOCHAIN ecosystem with a new DLT.
- The projects selected in the Objective B have reached the goal to design new applications for real-life use cases, using the ONTOCHAIN infrastructure. Indeed,
 - For Topic B1, Recheck Green Box proposed a digital building logbook for Real Estate data while guaranteeing a trust, secure and traceable storage of data through the integration of DKG.
 - For Topic B2, My3Sec a fully decentralized, transparent, and efficient system for tracking peoples career growth using the blockchain to record data. My3Sec plans to integrate the DKG solution to improve search and selection capabilities.
 - For Topic B4, ecOS deployed the smart contract on the Bellecour network to implement a platform enabling to digitalize energy communities while ensuring distributed energy resources and using a Token Model for all the users involved in the energy community. The team plan to integrate ADOS.
 - For Topic B6, DEFev implemented a distributed system for electric vehicle charging with an innovative payment scheme based on the Ontochain utility token. The smart contract is deployed on the Bellecour network and the team integrated Gimly to provide decentralized identification for the Owner Dapp only.
 - For Topic B7, OTCnLNG and DLMD developed a new solution for a transparent, traceable, accountable, secure data management for LNG buyers and sellers, and a new system for the last-mile delivery ecosystem using blockchain. OTCnLNG integrated DGK for handling knowledge assets and DLMD deployed the smart contract on the Bellecour network.
 - For Topic B8, CREATE implemented a digital content marketplace enabling creators to monetize their creations in a trustworthy, transparent and privacy, using a tokenization system. CREATE plan to integrate CopyrightLY to

link a verifiable ownership claim to content.

- o For Topic B10, DAOstar and INGRESS proposed a Semantic API Standards for DAOs and a gateway to financial inclusion respectively. DAOstar extended the work of REPUTABLE to be used by all DAOstar compliant services and INGRESS deployed their smart contract on the Bellecour network.
- o For the open topic, CAPS-CO, Low-code app builder and TRUSSIHEALTH also provided new applications. Indeed, CAPS-CO deployed their smart contract on the Bellecour network to implement a tool which calculate product carbon footprint. Low-code app builder integrated PXC and PiSwap to ease both the integration of different services of the ecosystem and the access to the end user. Regarding to TRUSSIHEALTH, the team implemented self-sovereign identity that empowers individuals with control over their health data and personal information, ensuring privacy, security, and autonomy in the health industry.

Each project also suggests several improvements and possible evolutions such as making their solution more user-friendly, integrating other ONTOCHAIN technologies to improve their solution, adding new features to extend their solution, etc.

Four projects (DEFev, ecOS, INGRESS, Low-code app builder) of the Open Call 3 might be interested to patent a part of their solution by carrying out further study for a patent claim. The other OC3 projects do not intend to patent their solution.

KPIs described in this deliverable have been relevant indicators for projects in OC1, OC2 and OC3, and enables to evaluate the impact of the OC3 projects as well as the whole the ONTOCHAN project. A detailed analysis of the impact of the ONTOCHAIN infrastructure is provided in the D5.5 deliverable.

Finally, the solutions provided in this OC3 enable not only to extend the ONTOCHAIN ecosystem but also to provides new use cases while using the ONTOCHAIN technologies. The results of the thirteen projects selected in OC3 are relevant inputs to assess the overall ONTOCHAIN ecosystem.