NGI ONTOCHAIN

**Blockchain
for the Next
Generation
Internet**

D2.2 OPEN CALL 2
SPECIFICATIONS AND LAUNCH
PACKAGE DOCUMENTS

02/08/2021

D2.2 OPEN CALL 2 SPECIFICATIONS AND LAUNCH PACKAGE DOCUMENTS

WORK PACKAGE	WP2
TASK	T2.2
DUE DATE	31/07/2021
SUBMISSION DATE	09/08/2021
DELIVERABLE LEAD	ED
VERSION	0.4
AUTHORS	Caroline Barelle (ED)
REVIEWERS	Alberto Ciaramella (IS)
	Vlado Stankovski (UL)
ABSTRACT	ONTOCHAIN with a €6 M fund marries the Semantic Web with Blockchain to deliver a new software ecosystem for trusted, traceable and transparent ontological knowledge management. This deliverable report on the Open Call 2 specifications and its related launch package document.
KEYWORDS	Decentralisation, trustworthy content, data traceability, trustworthy knowledge exchange, privacy protection, user empowerment, service interoperability

Document Revision History

Version	Date	Description of change	List of contributor(s)
0.1	02/08/2021	First full version	Caroline Barelle
0.2	04/08/2021	Revision	Alberto Ciaramella
0.3	09/08/2021	Revision	Vlado Stankovski
0.4	09/08/2021	Final version	Caroline Barelle

Nature of the deliverable:	R

Dissemination Level

PU	Public, fully open, e.g. web	✓
CL	Classified, information as referred to in Commission	
CO	Confidential to ONTOCHAIN project and Commission Services	

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EXECUTIVE SUMMARY

This report is the deliverable "D2.2 – Open Call 2 Specifications and launch package documents" of the European project "ONTOCHAIN – Trusted, traceable and transparent ontological knowledge on blockchain". It provides the necessary documents for the successful execution of the ONTOCHAIN Open Call 2. The documents are included as Annexes and depict all the specifications and support material for the applicants related to ONTOCHAIN Open Call 2. It follows the order presented hereafter:

o **Annex 1: The ONTOCHAIN Call 2** - This is a reference document intended to provide to the Open Call 2 applicants:

  o The Open Call 1 first outcomes as background to the Open Call 2 launch in particular the progress of the 17 selected teams in OC1 phase 1 and of the 7 remaining teams in OC1 phase 2 with what regards design specifications for ONTOCHAIN.

  o The first use case that may serve as an umbrella use case for ONTOCHAIN named "The Trustworthy Semantic Marketplace" and how the ONTOCHAIN ecosystem should be used.

  o The Open Call 2 scope and its 6 open topics.

  It is also a base that can be used to disseminate the call on proper websites (i.e. funding and tenders Portal of the European Commission, Specific publications, etc.).

o **Annex 2: ONTOCHAIN Guide for Applicant** – This is a step-by-step guide with detailed information on the application process. The Applicants are presented the call's specific scope and 6 specific technical topics, the eligibility criteria, the expected projects' types, the preparation and submission guidelines as well as the communication flow and evaluation process.

o **Annex 3: ONTOCHAIN Administrative Form and Additional Applicant's Template** – This is a document presenting all the questions and disclaimers the Applicants need to complete online to submit their proposals for ONTOCHAIN Open Call 2 as well as a template to be filled in if natural persons or legal entities are more than 3 participating as a group in the same proposal. This latest template, once completed, is to be attached as a PDF file to the online Application Form.

o **Annex 4: ONTOCHAIN Proposal Description Template** – This template document presents all the elements to be described by the Applicants in their proposal. This template, once completed, is attached as a PDF file to the online Application Form.

o **Annex 5: The ONTOCHAIN Indicative Sub-Grant Agreement Form** – This document informs the applicants in advance on the different terms that will regulate their involvement in the ONTOCHAIN project in particular with the IP management and the joint results exploitation

with the ONTOCHAIN consortium and other parties. This is the sub-agreement that will be signed by them, if selected. When applying, the Applicants must confirm that they have read it and that they agree with the terms presented in the Indicative Sub-grant Agreement Form.

- o **Annex 6: ONTOCHAIN Frequently Asked Question (FAQs)** – This document lists some of the most popular questions related in general to ONTOCHAIN Calls and in particular to Open Call 2, available in a form of a repository of knowledge, supporting the Applicants during the application process.

The ONTOCHAIN background is also part of the launch package document. It is intended to provide a technical background to potential applicants of the 3 Open calls activated by ONTOCHAIN including ONTOCHAIN OC2. It has already been provided in D2.1 "Open Call Specifications and launch package documents" therefore it is not repeated in this deliverable again.

The Guide for Evaluators is not included in this deliverable. This guide is for external experts hired to assess the Applicant's proposals. The file includes detailed information on the scoring process, regulations, and scheduling during the evaluation as well as the evaluators' obligations and registration requirements.

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ABBREVIATIONS

OC   Open Call

ANNEX 1- THE ONTOCHAIN OPEN CALL 2

ONTOCHAIN OPEN CALL 2

PROTOCOL SUITE AND SOFTWARE ECOSYSTEM FOUNDATIONS 2021-2022

Closing dates for proposals: 15th September 2021, 17:00 CET

Grant Agreement n° 957338

DISCLAIMER

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The ONTOCHAIN project is funded by the European Union's Horizon 2020 Research and Innovation programme under grant agreement no. 957338.

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1 ONTOCHAIN SO FAR

1.1 OVERALL OBJECTIVE

Today, more than ever, our digital life is an extension of our physical world. Thanks to the Internet, it is now possible for citizens from all over the world to participate in the generation and use knowledge like never before. However, from the current Internet standpoint, the way knowledge is actually generated, curated, shared and stored raises critical concerns about security, privacy, fair and equal distribution of benefits, potential for abuse and adverse impact on individual rights. Citizens, everywhere, are at risk of being presented with partial or biased information reflecting the viewpoint of their provider.

From now on, it is time to handle our digital world with the same critical, moral and ethical thinking that we use in our physical one. The internet of the future should follow a human rights approach, be more resilient, trustworthy and sustainable. It is time to empower citizens by means for collective organisation as well as for contribution and use of knowledge thanks to smart solutions that support transparency, trust, plurality and democracy.

ONTOCHAIN - Trust traceable and transparent ontological knowledge on blockchain, is a European project funded by the European Commission under the European Union's Horizon 2020 Research and Innovation Programme, and part of the European Commission's Next Generation Internet (NGI) initiative.

ONTOCHAIN was launched in September 2020 to empower Internet innovators and end users to develop trustworthy blockchain-based knowledge management solutions that will be part of a novel software ecosystem, through 3 Open Calls and a budget to be distributed of 4,2M€. The concept underlying this ecosystem is a better share of knowledge and value on the internet and that for various domains such as health, economy, mobility, public services, energy and sustainability, news, media, entertainment, Industry 4.0, tourism.

The Figure 1 below shows an overview of the ONTOCHAIN ecosystem architecture.
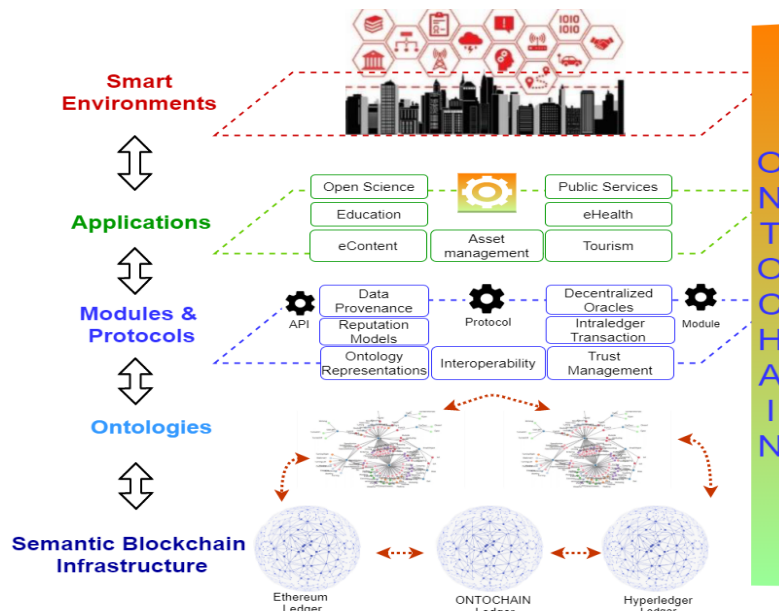
FIGURE 1: ONTOCHAIN ECOSYSTEM ARCHITECTURE

The merging of the semantic web, trust and blockchain constitutes its backbone. Building it with relevant actors, such as internet technologists, researchers and innovators from both industrial and academic sectors, is the catalyst for its achievement. In addition to Figure 1, Figure 2 below shows the mapping of the ONTOCHAIN technical topics on the architecture as well as existing and intended software development for each of the three open calls.
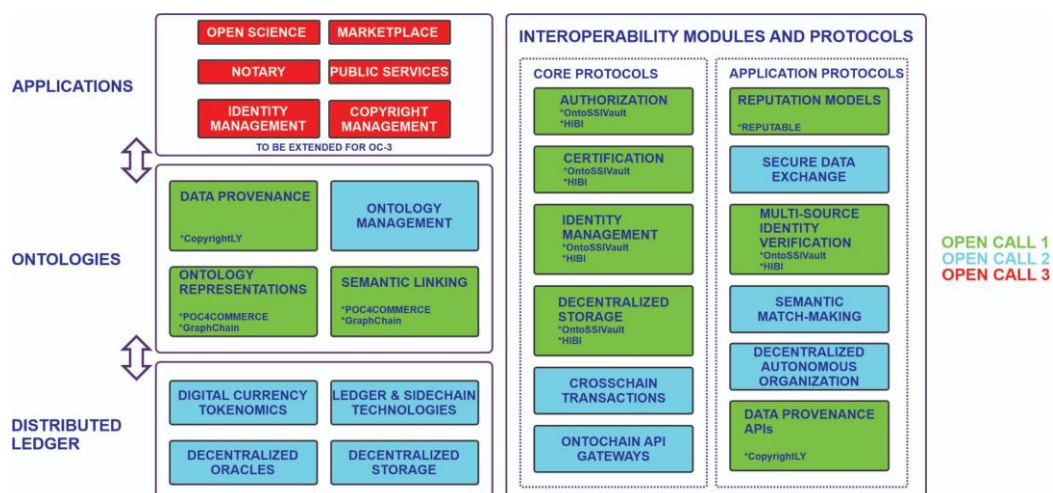
FIGURE 2: ONTOCHAIN VISION ARCHITECTURE FOR SOFTWARE DEVELOPMENT

This document provide the technical details for the ONTOCHAIN Open call 2. It present first an overview of the ONTOCHAIN Open Call 1 outcomes that are available at the time of writing this document since they might be useful to understand the ONTOCHAIN vision and concept. Then a first use case that may serve as an umbrella use case for the project named "The Trustworthy Semantic Marketplace" is discussed as well as how the ONTOCHAIN Ecosystem could be used in real life. Finally, the Open Call 2 scope, topics and intended deliverables are detailed. As a reminder, the indicative timelines of this Open Call close the document.

1.2 ONTOCHAIN OPEN CALL 1 FIRST OUTCOMES

The Open Call 1 objective is to establish the ONTOCHAIN framework as a human-centric solution to achieve decentralisation & trustworthiness for various domains such as health, economy, mobility, public services, energy and sustainability, news, media, entertainment, Industry 4.0, tourism and so on.

It is breaking down into 3 phases:

o Phase 1 Research proposal,

o Phase 2 Research award,

o Phase 3 Challenges for conferences.

It was launched on the 16th of November 2020. 137 projects applied to contribute to the specification design of the ONTOCHAIN ecosystem. Selection and negotiations were successfully completed with 17 projects to proceed to Phase 1.

More specifically, the 17 third parties were enrolled to conceptualize along 2 phases, a research project for 1 of the 6 following topics:

o Applications,

o Semantic interoperability,

o On-chain data management,

o Off-chain knowledge management,

o Ecosystem economy,

o Ecosystem scalability & integration.

The concept they proposed are described hereafter per topics and third parties.

TOPIC 1: APPLICATIONS

o **CopyrightLY** - It is a decentralised application that leverages blockchain and semantic web technologies to facilitate the copyright management for social media. It links social media content to on-chain authorship claims, in turn tied to creators' identities and content hashes. It is to state reuse conditions, allowing their negotiation and registering reuse agreements on-chain. Authorship claims are integrated with social media platforms through content hashes that creators add to media description. They are verified on-chain using oracles, which can also associate social media user profiles with on-chain identities.

o **LCDP-ONT-APP** - ONTOCHAIN Domain Builder is a model-driven approach that is centred on the research and development of a meta-language for application/components, ontologies to be used in domain-specific scenarios, and a low-code environment (IDE). Meta ontologies enable to model ONTOCHAIN applications components and formally define them. The IDE could be accessible in SaaS (via the AstraKode Blockchain platform).

o **OntoSsiVault (Gimly ID)** – It is a set of software applications (mobile and web) and libraries enabling self-sovereign identity and selective disclosure and verification of data for humans, organizations, machines, and objects. Gimly ID centers on the mobile application, which offers a password-less single-sign on experience and selective disclosure of data by leveraging decentralized identifiers (DIDs) and Verifiable Credentials (VCs) and a sovereign data vault. Gimly ID is built for interoperability, allowing a Gimly ID user to interact with other SSI conformant systems and solutions. The software developed can be consumed by other developers that will implement the SSO functionality and the issuance, management, and verification of identity and credentials into their applications and systems. The software can be used in open and closed ecosystems to manage and verify sovereign identities and data.

TOPIC 2: SEMANTIC INTEROPERABILITY

o **ISLAND** - Interlinked SemanticaLly-enriched BlockchAiN Data focuses on the generation of semantic data based on various sensors and Artificial Intelligence methods that can be aggregated and used as

ONTOCHAIN metadata as well as for further operations of smart applications in various use cases (e.g. part tracking and similar). The ISLAND framework envisions a layer of intermediation between the exposed APIs from the participating smart-contract-users (southbound) and the data consumers (northbound). The framework is set to expose a unified abstraction model to any data consumer that aims to infer meaningful knowledge from smart contracts, while at the same time enabling the semantic interoperability of the data. The project solution framework lies also in indexing and querying capabilities to structure data from multiple blockchain networks, represented as RDF Graphs and annotated with rich metadata from ontologies, and ensure the data integrity of RDF data instances via blockchain solutions.

o **OntoROPA** – Ontology based ecosystem for trustworthy Records of Processing Activities (ROPAs) focuses on the validation and certification of the processes for data management, with particular focus on legal compliance (e.g. with data protection acts such as GDPR). Successful Semantic Web approaches such as Linked Data and OWL are combined with blockchain technologies for the aim of ensuring easy access, quality and trust of ROPAs.

o **TENACIOUS** – Trustworthy sEmaNtic Aware marketplaCe for Interoperable clOUd. This project focuses on building a trustable marketplace where semantically described Cloud Services can be researched, discovered, and composed, according to the specific requirements needed. This project also offers a storage of the composed solution in RDF format within the Blockchain, to ensure the compliance to a proposed contract.

TOPIC 3: ON-CHAIN DATA MANAGEMENT

o **GraphChain** – It is a framework for on-chain data management for ONTOCHAIN which implements decentralised On-chain graph management technologies, including the ability to perform usual graph operations. GraphChain proposes a radically different approach – instead of encapsulating the semantic data into Blockchain blocks, they propose to design and implement the Blockchain mechanisms on top of semantic data. The GraphChain solution provides different functionalities such as:

- Hashing of subgraphs for the on-chain graph structures.
- Procedural smart contracts with access to the on-chain semantic data.
- Identification, authorization and data provenance for the on-chain data.
- Sharding mechanisms and strategies.

The whole idea of GraphChain is adding a new level of trust without sacrificing availability, query ability and performance of graph databases so the solution can be integrated in any software ecosystem that uses traditional LPG databases.

o **SEIP** – Service for Encrypted Information Provider focuses on delivering a framework to ensure granular data access control and confidentiality of data exchanged both On-chain, and Off-chain, in a decentralized and scalable fashion, by exploiting novel asymmetric, encryption mechanisms (Ciphertext-Policy Attribute-Based Encryption – CP-ABE) and credential-based approaches (W3C VCs). This project aims to reduce solution fragmentation that is critically impacting blockchain's large scale adoption and interoperability and also try to address current regulation constraints.

o **UniProDaPI –** Universal Proven Data & Process Interchange is a full-fledged platform for the exchange of verifiable and trustworthy data within industrial settings and sets up an interesting implementation scenario that can be used in industrial context. The solution addresses the key issues of Data and Identity Sovereignty and privacy, protection against CloudAct, GDPR or eIDAS compliance. It separates the probative and user metadata made public at sidechain level from the data itself, linked from the chain, made accessible only to authorized parties, and kept on producer's premises or securely accessed from distributed object storage. The proposed scheme allows for perfect file level auditability of the entire audit trail, from the blockchain to a (zipped) collection of all registry writes relative to some identifier, making it possible for lawyers to settle disputes. The unforgeable and easily verifiable registries of proofs of data, events and documents that produce the backbone of multi actor interaction is accessible through simple business APIs.

TOPIC 4: OFF-CHAIN KNOWLEDGE MANAGEMENT

o **DART –** A Distributed-OrAcles Framework for PRivacy-Preserving Data Traceability which provides methods to include Off-chain information with high probabilities of trustworthiness in the operation of services running on a semantic blockchain – ONTOCHAIN infrastructure. Their solution provides a scalable distributed oracles system, in which off-chain data to be stored in Ontoblocks pass through a consensus process autonomously handled by the involved oracles. A correlation model in order to enforce trust between oracles. They also can do a data traceability framework, in which content to be inserted in the ONTOCHAIN comes together with oracle measured contextual information.

o **KnowledgeX** – Trusted data-driven knowledge extraction focuses on establishing communities of data science professionals that can set

up and perform various analyses on data (e.g. industrial data) in a trustworthy way globally. In its operation it makes use of secure processing enclaves and other means for the protection of the privacy of the data. KnowledgeX is applicable to any situation where knowledge for a specific problem is needed and data is valuable.

o **REPUTABLE** – It is a Provenance-aware Decentralized Reputation System for a cross-platform privacy-aware reputation system which leverages blockchain technology to achieve decentralised, verifiable calculation of reputation scores. It enables interaction with end users and systems through a secure, reputation analytics dashboard to facilitate user verification as seamless integration with other systems and services.

TOPIC 5: ECOSYSTEM ECONOMY

o **DW-marking** – Data Watermarking: The missing link to on-/off-chain implementation of distributed data marketplaces which provides methods to include watermarks in structured data sets. DW-marking can develop a new breed of digital watermarking techniques for protecting ownership, and establishing accountability, in the off-chain handling of datasets. Their solution provides three main functionalities such as:

- Frequency Watermarking for datasets,
- Recursive Watermarking as an off-chain provenance primitive,
- Oracle for importing off-chain dataset transactions.

Frequency Watermarking is planned to be implemented as a standalone primitive for off-chain handling of ownership issues in Data Marketplace (DM) and other distributed systems. Recursive Watermarking is planned to be implemented as an Oracle for allowing off-chain DMs to upload past transactions into a blockchain.

o **POC4COMMERCE** – Making ONTOCHAIN practical for eCommerce is fundamental. POC4COMMERCE focuses on the design of ontologies needed for eCommerce that can further be embedded and used by the services of the ONTOCHAIN software ecosystem in various use case scenarios related to trading of products (agricultural products in the current use case) including their traceability and the use of various token mechanisms. POC4COMMERCE contributes to a shift towards a novel micro-economic model where individuals and companies cooperate and coordinate, deciding the allocation and utilization of resources, without third-parties intermediaries. In practice, it aims to design an eCommerce search engine for offerings as a software agent on OC-Commerce and OC-Ethereum.

TOPIC 6: ECOSYSTEM SCALABILITY AND INTEGRATION

- **HIBI** – Human Identity Blockchain Initiative focuses on the ability of the users to establish their identities in a legal way and link them to blockchain network addresses, which unlocks immense possibilities to improve trustworthiness of the information stored and managed On-chain. To realise a blockchain transaction, it is required to perform authentication via an eIDAS compliant eID. The address is then tied directly to a trustworthy ID and can be represented in further interactions. HIBI will provide Decentralized Key Management infrastructure and contribute to a key management tool called Smart Distributed Key Recovery which enables the mapping of blockchain keys to eIDAS identities for the purpose of backup and recovery. The technology can be integrated by integrating an eID solution that leverages an official eID app like "AusweisApp2". This bridge will allow accessing the European eID servers to extract data from it and can be integrated into mobile- and desktop wallets. It will also be open-sourced.

- **KUMO** – It focuses on designing and developing a network crawler that can keep gathering information about the peers in the Eth2 network and their behaviour such as a sudden and sharp increase or decrease in the number of messages communicated. The information gathered by the network crawler can be general or specific. The crawler can gather information like: what is the latency and geographical distribution nodes in the network, version of node which client is using and how much data is it propagating to the network, in this way it can suspect bad actors and suggest different attacks that may occur.

- **Solid Verif** – Verifiable Credentials and Solid is a project that focuses on the Solid framework with its W3C compliant storage solutions. It is a generic SDK design by which it is possible to achieve verifiable credentials. In this framework, actors can certify and verify the origin of data so that trust is increased and data can be reused with confidence.

All the aforementioned projects set up high standards and technologies for trustworthy content handling and information exchange, focusing on key aspects of the ONTOCHAIN architecture including identities, reputation (of identities, products and services), data protection (e.g. encrypting, governance, secure processing), On-chain metadata handling mechanisms that can be coupled with Off-chain data, the use of Smart Contracts, Decentralised Oracles, Verifiable Credentials and other existing mechanisms.

Their contribution so far in ONTOCHAIN Open Call 1 led up to the definition of the necessary Blockchain infrastructure that could be used in order to support the operation of the ONTOCHAIN software ecosystem. They are leveraging of reliable, widely used and proven open-source

technologies in order to further develop the software ecosystem with key necessary ingredients to unlock new applications that rely on processes for trustworthy metadata handling.

Actually, these 17 third parties have reached the end of Phase 1 and have been submitted to a high selective process where they have to highlight the reasons why their work is the best match to help establish the ONTOCHAIN framework as a human-centric, decentralised & trustworthy solution. From this contest, only 7 third parties could process. The context was both competitive and collaborative since building an ecosystem is all about co design, synergies and team work.

The teams granted for Phase 2 are: **CopyrightLY, GraphChain, HIBI, KnowledgeX, OntoSsiVault (Gimly ID), POC4COMMERCE and REPUTABLE.** Nonetheless, all projects that have collaborated so far were welcome to stay and collaborate with ONTOCHAIN around the development of the ecosystem.

For this phase 2, the selected teams elaborate on the concept proposed in Phase 1 and prepare design specifications to be implemented in this Open Call 2, dedicated to "Protocol Suite and Software Ecosystem Foundations".

The main intention to work with a comprehensive, smaller number of third parties is to be able to look into the details of those aspects that are deemed core to the establishment of the ONTOCHAIN ecosystem and in particular to the understanding of the possibility to integrate and provide an added value through collaboration in core design aspects.

1.3 AN UMBRELLA USE CASE FOR ONTOCHAIN: "THE TRUSTWORTHY SEMANTIC MARKETPLACE"

The first use case that may serve as an umbrella use case for the project has been named "The Trustworthy Semantic Marketplace".

Blockchains, being shared databases of cryptocurrency transactions, are all about trust, transparency and traceability when trading. Hence, it makes great deal of sense to think of using trustworthy metadata in the context of trading any kind of real or digital assets. In a way, the Trustworthy Marketplace is the ultimate place of testing the utility of ONTOCHAIN's infrastructure and software ecosystem.

Several existing OPEN Call 1 projects may rely on semantic descriptions and annotations of different entities, such as people (e.g. in the context of the KnowledgeX project), products (e.g. agricultural products

of the case of the POC4COMMERCE project), data (e.g. the Copyrightly project) and internet services (e.g. in the context of the TENACIOUS project).

Trust, identities, verifiability of the provided information, and reputation matter a lot in the context of trading. When one goes to a marketplace, it is necessary to check out the Quality, which can be established by both on-chain and off-chain metadata management means and consensus mechanisms. In addition to this it may be necessary to verify and/or certify the properties of either the entities that participate in the trading system, or the processes that govern the trading of those items (e.g. real-world items or data) marketplace, including any contextual information such as geolocation, precise time, environmental conditions and similar.

Within blockchains and their consensus mechanisms, an ontology of a traded entity can easily be agreed and even recorded (or its hashtag) on a blockchain. Following this, various instance data can be included (off-chain or on-chain, encrypted or public, verifiable/non-verifiable, identity, digital signature) that relate to either the actual ownership, versioning, manipulation, trading, part-tracking and any other aspect of the traded entity. Semantic information can be gradually updated from by the various actors in the marketplace that can engage in different interactions. In addition to this, temporal and geospatial information could be included and can be always verified by using on-chain methods.

The other side of the market is that of its users, with the products and services they provide or consume. The users may all come with their public or private data, identities and verifiable credentials. They may be engaged in various interactions, such as storing their own data for their personal use, giving access to their data to external entities, providing Verifiable Credentials to other users, using sensor data and AI methods for further annotations of the traded entities and similar. Such data can be linked to time, geospatial, identity and versioning information whenever it is generated, and can further be used to establish trustworthiness and fine-grained choices in the trading process.

Each interaction of two users (such as a provider and a consumer) can be accompanied with various proofs of such interactions, such as proof of buying the apple for which the quality is being assessed on social media, or proof of being present in a room when something really interesting happened, proof of using an apartment for which the user can perform rating at the end of the rental period and similar.

Moreover, tokens are popular trading mechanisms that can be associated with different market concepts, and can be used in the trading system to achieve win-win situations among their users, and move assets from

one blockchain to another, while relying on the semantics of such transactions. Mechanisms to achieve actual value sharing, be it information or actual real-world assets are currently embedded in various blockchains and should be possible to use along with semantic blockchain-based information.

1.4 HOW THE ONTOCHAIN ECOSYSTEM WOULD BE USED?

The idea behind the ONTOCHAIN Ecosystem is to focus on the needs of software companies that develop various smart applications and wish to include trusted knowledge management mechanisms in the operation of their applications. The main benefits of such smart application would be the added value of semantic blockchain metadata management mechanisms that can be used as essential trust-building measures.

In the context of ONTOCHAIN Open Call 2, the consortium expects well-defined, open source software solutions that can be used within the ecosystem to establish both the necessary infrastructure, trading mechanisms and ability for exploitation by the use case proposers (Open Call 3).

> **Hence, it is expected that participants in the ONTOCHAIN Open Call 2 will develop interoperable and sustainable solutions and services that will be able to integrate within the rest of the ONTOCHAIN ecosystem and can be actively used by the use-case applications from Open Call 3.**

2 ONTOCHAIN OPEN CALL 2

2.1 SCOPE

The overall goal of the ONTOCHAIN project is to generate an ecosystem of blockchain-based solutions, processes, and business models with strong market potential in the area of trusted blockchain-based data, metadata, ontology, knowledge and information management in order to achieve trustworthy content handling and information exchange as well as trustworthy service exchange in the Next Generation Internet/social networks and for vital sectors of the European economy.

The specific objective of the ONTOCHAIN Open Call 2 is to implement an infrastructure that will host ONTOCHAIN's trustworthy data, metadata and services, and specific software solutions that can be used widely, further extending the use cases and the architectural features planned by the end of the Open Call 1. To this end, again 6 paramount topics has been identified that should be addressed for the present call:

- o Topic 1: Decentralized Oracles for ONTOCHAIN
- o Topic 2: Market Mechanisms for ONTOCHAIN
- o Topic 3: ONTOCHAIN Interoperability & API Gateways
- o Topic 4: ONTOCHAIN Network Design and Scalability
- o Topic 5: Semantic Based Marketplaces for ONTOCHAIN
- o Topic 6: Data Provenance in ONTOCHAIN

They are further elaborated in the next section.

2.2 THE 6 TOPICS TO BE ADDRESSED IN OPEN CALL 2

Each table hereafter, elaborates on the challenge, the requirements, the use cases, the context, and the expected outcomes to be addressed in Open Call 2 as well as how it should work in practice.

2.2.1 Topic 1 - Decentralised oracles for ONTOCHAIN

Title	Decentralised oracles for ONTOCHAIN
Definition	The essence of blockchain smart contracts is based on the execution of instructions in a decentralized architecture, in which the executing outputs are trusted and accepted by all including nodes in the network. However smart contracts run entirely isolated and cannot access data from the external world on their own. Oracles are software components which allow smart contracts to interact with off-chain (external) data sources: their primary job is to collect data and input to smart contracts. Because oracles bring arbitrary data to the blockchain they create a major vulnerability, and the trustworthiness of the imported data is extremely difficult to assess. The goal of this topic is to design, implement and showcase trustful and trustless oracle prototypes that are capable of interacting with the ONTOCHAIN infrastructure and providing necessary data for the operation of its applications.
Challenges	Activities may focus on designing and developing new decentralised oracle prototypes that rely on advanced technologies, including, but not limited to the areas of IoT, AI, social networking, mobile technologies in the generation of metadata that can be assessed from the

	viewpoint of trustworthiness and fed to the ONTOCHAIN's semantic blockchain infrastructure. Novel oracle frameworks for ONTOCHAIN, e.g. based on different topologies or incentive strategies are also in scope. Approaches should address the problems of detecting, preventing and mitigating sybil attacks (e.g., majority attack, mirroring, freeloading, data corruption) and collusion among oracles, estimating probabilities for trustworthiness, and particularly focus on practical design and implementation challenges which are in the context of the ONTOCHAIN services and applications. Additional focus is on the high Quality of Service and low operational costs of the oracles, while achieving the same or higher levels of trust. The designed oracles should be implementable within the time period of the project, and should be showcased within the initial applications (e.g. marketplace, part tracing, copyrights and similar).
Requirements	The prototype should address as much as possible the challenges mentioned above and in particular: o Definition of APIs for common (generic) use cases; o Integrate with at least Ethereum smart contracts and the EVM, although support for additional chains is encouraged; o Support for semantic data (e.g. properties such as a vehicle colour) and semantic queries (e.g. via SPARQL); o Rely on existing standards or propose new standards for data transmission and data definition, to ensure reliable communication between oracles and smart contracts; o Support a variety of data sources, data formats and off-chain storage mediums/services; o Integration of identity verification or decentralized identity management; o Demonstrate the approach with several templates and examples, to be released to the open source community; o Modularity of the approach so that the developed oracles are packaged and can be deployed and used seamlessly by different entities should be duly elaborated in the proposal.
Use cases	o Feeding trustworthy information (geolocation, time location, IoT data, state, quality, size, price, reputation score, probability, etc.) to POC4COMMERCE

	about real-world items in supply chain use-cases (wheat, apple trade, car, apartment sharing, bio-food industry, etc); o Ingestion of verifiable documents (diplomas, licenses, etc.) for using as verifiable credentials in ONTOCHAIN projects (e.g. GIMLY ID, HIBI); o Social media oracles, e.g. for feeding a user's social media profile information to CopyrighLY; o Fact-checking in social media and data sharing platforms; o On-chain reputation and provenance, e.g. in the context of scientific research and COVID tracking; o IoT, sensor networks and crowd-sensing (e.g. for decentralized Insurance, traffic management); o Decentralized Finance, including collateralised lending and stablecoins; o Prediction market.
Context	Proposals should position the proposed solution on a landscape of existing services and platforms. Specific context for the action is provided by the following services, however, other contexts may apply: o *iExec:* a network of computers for running arbitrarily complex off-chain jobs with TEE and GPUs and pushing results directly in smart contracts, backed by reputation, decentralised consensus and economic incentives. o *ChainLink:* a trusted marketplace for oracles where clients and nodes are connected. o *Witnet:* a reputation-based decentralised oracle network in which correctness is defined by a consensus algorithm. o Provable blockchain: Leveraging all TEE environment providers to minimise vulnerability.
Expected outcomes	o Downloadable open source software components that can be used to build systems of oracles, which will be used to feed truthful off-chain information to the ONTOCHAIN semantic blockchain infrastructure; o Semantic representation (e.g. in Linked Data format) of the involved data sources, data features/attributes, and trustworthiness score;

	o Smart contracts, on- and off-chain API for querying the trustworthiness of external data; o Software should be resilient to security and privacy threats (DDOS, Sybil attacks, reputation manipulation, identity theft, etc.); o New trust-building mechanisms to assure authentic and trustworthy data feed for smart contracts.
In practice	The downloadable open-source Oracle software components will be applied in the initial applications of the ONTOCHAIN ecosystem (resulting from the Calls 1, 2, and 3). They will be deployed for the purpose of demonstration and accessed through their APIs. Oracle clients will be smart contracts and Web 2 applications running on top of the ONTOCHAIN semantic blockchain infrastructure. Users will be able to examine the oracle (e.g. status, historical data) through a web interface.

2.2.2 Topic 2 - Market mechanisms for ONTOCHAIN

Title	Market mechanisms for ONTOCHAIN
Definition	Blockchain has the potential to mitigate uncertainty and enable "trustless trust" between buyers and sellers. Blockchain records all valid transactions among traders (B2C, B2B, C2C) on the platform. These transaction records are transparent to platform members, and are hard to be altered once recorded. Apart from this basic concept, to exploit the full potential of blockchain, several additional functionality has to be offered, e.g., service/product digitization, market service matching neutrality, decentralized auction mechanisms, automated inventory management, etc. Moreover, facilitating DeFi services on top of blockchain is a key functionality for unlocking the full business value of blockchain; however, nowadays, DeFi (on top of Ethereum) is suffering from high transaction fees. The goal of this topic is to design, implement and showcase prototype services in the scope of advanced decentralized market and business-enabling mechanisms that offer win-win situations for all involved stakeholders, and are in line with the overall ONTOCHAIN objectives for trustworthy services/products exchange and trustworthy content handling.

Challenges	The challenge perceived is to build an unbiased service/product trading system on top of trustworthy information expressed in Semantic Web formats. This includes: o The ability to generate (mint) tokens of various types, i.e., Non-Fungible Tokens (NFTs), Fungible Tokens (FT), Semi-Interchangeable Tokens (SFT). o Support for building DeFi applications on top of the blockchain, i.e., token/stablecoin trading, interest on deposit accounts, token/stablecoin loans, crypto funds, etc. o The ability to facilitate the use of various types of tokens throughout the lifecycle of data and services. o The overall market mechanisms for tokenomics (e.g., token distribution strategies, token sharing for ecosystem sustainability, incentives for nodes etc.) o Enable stable transaction fees.
Requirements	The software prototype should address as much as possible the challenges mentioned above. In this context: o Support for token minting, distribution (for ecosystem economic sustainability) and exchange. o Support for developing unbiased trustworthy marketplaces of digitized (physical or virtual) assets. o Support for unbiased decentralized price determination mechanisms. o Support for service/product exchange. o Support for building efficient DeFi applications. o Design economic model prototype for all stakeholders (win-win situations, sustainability, incentives for the nodes and so on). o Support of necessary functionality for market enablement such as: eReceipts (attestations), inventory management, supply chain management, SLA compliance checking. The prototype should also focus on addressing one or more non-functional requirements, such as: o Reduce costs in primary transactions (frictionless trade);

	o Increase security and transparency of centralized markets (eliminate biases or market manipulation potential); o Improve transaction efficiency in networked businesses (and potentially integrate with existing business processes); o Monetize data in compliance with regulation (e.g., GDPR).
Use cases	Use cases include: o Provision of market mechanisms for at least 5 types of stakeholders (service providers, service users, regulators etc. based on the 1-st Open Call project results). o C2C, B2C, B2B commerce. o Efficient Decentralised Finance (Defi). o Data/service/product marketplace. o Business ecosystem enlargement.
Context	Proposals should position the proposed solution on a landscape of existing services and platforms. Specific context for the action is provided by the following services, however, other contexts may apply: o SAGA: a decentralized data marketplace, designed for users to monetize and acquire data in a trusted standardized and cost-effective way.
Expected outcomes	o Provide API/SDK for token minting, distribution (for ecosystem economic sustainability) and exchange. o Provide API/SDK for developing unbiased trustworthy marketplaces of digitized (physical or virtual) assets. o Provide API/SDK for unbiased decentralized price determination mechanisms. o Provide support (involving smart contracts) for service/product exchange. o Provide API/SDK for building efficient DeFi applications. o Design economic model prototypes for all stakeholders (win-win situations, sustainability, incentives for the nodes and so on). o Provide SDK/APIs for necessary functionality for market enablement's design and implementation for

	market enablement, such as eReceipts (attestations), inventory management, supply chain managements, SLA compliance checking.
In practice	The software should be downloadable and have open-source software components and SDK that can be used to establish market/tokenomics mechanisms to be used by the various decentralized apps that will be built atop the ONTOCHAIN software ecosystem and infrastructure.

2.2.3 Topic 3 - ONTOCHAIN interoperability & API Gateways

Title	ONTOCHAIN interoperability & API Gateways
Definition	This topic aims at developing the ONTOCHAIN cross-chain layer and Gateway APIs; this critical component must provide means for trusted bi-directional operations (e.g., transfer of information and assets) between the ONTOCHAIN network and a selection of the most widely used networks, as well as communications between different chains within the ONTOCHAIN network (e.g., Ethereum, CARDANO, COSMOS, KUSAMA, STELLAR, Hyperledger Fabric and Tezos). The ONTOCHAIN network itself will embrace several chains, with different protocols, to serve different applications and business cases. This topic must ensure that these networks integrate smoothly together and with the outside world.
Challenges	The challenge is to provide future-proof interoperability by developing a trustworthy, privacy-preserving, secure, transparent, democratic and traceable set of Blockchain APIs based on Semantic Web standards. The APIs must support the exchange of ontologies, of data and metadata, of knowledge and information from different blockchains towards ONTOCHAIN and vice versa. The proposed solutions must hide the heterogeneity of blockchain protocols which limit application development and can break important properties such as trust, consistency and security of data and services which are all paramount to mass adoption. Information and asset exchanges between chains with different protocols must ensure that semantic information, trust, identities and

	privacy are preserved while maintaining the highest possible level of security.
Requirements	The prototype should address as much as possible the challenges mentioned above, and in particular: o The topic is open to any existing blockchain solution but at least Ethereum, Tezos and Hyperledger Fabric must be supported. o Support for (at least) ERC-20, ERC-721, ERC-777 and ERC-1155. o Solutions must rely as much as possible on industry-wide standards and support existing chains with no modifications of their protocols, clients, virtual machines or programming framework. o The trust, validity and critical metadata attached to data/transactions must be preserved during a transfer within ONTOCHAIN and with external blockchains. o Provide efficient methods for reducing computational complexity and transaction sizes between ONTOCHAIN and other blockchain ecosystems.
Use cases	o Interledger communication. o Cross-chain oracles. o Legacy systems and Governance integration. o Cross blockchain token transfer. o Cross blockchain smart contract interaction.
Context	Proposals should position the proposed solution on a landscape of existing services and platforms. Specific context for the action is provided by the following services, however, other contexts may apply: o *Ark* uses SmartBridges architecture to address this challenge, and claims to provide universal interoperability, plus cross-blockchain communication and transfers. o *Cosmos* uses the Inter-blockchain Communication (IBC) protocol to enable blockchain economies to operate outside silos, and transfer files between each other.
Expected outcomes	o Bridges (smart contracts and off-chain services) for transferring assets between smart contracts deployed to any combination of the above-mentioned chains.

	o Cross-platform SDK and APIs allowing two directional communication between ONTOCHAIN provided services and widely used networks. o Scalable API endpoint for connecting clients to ONTOCHAIN applications and services. The software must implement modern security protocols and standards and provide the highest level of security to the clients.
In practice	The software will be used by application developers that have deployed instances of their smart contracts to multiple chains within and outside ONTOCHAIN. For example, if a marketplace application is deployed on Ethereum Mainnet and on a L2 chain within ONTOCHAIN, the interoperability components must allow items for sale on any of the instances to be purchased through any of the other instances.

2.2.4 Topic 4 - ONTOCHAIN Network Design and Scalability

Title	ONTOCHAIN Network Design and Scalability
Definition	Blockchain offers a plethora of features, such as traceability, transparency, anonymity, democracy, automation, decentralization and security. Despite these promising features the technical scalability of the network is still a key barrier which can put a strain on the adoption process, especially for real business environments. Throughput, storage, and networking are three aspects of scalability that should be considered to improve ONTOCHAIN network scalability. This topic aims to build an ONTOCHAIN client based on Ethereum that is a stable and well tested system for data transactions and has a cost-effective network for the operation of its applications.
Challenges	o Definition of stakeholders and their requirements. o Design of flexible services for the ONTOCHAIN ecosystem. o Deployment of the selected services and testing. o Optimization and Scalability of the network.

	o Operational costs of the network.
Requirements	The prototype should address as much as possible the above mentioned challenges and in particular: o Design suitable schemes to increase the throughput in order to sustain a huge volume of real world transactions for the ONTOCHAIN platform. o Solution can be focused on finding new approaches on how to store data effectively in the ONTOCHAIN platform with limited resources. o Design more efficient data transmission mechanisms for the ONTOCHAIN services and applications. o Design new prototypes on how different chains can be linked to each other on a hierarchical/scalable basis.
Use cases	o Faster and cheaper transaction o Real business environments o Scalability in adding new data linked to On-chain data. o Electricity energy resources
Context	Proposals should position the proposed solution on a landscape of existing services and platforms. Specific context for the action is provided by the following services, however, other contexts may apply: -*SegWit* can improve throughput and maintain good compatibility with the Bitcoin blockchain system, but the throughput improvement is limited. o Off-chain transaction (e.g., Lightning network, Duplex o Micropayment Channels) systems can reduce the number of transactions processed on the blockchain, but sacrifice transaction security and complicate the user experience. o Sharding(e.g., OmniLedger, Elastico) improves throughput and reduces the number of transactions processed by each node, but sacrifices global consensus o Decoupling management/control from execution supports QoS provisioning and improves decentralization, but increases the complexity of dynamic resource allocation and the decisions on which nodes should execute smart contracts. o Polygon: Framework for building and connecting multiple Ethereum-compatible blockchain networks.

	o Layer 2 solutions: Sidechains
Expected outcomes	o Developing the use of Property Graphs (PGs)/ Labelled Property Graphs (LPGs) on blockchains as on-chain data. o A tight integration between on-chain data storage engine and blockchain code. o Reduction of the transaction size for increasing the number of transactions in ONTOCHAIN blocks. o Reduction of the number of transactions processed by ONTOCHAIN nodes to improve throughput. o Efficient approaches for ONTOCHAIN block generation. o Transmit the transaction information effectively and reduce the requirement for network bandwidth resources. o Compatible with Layer2 sidechain.
In practice	This open-source software result and documentation can be used to deploy and join new ONTOCHAIN nodes in the initial ONTOCHAIN infrastructure, or to build a new ONTOCHAIN infrastructure on its own.

2.2.5 Topic 5 – Semantic based marketplaces for ONTOCHAIN

Title	Semantic based marketplaces for ONTOCHAIN
Definition	This topic will develop a marketplace where ONTOCHAIN users can buy or sell any goods or services that can be described with an ontological representation. The resulting software will provide services for publishing ontology-based descriptions of goods and services, creating and publishing market orders, searching through the orders based and complex criteria and matching sell and buy orders. The marketplace can implement different market mechanisms, e.g. spot, limit orders and so on. Ontology matching is a solution to the semantic heterogeneity problem. Finding correlations between semantically related entities of ontologies can be used for different tasks such as ontology merging, query answering, data translation, etc. In this topic, ontology matching is a requirement for finding compatible offer and demand (buy and sell orders) in semantic-based marketplaces. To guarantee the fairness of the

	transactions in the marketplace, the matching process should be fair to every party, e.g. preventing exclusion, censorship, price manipulation and fraud. The goal of this topic is to design and implement prototypes that will provide ontologies management and setup for decentralized semantic matching of demand and supply for different use case scenarios (e.g., apartments, land, cars, etc). The prototype should also make it possible to include oracles and reputation in its decision-making processes. It should operate on top of the ONTOCHAIN L2 sidechain.
Challenges	Developing a component that offers services similar to existing virtual marketplaces but for arbitrary goods/services, and ensuring the highest level of trust and fairness. The marketplace logic (including the propagation and the matching of market orders) must thus be as decentralized as possible, while offering high performance and low response time. The solution should leverage ONTOCHAIN services introduced in Open Call 1 for increasing trust between users (e.g., identity, reputation) and be open to all of the present and future ONTOCHAIN stakeholders. In addition to decentralization, particular care must be given to avoiding any censorship, market manipulation (e.g., by hiding, erasing or forging orders or ontological descriptions) and spam attacks. The semantic matching component must guarantee that every offer has been considered, that the returned service/good is always the most appropriate for the user, and that it satisfies every expressed requirement.
Requirements	The prototype should address as much as possible the aforementioned challenges and the following requirements: o Support different ambitious use-case scenarios (e.g., apartment rental, car sale, freelancing) based on metadata and semantic constraints (e.g., apartment size and location, etc.). o Rely on existing ONTOCHAIN components to provide new services like ontology description, evaluation, integration, etc. o Provide *fairness-first* solutions, i.e. a marketplace prototype that gives equal power to sellers, buyers and to the marketplace operator.

	o Find the best tradeoff for decentralized ontology matching for achieving higher throughput in large ontologies while maximizing trust and fairness. o Provide incorporation of Property Graphs (PGs)/ Labelled Property Graphs (LPGs) as an alternative data model for using semantics, this should include (but not limited to) the mechanism for encoding Ontologies using LPG data model, mechanism for reference to OWL Ontologies and the mechanism for reasoning over LPGs.
Use cases	o Ontology engineering o Information integration o Linked data o Peer-to-peer information sharing o Web service composition o Autonomous communication systems o Navigation and query answering on the web
Context	Proposals should position the proposed solution on a landscape of existing services and platforms. Specific context for the action is provided by the following services, however, other contexts may apply: o Binance: is an online exchange platform where users can trade cryptocurrencies. The exchange also supports the users to earn interest or transact using cryptocurrencies. o Booking.com: connects millions of travellers with various services like a range of transport options and places to stay -from home to hotels and much more. It is the largest world's travel marketplace that enables properties all over the world to reach a global audience and grow their businesses. o OAEI: The main goal of OAEI is to support the comparison of the systems and algorithms on the same basis and to allow anyone to draw conclusions about the best matching strategies. o Open Knowledge Graph: a visual interface that dramatically increases the visibility of research findings for science and society alike. The goal is to offer a better way to explore and discover scientific knowledge.
Expected outcomes	The output of this task must be an API, a SDK and a GUI for interacting with the marketplace and implement the following functions:

	o Uploading ontological descriptions of goods and services;
	o Generating market buy and sell orders from an ontological description and specific qualitative and non-qualitative criterias;
	o Publishing and propagating orders;
	o Matching ontological market orders;
	o Sealing deals permanently in a smart contract on the underlying blockchain.
	o All the functions must be accessible to end users and applications through all three interfaces.
In practice	This open-source software outcome can be used mainly as a design of a potential front-end to the ONTOCHAIN infrastructure and services. It can be used to showcase the potential of the new trustworthy knowledge management services provided by ONTOCHAIN.

2.2.6 Topic 6 – Data provenance in ONTOCHAIN

Title	Data provenance in ONTOCHAIN
Definition	Data Provenance or lineage is the technology field whose objective is to manage metadata associated with the history of data, from its inception to various stages of the data lifecycle. Thus, data provenance metadata helps to provide a detailed picture of how the data was created/collected, where it was stored and how it was used/modified/transformed. Data provenance metadata is also useful for auditing. For each data exchange and data handling a specific record of processing activity (ROPA) is recorded. ROPAs should be automatically checked against GDPR, so that the data processor (e.g., identifiable by means of DIDs) is authorized (e.g., by means of verifiable credentials) to apply the processing which is compatible with the GDPR; overall, this is termed to be trustworthy data handling. Data transformations, accesses and handling should be trustworthy and recorded, so that data provenance can be supported. Data provenance is particularly important for data lakes/aggregators (i.e., repositories of data belonging to multiple owners), data traders and business processes (especially supply chain management).

Challenges	In data lakes, creating a comprehensive immutable audit record of the data, which can be independently verified to ascertain the authenticity of the data is important. In the context of data trading, data owners can prove the legitimacy of owning data and trade it to others or control the number of legitimate copies of the data. Finally, in the context of business processes, associating a digital token to each high-value item in the supply chain, when the physical item changes hands in the real world, the corresponding digital token is re-assigned in the blockchain. This ensures that the blockchain tracks the journey of the high valued item in the real world. This allows the buyer on receipt of the item to backtrack and verify the chain back to the origin i.e. all the way to the manufacturer.
Requirements	The prototype should address as much as possible the above mentioned challenges and the following requirements: o Support automated checking of data-related transactions against GDPR. o Define/adopt ontology for ROPAs. o Store chains of ROPAs on data processing. o Record business processes, especially for supply chain management. o Automated verification of rule compliance in business processes. o Rely on existing ONTOCHAIN components for data semantics on business processes.
Use cases	The following use cases apply: o Data provenance in warehouses/lakes o Data Trading o Data Trustworthiness o Service/Product quality
Context	Proposals should position the proposed solution on a landscape of existing services and platforms. Specific context for the action is provided by the following services, however, other contexts may apply: o Example: Aravind Ramachandran and Murat Kantarcioglu. 2018. SmartProvenance: A Distributed, Blockchain Based DataProvenance System. In Proceedings of the Eighth

	ACM Conference on Data and Application Security and Privacy (CODASPY '18).
	o Another example is the system ProvChain A Blockchain-Based Data Provenance Architecture in Cloud Environment with Enhanced Privacy and Availability byXueping Liang and Alii 2017 17th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGRID)
Expected outcomes	o Smart contracts for automated checking of data-related transactions against GDPR.
	o Define/adopt ontology for ROPAs.
	o Provide API/SDK for storing chains of ROPAs on data processing.
	o Provide API/SDK for recording business processes, especially for supply chain management.
	o Smart contracts for automated verification of rule compliance in business processes.
In practice	The open source software produced in this topic will enable data trustworthiness assessment, the creation of GDPR-compliant data marketplaces, and greater trustworthiness in service/product transactions.

The emergence and popularity of blockchain techniques will significantly change the way of digital and networking systems' operation and management. In the meantime, the application of blockchain will raise new requirements, more open issues and challenges.

ONTOCHAIN seeks submissions of projects that invent novel technologies, provide new applications, supply advanced methodologies, propose promising software development directions and approaches for unsolved issues.

Note that ONTOCHAIN Open Call 2 includes the six topics aforementioned, but is not limited to them, A proposal under open topic will also be considered as long as it serves as a building block of the infrastructure and to the overall ONTOCHAIN vision and objectives (see Section 1), excluding ONTOCHAIN applications, to which the open call 3 will be specifically devoted.

2.2.7 Deliverables

Whatever the topic, the projects funded by the ONTOCHAIN consortium must deliver four deliverables during their participation process on the

ONTOCHAIN foundation. In this context the deliverables that each project has to prepare are defined below:

o D1: Detailed technical specification of the solution and software implementation work plan

o D2: Software deployment and use case scenarios

o D3: Implementation, deployment, testing, demonstration and validation

o D4: Modularised software components ready for distribution

For more details regarding the delivery dates, see the ONTOCHAIN Open Call 2 Guide for Applicant.

2.3 SUPPORT SERVICES PROVIDED BY ONTOCHAIN TO THIRD PARTIES

All selected third parties will benefit of:

o **Access to Infrastructure**: All the teams selected will have access if willing and needing so, to the iExec blockchain platform, for their off-chain developments (see 8.1 for more details) and to the MyIntelliPatent web application, populated with updated blockchain applications, for patent analysis and monitoring (see 8.2 for more details).
The use of the iExec platform and of the MyIntelliPatent web application are not mandatory. Applicants shall bear in mind that interoperability of the solutions build within the ONTOCHAIN project is a paramount requirement.

o **Business support services**: To support the teams to exploit their use cases and successfully reach the market, different trainings and sessions with mentors will be organised. Depending on the team profile, aspects such as Value Proposition, pitching or IPR (among others) will be explored.

o **Communication support services**: Major visibility, promotion and networking opportunities are offered as part of the ONTOCHAIN project and the Next Generation Internet initiative. Selected teams will:

> o have access to communication tool kits and co-branding materials,
> o be showcased in the ONTOCHAIN project website,
> o be interviewed and promoted on relevant media channels
> o be invited to participate in top events

o connect with a vibrant ecosystem of innovators, investors, industry players and public authorities.

Each third party selected will be assigned one or more mentors from the ONTOCHAIN consortium that will follow its updates on a weekly basis.

3   ANNOUNCEMENT

Submission to the ONTOCHAIN Open Call 2 will open on the 15th July 2021 at 12:00 PM CEST and close on the 15th September 2021 at 17:00 CEST. Dates for the different phases are outlined below but may be subject to change if any modifications in the project's schedule occur.

Call title:	ONTOCHAIN Open Call 2 - Framework Prototype
Full name of the EU funded project:	Trusted, traceable and transparent ontological knowledge on blockchain
Project acronym:	ONTOCHAIN
Grant agreement number:	H2020-957338
Call publication date:	15th July 2021 at 12:00 PM CEST
Call deadline:	15th September 2021 at 17:00 CEST
Expected duration of participation:	5 (small projects) or 10 months programme (large projects)
Total EU funding available:	1 320 000 €
Task description:	ONTOCHAIN will deliver a new software ecosystem for trusted, traceable and transparent ontological knowledge management. The specific objective of the ONTOCHAIN Open Call 2 is to implement an infrastructure that will host ONTOCHAIN's

	trustworthy data, metadata and services, and specific software solutions that can be used widely, further extending the use cases and the architectural features planned by the end of the Open Call 1.
Submission & evaluation process:	Proposals are submitted in a single stage and the evaluation process is composed of three phases as presented hereafter: o Phase 1: Admissibility & eligibility check o Phase 2: Proposals evaluation carried out by the ONTOCHAIN Consortium with the assistance of independent experts. o Phase 3: Online interviews (10 minutes pitching & 20 minutes of Q&As) and final selection carried out by the ONTOCHAIN Consortium and the ONTOCHAIN Advisory Board Members.
Further information:	Further details are available at: https://ontochain.ngi.eu/apply

4   SUPPORT TO APPLICANT

The ONTOCHAIN consortium will provide information to the applicants only via ontochain@ngi.eu. No binding information will be provided via any other means (e.g., telephone or other email).

o More info at: https://ontochain.ngi.eu/apply
o Apply via: https://www.f6s.com/ontochain-open-call-2/apply
o Support team: ontochain@ngi.eu
o Personal Data Protection Policy available at: https://ontochain.ngi.eu/Terms_of_Service_and_Privacy_Policy_v0.2

The ONTOCHAIN consortium will also organise webinars to connect with interested applicants. Stay update by following the ONTOCHAIN project on the following channels:

o Website
o Newsletter
o Twitter
o LinkedIn
o Facebook
o YouTube

5   KIT FOR APPLICATION

The ONTOCHAIN Open Call 2 supported material is the following:

o **The ONTOCHAIN Background**

This document describes the ONTOCHAIN project context and the need for means for collective organisation as well as for contribution and use of knowledge thanks to smart solutions that support transparency, trust, plurality and democracy.

o **The ONTOCHAIN Open Call 2 text**

> The present document.

o **The ONTOCHAIN Guide for applicant**

This document provide in details the information to help apply to the ONTOCHAIN Open Call 2 such as an abstract of the ONTOCHAIN action, a description of the ONTOCHAIN open call 2, the modalities for application, the eligibility criteria, the evaluation process, the scheme of the funding support, the IPR aspects related to ONTOCHAIN and how to prepare and submit a proposal.

o **The ONTOCHAIN Application material**

- **Administrative form preparation template,** which presents the list of administrative information that you need to fill in directly in the F6S portal.
- **Proposal description template**: a mandatory and editable document to describe your proposal.
- **ONTOCHAIN additional applicant's template**: In case your proposal has more than 3 applicants participating as individuals (Natural persons) or/and more than 3 applicants participating as organisations (Legal entities), you will have to fill in this document and upload it in section 3 of the F6S form.

o **The Indicative sub-grant agreement form**

This document provides a template of the sub-grant agreement that only the selected applicants will be requested to sign. It is not necessary to send this document at the time of application.

All documents are available at: https://ontochain.ngi.eu/apply

ONTOCHAIN GUIDE FOR APPLICANTS

SECOND OPEN CALL FOR PROPOSALS

Closing dates for proposals: 15th September 2021, 17:00 CET

Grant Agreement n° 957338

TABLE OF CONTENTS

1   OVERVIEW OF THE ONTOCHAIN OPEN CALLS

1.1   THE ONTOCHAIN ACTION

Today, digital life is an extension of our physical world and it demands the same critical, moral and ethical thinking. However, from the current standpoint and when it comes to exchange of knowledge and services, Internet cannot assure that bias or systematic abuse of global trust are avoided. Several threats in the real-life scenarios of person's interaction with the Internet can be identified, e.g. corrupted information by malicious storage and network, or by censorship that can be shared and propagate to unforeseeable extent, daily decisions made on the basis of often uneven and unassessed information, revenue that service providers make through the web are not shared with the users that are publicly exposed to provide feedback and rate the services and similar.

In order to overcome these threats and make the Internet a resilient, trustworthy and sustainable means of knowledge and services exchange, the ONTOCHAIN research and innovation action proposes to create a software ecosystem that suitably employs 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 and for vital sectors of the European economy. It aims at demonstrating its potential in high impact verticals, such as eScience, eEducation, eHealth, eGovernment, eCommerce, eTourism, eInfrastructures and so on.

ONTOCHAIN - Trust traceable and transparent ontological knowledge on blockchain, is a European project funded by the European Commission under the European Union's Horizon 2020 Research and Innovation Programme and the call topic ICT-54. As such, it is part of the European Commission's Next Generation Internet (NGI) initiative. ONTOCHAIN was launched in September 2020 to empower Internet innovators with a novel software ecosystem for trusted, traceable and transparent ontological blockchain-based knowledge management through 3 Open Calls and a budget to be distributed of 4,2M€.

The 3 Open Calls are the following:

o **Call 1- Research 2020-2021**

The objective of this call is to establish the ONTOCHAIN framework as human centric decentralised & trustworthy solution based on available technologies. This call is in progress, a first batch of specifications have been delivered by 17 Teams in phase one of the call and 7 remaining Teams will delivered the full ONTOCHAIN framework in September 2021.

o **Call 2- Protocol suite and software ecosystem foundations 2021-2022**

> The objective of Call 2 is to build the ONTOCHAIN concept for the creation of a trustworthy information/service exchange process & a more trustworthy content handling. This call will enable to deliver the ONTOCHAIN Framework prototypes. It is the focus point of the guide for applicants.

o **Call 3- Application and experimentation 2022-2023**

The objective of Call 3 is to exploit the ONTOCHAIN solution formulated in Call 2 for real life use cases.

Through these 3 Open Calls, the selected projects should have potential to entail a substantial advance in the state of the art, delivering new software solutions and services to the ONTOCHAIN software ecosystem with potential to improve the Internet infrastructure and/or reach the market in the short run.

Following the spirit of the H2020 Call ICT-54 Blockchain for the Next Generation Internet, **the ONTOCHAIN Research and Innovation Action encourages open-source software and open hardware design, open access to data, standardisation activities, access to testing and operational infrastructure as well as an IPR regime ensuring interoperability, reusability of results, lasting and sustainable impact.**

This guide is specifically dedicated to the **Open Call 2** and outlines the application modalities for this call.

1.2   ONTOCHAIN CALL 2

The specific objective of the ONTOCHAIN Open Call 2 is to implement an infrastructure that will host ONTOCHAIN's trustworthy data, metadata and services, and specific software solutions that can be used widely, further extending the use cases and the architectural features planned by the end of the ONTOCHAIN Open Call 1.

It aims at selecting up to 12 projects led and executed by a critical number of developers, innovators, researchers, SMEs and entrepreneurs among others, actively involved in research, development and application activities in the fields of Blockchain, Semantic Web, Ontology Engineering, Software Engineering, Cloud, Edge and Fog Computing, Ecosystem Economy, Smart Applications, Cryptography, Standardisation and similar. This will represent a comprehensive ecosystem. Six of them will **be selected** for a 5-month period (small projects) and the remaining six projects for a 10-month period (large projects) according to excellence criteria and planned implementation outcomes.

It is important to note that all proposals should be submitted for large projects with respective objectives and work plan. However, all proposals should also clearly list the functionality that is going to be provided by each one of them, if they get selected as short projects.

As part of the action, experts in diverse fields will also provide to beneficiaries technology development guidance, working methodology as well as access to top infrastructure, training in business and data related topics, coaching, mentoring, visibility and community building support.

The call is open for submission from 15th July 2021 (12:00 PM CEST) until 15th September 2021 (17:00 CEST) and its indicative budget is € 1 320 000.

Actions	Type of projects	Duration	Indicative budget
To build a prototype for 1 of the 6 challenges described in the next section fully integrable with the ONTOCHAIN Ecosystem. & To enhance the prototype of phase 1 with substantial additional functionality fully integrable with the ONTOCHAIN Ecosystem	Small projects	5 months	€ 450 000
	Large projects	10 months	€ 870 000

Whether short or long duration, ONTOCHAIN will support projects to build the ONTOCHAIN Framework prototype as a human centric, decentralized and trustworthy solution according to 6 topics:

o   Decentralized oracles for ONTOCHAIN

o   Market mechanisms for ONTOCHAIN

o   ONTOCHAIN interoperability & API Gateways

o   ONTOCHAIN Network Design and scalability

o   Semantic based marketplaces for ONTOCHAIN

o   Data Provenance in ONTOCHAIN

Applicants will have to submit their proposal within – but not limited to– these 6 topics. Excluding ONTOCHAIN applications, to which the open call 3 will be specifically devoted, a proposal under a different topic will also be considered as long as it serves as a building block of the ONTOCHAIN infrastructure and it contributes to the overall ONTOCHAIN vision and objectives. In particular, the ONTOCHAIN project objective is:

"Developing scalable blockchain, decentralized reputation systems and semantic web technologies, in order to achieve <u>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"</u>

The 6 topics of Open Call 2 are further detailed in the next section (section 1.3).

1.3 WHAT ARE THE 6 TOPICS TO BE ADDRESSED?

The six topics are presented in detailed tables hereafter. Each table elaborates in particular on the challenge, the requirements, the use cases, the context, and the expected outcomes to be addressed as well as how it should work in practice.

1.3.1 Topic 1 – Decentralised oracles for ONTOCHAIN

Title	Decentralised oracles for ONTOCHAIN
Definition	The essence of blockchain smart contracts is based on the execution of instructions in a decentralized architecture, in which the executing outputs are trusted and accepted by all including nodes in the network. However smart contracts run entirely isolated and cannot access data from the external world on their own. Oracles are software components which allow smart contracts to interact with off-chain (external) data sources: their primary job is to collect data and input to smart contracts. Because oracles bring arbitrary data to the blockchain they create a major vulnerability, and the trustworthiness of the imported data is extremely difficult to assess.

	The goal of this topic is to design, implement and showcase trustful and trustless oracle prototypes that are capable of interacting with the ONTOCHAIN infrastructure and providing necessary data for the operation of its applications.
Challenges	Activities may focus on designing and developing new decentralised oracle prototypes that rely on advanced technologies, including, but not limited to the areas of IoT, AI, social networking, mobile technologies in the generation of metadata that can be assessed from the viewpoint of trustworthiness and fed to the ONTOCHAIN's semantic blockchain infrastructure. Novel oracle frameworks for ONTOCHAIN, e.g. based on different topologies or incentive strategies are also in scope. Approaches should address the problems of detecting, preventing and mitigating sybil attacks (e.g., majority attack, mirroring, freeloading, data corruption) and collusion among oracles, estimating probabilities for trustworthiness, and particularly focus on practical design and implementation challenges which are in the context of the ONTOCHAIN services and applications. Additional focus is on the high Quality of Service and low operational costs of the oracles, while achieving the same or higher levels of trust. The designed oracles should be implementable within the time period of the project, and should be showcased within the initial applications (e.g. marketplace, part tracing, copyrights and similar).
Requirements	The prototype should address as much as possible the challenges mentioned above and in particular: o Definition of APIs for common (generic) use cases; o Integrate with at least Ethereum smart contracts and the EVM, although support for additional chains is encouraged; o Support for semantic data (e.g. properties such as a vehicle colour) and semantic queries (e.g. via SPARQL); o Rely on existing standards or propose new standards for data transmission and data definition, to ensure reliable communication between oracles and smart contracts; o Support a variety of data sources, data formats and off-chain storage mediums/services; o Integration of identity verification or decentralized identity management;

	o Demonstrate the approach with several templates and examples, to be released to the open source community; o Modularity of the approach so that the developed oracles are packaged and can be deployed and used seamlessly by different entities should be duly elaborated in the proposal.
Use cases	o Feeding trustworthy information (geolocation, time location, IoT data, state, quality, size, price, reputation score, probability, etc.) to POC4COMMERCE about real-world items in supply chain use-cases (wheat, apple trade, car, apartment sharing, bio-food industry, etc); o Ingestion of verifiable documents (diplomas, licenses, etc.) for using as verifiable credentials in ONTOCHAIN projects (e.g. GIMLY ID, HIBI); o Social media oracles, e.g. for feeding a user's social media profile information to CopyrighLY; o Fact-checking in social media and data sharing platforms; o On-chain reputation and provenance, e.g. in the context of scientific research and COVID tracking; o IoT, sensor networks and crowd-sensing (e.g. for decentralized Insurance, traffic management); o Decentralized Finance, including collateralised lending and stablecoins; o Prediction market.
Context	Proposals should position the proposed solution on a landscape of existing services and platforms. Specific context for the action is provided by the following services, however, other contexts may apply: o *iExec:* a network of computers for running arbitrarily complex off-chain jobs with TEE and GPUs and pushing results directly in smart contracts, backed by reputation, decentralised consensus and economic incentives. o *ChainLink:* a trusted marketplace for oracles where clients and nodes are connected. o *Witnet:* a reputation-based decentralised oracle network in which correctness is defined by a consensus algorithm. o *Provable blockchain:* Leveraging all TEE environment providers to minimise vulnerability.

Expected outcomes	o Downloadable open source software components that can be used to build systems of oracles, which will be used to feed truthful off-chain information to the ONTOCHAIN semantic blockchain infrastructure; o Semantic representation (e.g. in Linked Data format) of the involved data sources, data features/attributes, and trustworthiness score; o Smart contracts, on- and off-chain API for querying the trustworthiness of external data; o Software should be resilient to security and privacy threats (DDOS, Sybil attacks, reputation manipulation, identity theft, etc.); o New trust-building mechanisms to assure authentic and trustworthy data feed for smart contracts.
In practice	The downloadable open-source Oracle software components will be applied in the initial applications of the ONTOCHAIN ecosystem (resulting from the Calls 1, 2, and 3). They will be deployed for the purpose of demonstration and accessed through their APIs. Oracle clients will be smart contracts and Web 2 applications running on top of the ONTOCHAIN semantic blockchain infrastructure. Users will be able to examine the oracle (e.g. status, historical data) through a web interface.

1.3.2 Topic 2 - Market mechanisms for ONTOCHAIN

Title	Market mechanisms for ONTOCHAIN
Definition	Blockchain has the potential to mitigate uncertainty and enable "trustless trust" between buyers and sellers. Blockchain records all valid transactions among traders (B2C, B2B, C2C) on the platform. These transaction records are transparent to platform members, and are hard to be altered once recorded. Apart from this basic concept, to exploit the full potential of blockchain, several additional functionality has to be offered, e.g., service/product digitization, market service matching neutrality, decentralized auction mechanisms, automated inventory management, etc. Moreover, facilitating DeFi services on top of blockchain is a key functionality for unlocking the full business value of blockchain; however, nowadays, DeFi (on top of Ethereum) is suffering from high transaction fees.

	The goal of this topic is to design, implement and showcase prototype services in the scope of advanced decentralized market and business-enabling mechanisms that offer win-win situations for all involved stakeholders, and are in line with the overall ONTOCHAIN objectives for trustworthy services/products exchange and trustworthy content handling.
Challenges	The challenge perceived is to build an unbiased service/product trading system on top of trustworthy information expressed in Semantic Web formats. This includes: o The ability to generate (mint) tokens of various types, i.e., Non-Fungible Tokens (NFTs), Fungible Tokens (FT), Semi-Interchangeable Tokens (SFT). o Support for building DeFi applications on top of the blockchain, i.e., token/stablecoin trading, interest on deposit accounts, token/stablecoin loans, crypto funds, etc. o The ability to facilitate the use of various types of tokens throughout the lifecycle of data and services. o The overall market mechanisms for tokenomics (e.g., token distribution strategies, token sharing for ecosystem sustainability, incentives for nodes etc.) o Enable stable transaction fees.
Requirements	The software prototype should address as much as possible the challenges mentioned above. In this context: o Support for token minting, distribution (for ecosystem economic sustainability) and exchange. o Support for developing unbiased trustworthy marketplaces of digitized (physical or virtual) assets. o Support for unbiased decentralized price determination mechanisms. o Support for service/product exchange. o Support for building efficient DeFi applications. o Design economic model prototype for all stakeholders (win-win situations, sustainability, incentives for the nodes and so on). o Support of necessary functionality for market enablement such as: eReceipts (attestations), inventory management, supply chain management, SLA compliance checking.

	The prototype should also focus on addressing one or more non-functional requirements, such as: o Reduce costs in primary transactions (frictionless trade); o Increase security and transparency of centralized markets (eliminate biases or market manipulation potential); o Improve transaction efficiency in networked businesses (and potentially integrate with existing business processes); o Monetize data in compliance with regulation (e.g., GDPR).
Use cases	Use cases include: o Provision of market mechanisms for at least 5 types of stakeholders (service providers, service users, regulators etc. based on the 1-st Open Call project results). o C2C, B2C, B2B commerce. o Efficient Decentralised Finance (Defi). o Data/service/product marketplace. o Business ecosystem enlargement.
Context	Proposals should position the proposed solution on a landscape of existing services and platforms. Specific context for the action is provided by the following services, however, other contexts may apply: o SAGA: a decentralized data marketplace, designed for users to monetize and acquire data in a trusted standardized and cost-effective way.
Expected outcomes	o Provide API/SDK for token minting, distribution (for ecosystem economic sustainability) and exchange. o Provide API/SDK for developing unbiased trustworthy marketplaces of digitized (physical or virtual) assets. o Provide API/SDK for unbiased decentralized price determination mechanisms. o Provide support (involving smart contracts) for service/product exchange. o Provide API/SDK for building efficient DeFi applications.

	o Design economic model prototypes for all stakeholders (win-win situations, sustainability, incentives for the nodes and so on).
	o Provide SDK/APIs for necessary functionality for market enablement's design and implementation for market enablement, such as eReceipts (attestations), inventory management, supply chain managements, SLA compliance checking.
In practice	The software should be downloadable and have open-source software components and SDK that can be used to establish market/tokenomics mechanisms to be used by the various decentralized apps that will be built atop the ONTOCHAIN software ecosystem and infrastructure.

1.3.3 Topic 3 – ONTOCHAIN interoperability & API Gateways

Title	ONTOCHAIN interoperability & API Gateways
Definition	This topic aims at developing the ONTOCHAIN cross-chain layer and Gateway APIs; this critical component must provide means for trusted bi-directional operations (e.g., transfer of information and assets) between the ONTOCHAIN network and a selection of the most widely used networks, as well as communications between different chains within the ONTOCHAIN network (e.g., Ethereum, CARDANO, COSMOS, KUSAMA, STELLAR, Hyperledger Fabric and Tezos). The ONTOCHAIN network itself will embrace several chains, with different protocols, to serve different applications and business cases. This topic must ensure that these networks integrate smoothly together and with the outside world.
Challenges	The challenge is to provide future-proof interoperability by developing a trustworthy, privacy-preserving, secure, transparent, democratic and traceable set of Blockchain APIs based on Semantic Web standards. The APIs must support the exchange of ontologies, of data and metadata, of knowledge and information from different blockchains towards ONTOCHAIN and vice versa. The proposed solutions must hide the heterogeneity of blockchain protocols which limit application development and can break important properties such as trust,

	consistency and security of data and services which are all paramount to mass adoption. Information and asset exchanges between chains with different protocols must ensure that semantic information, trust, identities and privacy are preserved while maintaining the highest possible level of security.
Requirements	The prototype should address as much as possible the challenges mentioned above, and in particular: o The topic is open to any existing blockchain solution but at least Ethereum, Tezos and Hyperledger Fabric must be supported. o Support for (at least) ERC-20, ERC-721, ERC-777 and ERC-1155. o Solutions must rely as much as possible on industry-wide standards and support existing chains with no modifications of their protocols, clients, virtual machines or programming framework. o The trust, validity and critical metadata attached to data/transactions must be preserved during a transfer within ONTOCHAIN and with external blockchains. o Provide efficient methods for reducing computational complexity and transaction sizes between ONTOCHAIN and other blockchain ecosystems.
Use cases	o Interledger communication. o Cross-chain oracles. o Legacy systems and Governance integration. o Cross blockchain token transfer. o Cross blockchain smart contract interaction.
Context	Proposals should position the proposed solution on a landscape of existing services and platforms. Specific context for the action is provided by the following services, however, other contexts may apply: o *Ark* uses SmartBridges architecture to address this challenge, and claims to provide universal interoperability, plus cross-blockchain communication and transfers. o *Cosmos* uses the Inter-blockchain Communication (IBC) protocol to enable blockchain economies to operate outside silos, and transfer files between each other.

Expected outcomes	o Bridges (smart contracts and off-chain services) for transferring assets between smart contracts deployed to any combination of the above-mentioned chains. o Cross-platform SDK and APIs allowing two directional communication between ONTOCHAIN provided services and widely used networks. o Scalable API endpoint for connecting clients to ONTOCHAIN applications and services. The software must implement modern security protocols and standards and provide the highest level of security to the clients.
In practice	The software will be used by application developers that have deployed instances of their smart contracts to multiple chains within and outside ONTOCHAIN. For example, if a marketplace application is deployed on Ethereum Mainnet and on a L2 chain within ONTOCHAIN, the interoperability components must allow items for sale on any of the instances to be purchased through any of the other instances.

1.3.4 Topic 4 – ONTOCHAIN Network Design and scalability

Title	**ONTOCHAIN Network Design and scalability**
Definition	Blockchain offers a plethora of features, such as traceability, transparency, anonymity, democracy, automation, decentralization and security. Despite these promising features the technical scalability of the network is still a key barrier which can put a strain on the adoption process, especially for real business environments. Throughput, storage, and networking are three aspects of scalability that should be considered to improve ONTOCHAIN network scalability. This topic aims to build an ONTOCHAIN client based on Ethereum that is a stable and well tested system for data transactions and has a cost-effective network for the operation of its applications.
Challenges	o Definition of stakeholders and their requirements. o Design of flexible services for the ONTOCHAIN ecosystem.

	o Deployment of the selected services and testing. o Optimization and Scalability of the network. o Operational costs of the network.
Requirements	The prototype should address as much as possible the above mentioned challenges and in particular: o Design suitable schemes to increase the throughput in order to sustain a huge volume of real world transactions for the ONTOCHAIN platform. o Solution can be focused on finding new approaches on how to store data effectively in the ONTOCHAIN platform with limited resources. o Design more efficient data transmission mechanisms for the ONTOCHAIN services and applications. o Design new prototypes on how different chains can be linked to each other on a hierarchical/scalable basis.
Use cases	o Faster and cheaper transaction o Real business environments o Scalability in adding new data linked to On-chain data. o Electricity energy resources
Context	Proposals should position the proposed solution on a landscape of existing services and platforms. Specific context for the action is provided by the following services, however, other contexts may apply: -*SegWit* can improve throughput and maintain good compatibility with the Bitcoin blockchain system, but the throughput improvement is limited. o Off-chain transaction (e.g., Lightning network, Duplex o Micropayment Channels) systems can reduce the number of transactions processed on the blockchain, but sacrifice transaction security and complicate the user experience. o Sharding(e.g., OmniLedger, Elastico) improves throughput and reduces the number of transactions processed by each node, but sacrifices global consensus o Decoupling management/control from execution supports QoS provisioning and improves decentralization, but increases the complexity of dynamic resource allocation and the decisions on which nodes should execute smart contracts.

	o Polygon: Framework for building and connecting multiple Ethereum-compatible blockchain networks. o Layer 2 solutions: Sidechains
Expected outcomes	o Developing the use of Property Graphs (PGs)/ Labelled Property Graphs (LPGs) on blockchains as on-chain data. o A tight integration between on-chain data storage engine and blockchain code. o Reduction of the transaction size for increasing the number of transactions in ONTOCHAIN blocks. o Reduction of the number of transactions processed by ONTOCHAIN nodes to improve throughput. o Efficient approaches for ONTOCHAIN block generation. o Transmit the transaction information effectively and reduce the requirement for network bandwidth resources. o Compatible with Layer2 sidechain.
In practice	This open-source software result and documentation can be used to deploy and join new ONTOCHAIN nodes in the initial ONTOCHAIN infrastructure, or to build a new ONTOCHAIN infrastructure on its own.

1.3.5 Topic 5 - Semantic based marketplaces for ONTOCHAIN

Title	Semantic based marketplaces for ONTOCHAIN
Definition	This topic will develop a marketplace where ONTOCHAIN users can buy or sell any goods or services that can be described with an ontological representation. The resulting software will provide services for publishing ontology-based descriptions of goods and services, creating and publishing market orders, searching through the orders based and complex criteria and matching sell and buy orders. The marketplace can implement different market mechanisms, e.g. spot, limit orders and so on. Ontology matching is a solution to the semantic heterogeneity problem. Finding correlations between semantically related entities of ontologies can be used for different tasks such as ontology merging, query answering, data translation, etc. In this topic, ontology

	matching is a requirement for finding compatible offer and demand (buy and sell orders) in semantic-based marketplaces. To guarantee the fairness of the transactions in the marketplace, the matching process should be fair to every party, e.g. preventing exclusion, censorship, price manipulation and fraud. The goal of this topic is to design and implement prototypes that will provide ontologies management and setup for decentralized semantic matching of demand and supply for different use case scenarios (e.g., apartments, land, cars, etc). The prototype should also make it possible to include oracles and reputation in its decision-making processes. It should operate on top of the ONTOCHAIN L2 sidechain.
Challenges	Developing a component that offers services similar to existing virtual marketplaces but for arbitrary goods/services, and ensuring the highest level of trust and fairness. The marketplace logic (including the propagation and the matching of market orders) must thus be as decentralized as possible, while offering high performance and low response time. The solution should leverage ONTOCHAIN services introduced in Open Call 1 for increasing trust between users (e.g., identity, reputation) and be open to all of the present and future ONTOCHAIN stakeholders. In addition to decentralization, particular care must be given to avoiding any censorship, market manipulation (e.g., by hiding, erasing or forging orders or ontological descriptions) and spam attacks. The semantic matching component must guarantee that every offer has been considered, that the returned service/good is always the most appropriate for the user, and that it satisfies every expressed requirement.
Requirements	The prototype should address as much as possible the aforementioned challenges and the following requirements: o Support different ambitious use-case scenarios (e.g., apartment rental, car sale, freelancing) based on metadata and semantic constraints (e.g., apartment size and location, etc.). o Rely on existing ONTOCHAIN components to provide new services like ontology description, evaluation, integration, etc.

	o Provide *fairness-first* solutions, i.e. a marketplace prototype that gives equal power to sellers, buyers and to the marketplace operator. o Find the best tradeoff for decentralized ontology matching for achieving higher throughput in large ontologies while maximizing trust and fairness. o Provide incorporation of Property Graphs (PGs)/ Labelled Property Graphs (LPGs) as an alternative data model for using semantics, this should include (but not limited to) the mechanism for encoding Ontologies using LPG data model, mechanism for reference to OWL Ontologies and the mechanism for reasoning over LPGs.
Use cases	o Ontology engineering o Information integration o Linked data o Peer-to-peer information sharing o Web service composition o Autonomous communication systems o Navigation and query answering on the web
Context	Proposals should position the proposed solution on a landscape of existing services and platforms. Specific context for the action is provided by the following services, however, other contexts may apply: o Binance: is an online exchange platform where users can trade cryptocurrencies. The exchange also supports the users to earn interest or transact using cryptocurrencies. o Booking.com: connects millions of travellers with various services like a range of transport options and places to stay -from home to hotels and much more. It is the largest world's travel marketplace that enables properties all over the world to reach a global audience and grow their businesses. o OAEI: The main goal of OAEI is to support the comparison of the systems and algorithms on the same basis and to allow anyone to draw conclusions about the best matching strategies. o Open Knowledge Graph: a visual interface that dramatically increases the visibility of research findings for science and society alike. The goal is to offer a better way to explore and discover scientific knowledge.

Expected outcomes	The output of this task must be an API, a SDK and a GUI for interacting with the marketplace and implement the following functions: ○ Uploading ontological descriptions of goods and services; ○ Generating market buy and sell orders from an ontological description and specific qualitative and non-qualitative criteria; ○ Publishing and propagating orders; ○ Matching ontological market orders; ○ Sealing deals permanently in a smart contract on the underlying blockchain. ○ All the functions must be accessible to end users and applications through all three interfaces.
In practice	This open-source software outcome can be used mainly as a design of a potential front-end to the ONTOCHAIN infrastructure and services. It can be used to showcase the potential of the new trustworthy knowledge management services provided by ONTOCHAIN.

1.3.6 Topic 6 – Data provenance in ONTOCHAIN

Title	Data provenance in ONTOCHAIN
Definition	Data Provenance or lineage is the technology field whose objective is to manage metadata associated with the history of data, from its inception to various stages of the data lifecycle. Thus, data provenance metadata helps to provide a detailed picture of how the data was created/collected, where it was stored and how it was used/modified/transformed. Data provenance metadata is also useful for auditing. For each data exchange and data handling a specific record of processing activity (ROPA) is recorded. ROPAs should be automatically checked against GDPR, so that the data processor (e.g., identifiable by means of DIDs) is authorized (e.g., by means of verifiable credentials) to apply the processing which is compatible with the GDPR; overall, this is termed to be trustworthy data handling. Data transformations, accesses and handling should be

	trustworthy and recorded, so that data provenance can be supported. Data provenance is particularly important for data lakes/aggregators (i.e., repositories of data belonging to multiple owners), data traders and business processes (especially supply chain management).
Challenges	In data lakes, creating a comprehensive immutable audit record of the data, which can be independently verified to ascertain the authenticity of the data is important. In the context of data trading, data owners can prove the legitimacy of owning data and trade it to others or control the number of legitimate copies of the data. Finally, in the context of business processes, associating a digital token to each high-value item in the supply chain, when the physical item changes hands in the real world, the corresponding digital token is re-assigned in the blockchain. This ensures that the blockchain tracks the journey of the high valued item in the real world. This allows the buyer on receipt of the item to backtrack and verify the chain back to the origin i.e. all the way to the manufacturer.
Requirements	The prototype should address as much as possible the above mentioned challenges and the following requirements: o Support automated checking of data-related transactions against GDPR. o Define/adopt ontology for ROPAs. o Store chains of ROPAs on data processing. o Record business processes, especially for supply chain management. o Automated verification of rule compliance in business processes. o Rely on existing ONTOCHAIN components for data semantics on business processes.
Use cases	The following use cases apply: o Data provenance in warehouses/lakes o Data Trading o Data Trustworthiness o Service/Product quality
Context	Proposals should position the proposed solution on a landscape of existing services and platforms. Specific

	context for the action is provided by the following services, however, other contexts may apply:
	o Example: Aravind Ramachandran and Murat Kantarcioglu. 2018. SmartProvenance: A Distributed, Blockchain Based DataProvenance System. In Proceedings of the Eighth ACM Conference on Data and Application Security and Privacy (CODASPY '18).
	o Another example is the system ProvChain A Blockchain-Based Data Provenance Architecture in Cloud Environment with Enhanced Privacy and Availability byXueping Liang and Alii 2017 17th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGRID)
Expected outcomes	o Smart contracts for automated checking of data-related transactions against GDPR. o Define/adopt ontology for ROPAs. o Provide API/SDK for storing chains of ROPAs on data processing. o Provide API/SDK for recording business processes, especially for supply chain management. o Smart contracts for automated verification of rule compliance in business processes.
In practice	The open source software produced in this topic will enable data trustworthiness assessment, the creation of GDPR-compliant data marketplaces, and greater trustworthiness in service/product transactions.

1.3.7 Deliverables

Whatever the topic, the projects funded by the ONTOCHAIN consortium must deliver four deliverables during their participation process on the ONTOCHAIN foundation. In this context the deliverables that each project has to prepare are defined below:

o D1: Detailed technical specification of the solution and software implementation work plan

o D2: Software deployment and use case scenarios

o D3: Implementation, deployment, testing, demonstration and validation

o D4: Modularised software components ready for distribution

For more details regarding the delivery dates, see the table "mandatory deliverables and reports" in Annex 1 - Indicative sub-grant agreement form.

2   MODALITIES FOR APPLICATION

2.1   WHAT TYPES OF PROJECTS WILL BE ELEGIBLE?

Applications must be based on the ONTOCHAIN proposal description template (Annex 3) and must clearly fit within one of the six topics aforementioned in section 1.3. All six call topics require advancing the state of the art and prototyping activities to build the ONTOCHAIN Framework.

Note that ONTOCHAIN Open Call 2 includes the six topics above, but is not limited to them, as explained in Section 1.2, and repeated here for convenience. A proposal under a different topic will also be considered as long as it serves as a building block of the infrastructure the overall ONTOCHAIN vision and objectives (see Section 1), excluding ONTOCHAIN applications, to which the open call 3 will be specifically devoted.

Furthermore, the participants should demonstrate their long-term commitment to the ONTOCHAIN research and innovation agenda. **The teams will work to demonstrate that the proposed solution progresses from the beginning of the project, reaching a higher maturity level and take-up by the end of the action. Thus, projects in all six topic areas must evidence a substantial progress with a particular focus on the interoperability and sustainability of the outcomes.**

Thus, following the spirit of the H2020 Call ICT-54 Blockchain for the Next Generation Internet, the ONTOCHAIN Research and Innovation Action encourages open-source software and open hardware design, open access to data, standardisation activities, access to testing and operational infrastructure as well as an IPR regime ensuring lasting impact and reusability of results. If the expected results of the proposed project cannot be released as open source, it should be duly justified in the application document.

At the eligibility evaluation stage, if a proposal is considered to better fit a different topic that the one selected by the applicant, this latest will be contacted by the ONTOCHAIN Consortium in order to commonly agree to move the proposal to the relevant topic for evaluation.

2.2 WHAT HAPPENS AFTER THE PROPOSALS ARE SUBMITTED?

Immediately after the submission deadline (15th September 2021, 17:00 CEST) is over, the evaluation process begins (as described in detail in Section 4 of this Guide).

Experts will evaluate proposals and score them adequately according to the quality of the content presented.

The goal of the process is to select around 12 proposals with the highest scores under the six defined call topics or other valuable proposed topics that will be invited to join the ONTOCHAIN Research and Innovation Action. The exact number of selected projects will be subject to the quality of the proposals and the funding available.

3 ELIGIBILITY CRITERIA

All Applicants will have to abide to all general requirements described in this section to be considered eligible for ONTOCHAIN.
Therefore, please read this section carefully.

3.1 TYPES OF APPLICANTS

The target Applicants of this call are Internet technologists, researchers, developers and innovators. Applicants can apply as individuals or linked to a legal entity. Hence, the participation is possible in several ways:

o **Team of natural person(s):**

Team of individuals, all established in any eligible country (see section 3.2). This does not consider the country of origin but the residence permit.

o **Legal entity(ies):**

One or more entities (consortium) established in an eligible country (see section 3.2);

It can be: Universities, research centres, NGOs, foundations, micro, small and medium-sized enterprises (see definition of SME according to the Commission Recommendation 2003/361/EC), large enterprises working on Internet or/and other related technologies are eligible.

o **Any combination of the above.**

In addition, the following condition apply:

o The participating organisations should not have been declared bankrupt or have initiated bankruptcy procedures.

o The organisations or individuals applying should not have convictions for fraudulent behaviour, other financial irregularities, and unethical or illegal business practices.

3.2 ELIGIBLE COUNTRIES

Only Applicants legally established/resident in any of the following countries (hereafter collectively identified as the "Eligible Countries") are eligible:

o The Member States (MS) of the European Union (EU), including their outermost regions;

o The Overseas Countries and Territories (OCT) linked to the Member States[1];

o H2020 associated countries (those which signed an agreement with the Union as identified in Article 7 of the Horizon 2020 Regulation): according to the updated list published by the EC[2];

o The UK Applicants are eligible under the conditions set by the EC for H2020 participation and as long as they comply with the same eligibility rules as the other Applicants.

3.3 LANGUAGE

English is the official language for ONTOCHAIN open calls. Submissions done in any other language will be disregarded and not evaluated.

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[1] Entities from Overseas Countries and Territories (OCT) are eligible for funding under the same conditions as entities from the Member States to which the OCT in question is linked
[2] http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/3cpart/h2020-hi-list-ac_en.pdf

English is also the only official language during the whole execution of the ONTOCHAIN programme. This means any requested submission of deliverables must be done in English in order to be eligible.

3.4 PROPOSAL SUBMISSION

Proposals must be submitted electronically, using the ONTOCHAIN Online Submission Service accessible via https://www.f6s.com/ontochain-open-call-2/apply Proposals submitted by any other means, will not be evaluated.

Only the documentation included in the application will be considered by evaluators. It will be composed by a form with administrative questions to be completed directly in the platform and the proposal description attached in PDF format.

The information provided should be actual, true and complete and should allow the assessment of the proposal.

The preparation and submission of the proposal and other actions that follow this procedure (such as withdrawal) fall under the final responsibility of the Applicant.

3.4.1 Multiple submissions

Given the fact that this call is a competitive one, and one Applicant should focus on only one specific topic the following apply:

o Only one proposal per **Applicant** should be submitted to this call, and only one proposal per **Applicant** will be evaluated. In the event of multiple submissions by an applicant, only the last one received (timestamp of the system) will enter into the evaluation process. Any other submitted proposals by the same Applicant involving the same Applicant will be declared non-eligible and will not be evaluated in any case.

o Only one proposal per **Individual** should be submitted to this call whether if he/she apply within as Team of natural persons or as part as part of a consortium member. If an individual is taking part in several teams/consortium, the members of the other teams/consortium will be informed about the participation of an individual in multiple teams/consortium. Then, only the last proposal received (timestamp of the system) including the individual will enter into the evaluation process. Any other submitted proposals involving this Individual will be declared non-eligible and will not be evaluated in any case.

Note that the regular functioning of the F6S platform limits to one application submission per F6S user in each call. If an F6S user wishes to submit more than one application, **for example on behalf of different Applicants**, the F6S user should request support from the F6S support team (support@f6s.com) at least 10 days prior the open call deadline.

3.4.2 Participation to the 3 ONTOCHAIN Calls and funding rules

Applicants can apply, participate and benefit from the three ONTOCHAIN open Calls but the maximum funding one beneficiary can receive from the whole ONTOCHAIN project is limited to € 200 000.

3.4.3 Complaint due to a technical error of the ONTOCHAIN Online Submission Service

If you experience any problem with the application submission system prior the deadline of the open call, you should reach F6S by e-mail through support@f6s.com, cc'ing the ONTOCHAIN Team (ontochain@ngi.eu), and explain your situation.

If you believe that the submission of your proposal was not entirely successful due to a technical error on the side of the ONTOCHAIN Online Submission Service, you may lodge a complaint by email through support@f6s.com cc'ing the ONTOCHAIN Team (ontochain@ngi.eu) and explain your situation. For the complaint to be admissible it must be filed within 3 calendar days following the day of the call closure. You will receive an acknowledgement of receipt, the same or next working day.

What else to do? You should secure a PDF version of all the documents of your proposal holding a time stamp (file attributes listing the date and time of creation and last modification) that is prior to the call deadline, as well as any proof of the alleged failure (e.g. screen shots). Later in the procedure you may be requested by the ONTOCHAIN IT Helpdesk to provide these items.

For your complaint to be upheld, the IT audit trail (application log files and access log files of ONTOCHAIN Online Submission Service) must show that there was indeed a technical problem at the ONTOCHAIN consortium side which prevented you from submitting your proposal using the electronic submission system.
Applicants will be notified about the outcome of their complaint within the time indicated in the acknowledgment of receipt. If a complaint is upheld, the secured files (provided to the IT helpdesk) for which the

investigation has demonstrated that technical problems at the ONTOCHAIN consortium side prevented submission will be used as a reference for accepting the proposal for evaluation.

3.5 CONFIDENTIALITY AND DEADLINE

Any information regarding the proposal will be treated in a strictly confidential manner.

Only proposals submitted before the deadline will be accepted. After the call closure no additions or changes to received proposals will be taken into account.

Proposals must be submitted before 15th September 2021, 17:00 CEST. To avoid missing the deadline, you are encouraged to submit your proposal as soon as possible.

3.6 CONFLICT OF INTEREST

Applicants (even individual members of applicants) shall not have any actual or/and potential conflict of interest with the ONTOCHAIN selection process and during the whole programme. All cases of conflict of interest will be assessed case by case. In particular, applicants (even individual members of applicants) cannot be ONTOCHAIN Consortium partners or affiliated entities nor their employees or co-operators under a contractual agreement, nor a member of the ONTOCHAIN Advisory Board.

If a conflict of interest is discovered and confirmed at the time of the evaluation process, the proposal will be considered as non-eligible and will not be evaluated.

3.7 OTHER

Each Applicant must confirm:

o   It is not under liquidation or is not an enterprise under difficulty accordingly to the Commission Regulation No 651/2014, art. 2.18,

o   Its project is based on the original works and going forward any foreseen developments are free from third party rights, or they are clearly stated,

o   It does not receive extra funding for the development of its proposal from any other public or private entity.

o It is not excluded from the possibility of obtaining EU funding under the provisions of both national and EU law, or by a decision of both national or EU authority,

o Via the principal investigator that he/she agrees with the terms presented in Annex 1-Indicative Sub-grant Agreement Form.

4   EVALUATION PROCESS

4.1 PROPOSAL EVALUATION AND ACCESS TO THE ONTOCHAIN FUNDING

Proposals are submitted in a single stage and the evaluation process is composed of three stages as presented hereafter.

o Stage 1: Admissibility & eligibility check

o Stage 2: Proposals evaluation

o Stage 3: Online interviews and final selection
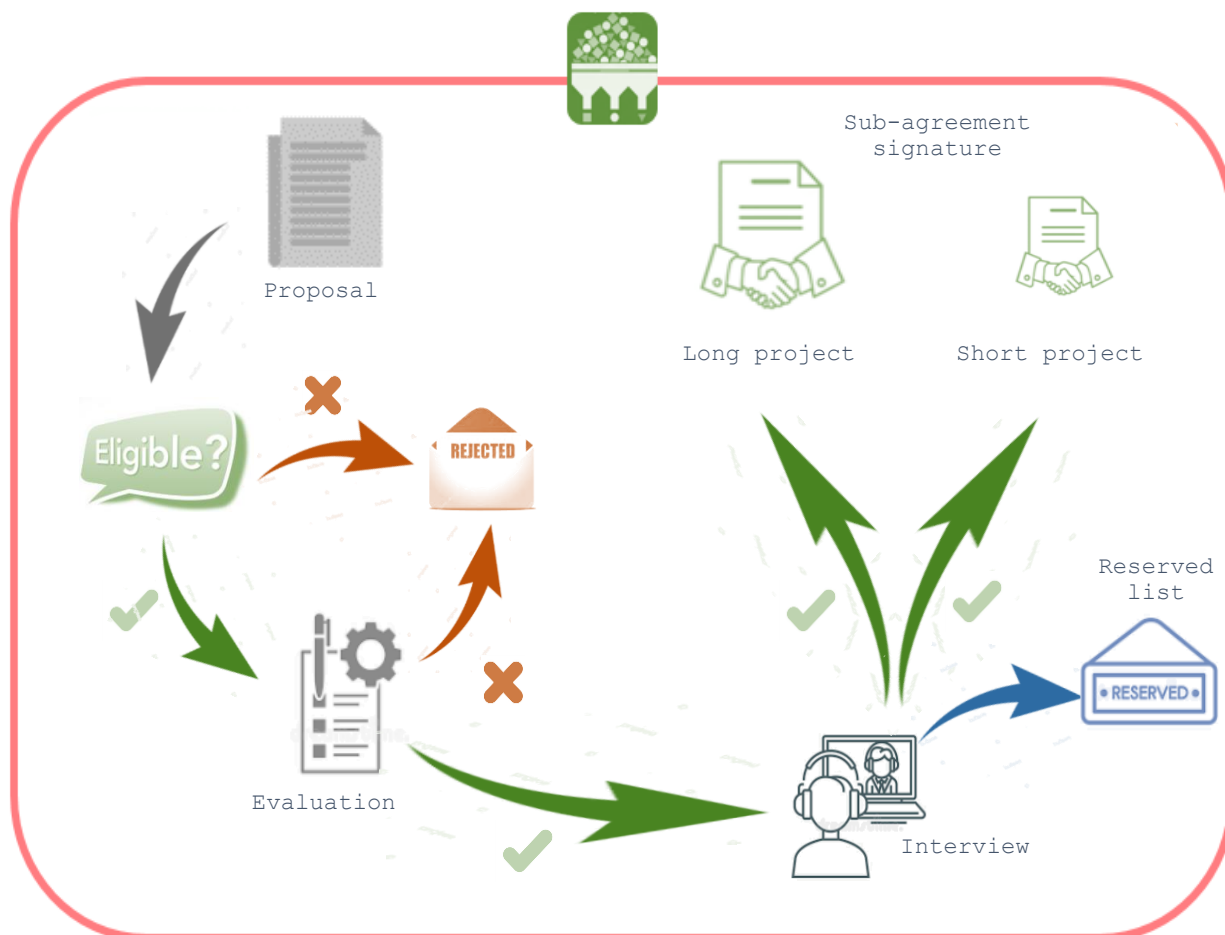
4.1.1 Admissibility and eligibility check

Admissibility and eligibility criteria for each proposal are checked by the ONTOCHAIN Consortium staff. A proposal may be declared ineligible or inadmissible at any stage.

To be considered admissible, a proposal must be:

o Submitted in the electronic submission system before the call deadline;

o Compliant with the specific eligibility conditions set out in the relevant parts of this guide (see section 3 of this guide). The eligibility filter enable the creation of a shortlist of proposals to be evaluated;

o Readable, accessible and printable;

o Complete and include the requested administrative data, and any obligatory supporting documents specified in the call (following the template presented in Annex 2 and in Annex 3 if necessary);

o Include the research proposal description. Applicants must follow the template and instructions for drafting the research proposal included in this guide (Annex 3). A proposal will only be considered eligible if its content corresponds specifically to the topics of the ONTOCHAIN Call 2 or is proposed as "open topic" and demonstrates that it aims to advance the state of the art and prototyping activities to build the ONTOCHAIN Framework.

4.1.2 Proposal evaluation

The evaluation of proposals is carried out by the ONTOCHAIN Consortium with the assistance of independent experts. ONTOCHAIN Consortium staff ensures that the process is fair and in line with the principles contained in the European Commission's rules on Proposal submission and evaluation. To facilitate the independent experts and the evaluation process, the EasyChair platform (https://easychair.org/) will be used.

Experts perform evaluations on a personal basis, not as representatives of their employer, their country or any other entity. They are required to be independent, impartial and objective, and to behave throughout in a professional manner. They sign an expert contract, including a declaration of confidentiality and absence of conflict of interest, before beginning their work.

All experts must declare beforehand any known conflicts of interest, and must immediately inform the ONTOCHAIN Consortium staff if they detect a conflict of interest during the course of the evaluation. The expert contract also requires experts to maintain strict confidentiality with respect to the whole evaluation process. They must follow any instruction given by the ONTOCHAIN Consortium to ensure this. Under no circumstance may an expert attempt to contact an applicant on his/her own account, during the evaluation process. Confidentiality rules must be adhered to at all times before, during and after the evaluation.

Each proposal is evaluated by a set of 2 experts (one from the ONTOCHAIN Consortium and one external) according to the following criteria:

1-Excellence and innovation (40% weighting)
o   Clarity, pertinence, soundness of the proposed solution in the ONTOCHAIN context and credibility of the proposed methodology
o   Extent that the proposed work is beyond the state of the art, and demonstrates innovation potential in relation to ONTOCHAIN objective (e.g. ground-breaking objectives, novel concepts and approaches, new products, services or business and organisational models)
o   Excellence/Capacity of the applicant

2-Expected impact and value for money (30% weighting)
o   Contribution to establishing and strengthening a durable software ecosystem to achieve trustworthy content handling and information exchange as well as trustworthy service exchange in the next generation Internet/social networks
o   Impact of the innovation on the needs of European and global markets
o   Quality of the proposed measures to exploit and disseminate the project results (including management of IPR), and to manage research data where relevant in the context of ONTOCHAIN

3-Project Implementation (30% weighting)
o   Quality and effectiveness of the work plan, including extent to which the resources assigned to the work are in line with its objective and deliverables
o   Integration capacity in the overall ONTOCHAIN ecosystem

The experts will score each award criterion on a scale from 0 to 5 (half point scores may be given):

0=**Proposal** fails to address the criterion or cannot be assessed due to missing or incomplete information.

1=**Poor**, criterion are inadequately addressed or there are serious inherent weaknesses

2=**Fair**, proposal broadly addresses the criterion but there are significant weaknesses.

3=**Good**, proposal addresses the criterion well, but a number of shortcomings is present.

4=**Very good**, proposal addresses the criterion very well but a small number of shortcomings is present.

5=**Excellent**, the proposal successfully addresses all relevant aspects of the criterion. Any shortcomings are minor.

For each criterion, the minimum threshold is 3 out of 5 points. The default overall threshold, applying to the sum of the three individual scores with the corresponding weight each, is 10.

Each evaluator establishes an individual evaluation report. Following the individual evaluations by the 2 experts, a consensus activity, typically mediated by the evaluation tool is organised between the 2 experts to find a consensus between them on the quality of the proposal based on the 2 evaluation reports. Comments and scores are validated by the 2 experts in a consolidated evaluation report. The result of this phase lead to a ranking list per each of the 6 topics.

Where necessary, an additional review of projects for which there was a lack of consensus in terms of scoring by individual evaluators or for which additional clarifications are required is undertaken by the ONTOCHAIN topic referent, member of the ONTOCHAIN Consortium staff.

The ONTOCHAIN consortium then formally approves the ranking list and the top 18-24 projects (aiming at 3 projects per topic, but considering up to 4 when ranked higher than projects of subsequent topic(s)) will be

selected for the last evaluation stage: the online pitching and interview session.

Regarding the communication of the results, each applicant will receive via e-mail a letter informing of the decision whether a rejection decision or an invitation to the online pitching and interview session.

4.1.3 Online interview and final selection

The top projects per topic at the end of the proposal evaluation stage will be invited to the final selection stage, which involves a pitch presentation and a Q&A session.
The interview aims to deeply understand the project concept and centrality to the ONTOCHAIN vision, team skills & competencies, capacity and willingness to exploit the results under a commonly agreed plan. They will be carried out by the evaluation board composed of the ONTOCHAIN topics referents and the ONTOCHAIN Advisory Board members. On the basis of 10 minutes pitching and 20 minutes of Q&As, the evaluation committee will assess the finalist project proposals against the following criteria:

o   Credibility of proposed project outcomes: Based on the explanations of the proposed solutions, implementation plan, and evaluation of the overall expected value of each project proposal.

o   Value for money: Significance of the project outcomes for ONTOCHAIN with respect to the project duration.

o   Collaborative Spirit/Commitment: Evidence of the applicant's willingness to enter the ONTOCHAIN community/ecosystem and commitment to get involved in the future.

o   Business compatibility: Understand early exploitation plans and compatibility check against joint overall exploitation plans for ONTOCHAIN platform.

In conclusion,

o   6 proposals will be selected to sign a sub-grant agreement for large project implementation (10 months)

o   6 proposals will be selected to sign a sub-grant agreement for small project implementation (5 months)

o   Remaining proposals (up to 12) will be maintained on a reserve list and potentially be later admitted in case of withdrawal or failure of one the large or small projects to successfully complete any phase of the contract signing process.

The list of selected projects is then submitted to the European Commission for final screening and validation.

4.1.4 Scientific misconduct and research Integrity

Issues of scientific misconduct and research integrity are taken very seriously. In line with the Horizon 2020 Rules for Participation, appropriate action such as disqualification of the application, termination of the Grant Agreement Preparation phase or, if the Grant Agreement has been signed, the implementation of liquidated damages and financial penalties, suspension of payments, recoveries and termination of the Grant Agreement, will be taken against any applicants/beneficiaries found to have misrepresented, fabricated or plagiarised any part of their proposal.

4.2 THE NEGOTIATION PROCESS

The objective of the negotiations is to fulfil the legal requirements between the ONTOCHAIN consortium and each selected project of the call. It covers essentially the status information of the beneficiaries. The legal requirements for legal entities and natural persons are provided in the table hereafter.

For legal entities	For natural persons
A legal existence: Company Register, Official Journal and so forth, showing the name of the organization, the legal address and registration number and, if applicable, a copy of a document proving VAT registration (in case the VAT number does not show on the registration extract or its equivalent) **Specifically for SMEs:** 1. A proof of the SME condition is required: - If the applicant has been fully validated as an SME on the Beneficiary Register of the H2020 Participant Portal, the PIC number must be provided. - If the applicant has not been fully validated as an SME on the H2020 Participant Portal, the following documents will be required to prove the status as an SME: 2. In the event the beneficiary declares being non-autonomous, the balance sheet and profit	1. A copy of the ID-card or passport of participant(s) in the project team will be required. 2. A proof for each participant in the project that (s)he is legally established and working in an eligible country (see section 3.2).

and loss account (with annexes) for the last period for upstream and downstream organizations is required.

3. Status Information Form. It includes the headcount (AWU), balance, profit & loss accounts of the latest closed financial year and the relation, upstream and downstream, of any linked or partner company.

4. Supporting documents. In cases where either the number of employees or the ownership is not clearly identified: any other supporting documents which demonstrate headcount and ownership such as payroll details, annual reports, national regional, association records, etc.

Bank account information:

The account where the funds will be transferred will be indicated via a financial information form signed by the entity, individuals and the bank owners. The holder of the account will be the legal entity and/or all the individuals or the coordinator of the group on its own (consortium of legal entities or consortium of legal entities and natural persons) if allowed by the other team members.

Sub-grantee funding agreement:

Signed between the ONTOCHAIN Consortium (represented by its coordinator European Dynamics), and the beneficiary/ies.
Have a careful look to the document in Annex 1.

The information request, by the ONTOCHAIN consortium will be done including deadlines. Failing to meet the deadlines requested will directly end up the negotiation process.

4.3 MONITORING PROCESS ALL ALONG THE SUB-PROJECTS DURATION

Whatever the duration of the projects (10 months or 5 months), to monitor the progress and proper evolution of the selected Third Parties, they

will have to attend several mandatory internal events organised with the ONTOCHAIN Consortium. Indicatively they are the following:

o Kick-off event devoted to knowing the different Third Parties and their foreseen contribution to ONTOCHAIN.

o Meeting for the set-up of clear KPIs that will be linked to the funding of the selected Third Parties.

o Midterm event devoted to the follow up of the progress of the Third Parties according to the defined KPIs with pitch contest where the Third Parties will present their projects outcomes in particular their prototype and their deployment scenarios.

o Final event with pitch contest where the Third Parties will present their solution in particular their modularised software components ready for distribution.

5   FINANCIAL SUPPORT

5.1   INDICATIVE DISTRIBUTION OF THE FUNDS

Selected teams will become part of the ONTOCHAIN programme and will go through an exhaustive sequential process which will last for large projects 10 months and 5 months for small ones. The maximum amount of the fund will vary depending on the type of team (See Section 3.1 Type of Beneficiaries) as indicated in the table below and providing that all of the phases have been completed.

Type of team	Maximum funding	
	Small projects	Large projects
Team of natural persons	56 250€	108 750€
Legal entity or consortium of legal entities or combination of legal entities and natural persons	75 000€	145 000€

Whatever the duration of the project, payments will be done in 3 instalments based on concrete results. A detailed evaluation process

will be presented in the Open Call 2 guide for implementation for the related periods.

- o **Beginning of the implementation and Pre-financing:**

  During the first weeks of the project implementation, each team will define with their coaches, a set of clear and objective KPIs to be achieved and linked with the funding. These KPIs are different for each team and are related to the solution to be implemented. These KPIs will help measure the progress if any, but also the commitment and involvement of the teams (i.e. attending periodic call meetings with the coaches, meeting the deadlines for reporting, etc.). After this KPIs definition, a pre-financing of 30% will be released.

- o **Mid-term review and 2nd payment:**

  At midterm of the project implementation, the coaches will assess the KPI's percentage of execution of the project. A 100% completion of the KPIs for the related period will unlock the total of the 2nd payment which is 30% of the total amount. A lower completion of the tasks will launch the proportional payment. If the KPIs for the related period are met by less than 50%, the payment will be retained until KPIs for the period are assessed as completely reached. If less than 25%, the teams will be automatically disqualified from the process.

- o **Final review and third payment:**

  At the end of the project implementation, third parties will be paid according to their overall completion of KPIs. A final event will be used to evaluate third parties on a face to face pitch contest. The third parties will present their implemented solution, and their business plan in the context of ONTOCHAIN.

  A panel of evaluators consisting of the ONTOCHAIN Consortium and Advisory Board members, will assess the teams to release the final payment (remaining 40%). Only in the case of an underperformance below of a 25% the team will be disqualified, and no further payment released.

5.2 SUMMARY OF THE FUNDING PER TYPE OF BENEFICIARY

	Small projects			Large projects		
	Pre-financing 30% of the total funding	Interim Payment 30% of the total funding	Final Payment 40% of the total funding	Pre-financing 30% of the total funding	Interim Payment 30% of the total funding	Final Payment 40 % of the total funding
Indicative dates	M1	M3	M5	M1	M5	M10
Team of Natural persons	16 875€	16 875€	22 500€	32 625€	32 625€	43 500€
Legal Entity(ies) or combination of legal entities or combination of legal entity (ies) and individual(s)	22 500€	22 500€	30 000€	43 500€	43 500€	58 000€

These numbers are indicatives, detailed payment schedule and payment conditions will be settled in the Sub-grant Agreement (Annex 1) at the time of the signature.

5.3 ORIGIN OF THE FUNDS AND SPECIFIC PROVISION REGARDING MULTIPLE BENEFICIARIES

Any selected proposer will sign a dedicated Sub-Grantee Funding Agreement (Annex 1) with the ONTOCHAIN project coordinator (on behalf of ONTOCHAIN Consortium).

o **Specific provision regarding contracting in case of multiple beneficiaries**

In the case of projects with **multiple beneficiaries** (Team of natural persons, combination of legal entities, combination of legal entities and individual(s)), **a Team/Consortium Agreement that designates among other the Coordinator/Authorized representative of the Team/Consortium**

has to be adopted and signed by the multiple beneficiaries prior to the signature of the **ONTOCHAIN Sub grantee Agreement**.

The Coordinator/Authorized representative of the Team/Consortium signs the ONTOCHAIN Sub grantee Agreement on behalf of the multiple beneficiaries.

The Coordinator /Authorized representative receives the funding and must distribute the payments between the beneficiaries according to the conditions set in the Team/Consortium Agreement.

The funds attached to the Sub-Grantee Funding Agreement come directly from the funds of the European Project ONTOCHAIN, and the ONTOCHAIN consortium is managing the funds according to the Grant Agreement Number 957338 signed with the European Commission.

As will be indicated in the Sub-Grantee Funding Agreement, this relation between the sub-grantees and the European Commission through ONTOCHAIN project carries a set of obligations to the sub-grantees with the European Commission. It is the task of the sub-grantees to accomplish them, and of the ONTOCHAIN consortium partners to inform about them.

6 PREPARATION AND SUBMISSION OF THE PROPOSALS

The submission will be done through the F6S platform (https://www.f6s.com/ontochain-open-call-2/apply) which is directly linked with the ONTOCHAIN Programme. The applicants are required to register a profile at F6S to be able to submit a proposal.

The documents that will be submitted are:

o **Application form (Annex 2):** administrative questions to be completed directly in the F6S platform. In addition, some general questions for statistic purpose and tick boxes to be clicked by the third parties confirming they have read the conditions and agree with the conditions defined in this document. In addition, an Annex 4 will be uploaded in case that more than 3 applicants participate as individuals (natural persons) or/and more than 3 applicants participate as organisations (Legal entities) filled with the information about the applicant(s) that do not fit in the application form.

o **Proposal description (Annex 3):** document in PDF format containing the description of the project. It will include three different sections:

(1) Project Summary,

(2) Organisation background,
(3) Detailed proposal description.

The project proposals must strictly adhere to the template provided by the ONTOCHAIN consortium via the F6S platform, which defines sections and the overall length.

Participants are requested to carefully read and follow the instructions in the form. Evaluators will be instructed not to consider extra material in the evaluation.

Additional material, which has not been specifically requested in the online application form, will not be considered for the evaluation of the proposals. Data not included in the proposal will not be taken into account.

It is strongly recommended not to wait until the last minute to submit the proposal. Failure of the proposal to arrive in time for any reason, including communication delays, automatically leads to rejection of the submission. The time of receipt of the message as recorded by the submission system will be definitive.

ONTOCHAIN offers a dedicated support channel available for proposers at ontochain@ngi.eu for requests or inquiries about the submission system or the call itself. Those received after the closure time of the call will neither be considered nor answered.

7 APPLICANTS COMMUNICATION FLOW

7.1 GENERAL COMMUNICATION PROCEDURE

The applicants will receive communications after each step of the evaluation process indicating if they passed or not. A communication will also be sent to applicants rejected, including the reasons for the exclusion.

7.2 APPEAL PROCEDURE

If, at any stage of the evaluation process, the applicant considers that a mistake has been made or that the evaluators have acted unfairly or have failed to comply with the rules of this ONTOCHAIN Open Call, and that her/his interests have been prejudiced as a result, the following appeal procedures are available.

A complaint should be drawn up in English and submitted by email to: ontochain@ngi.eu

Any complaint made should include:

o   Contact details;

o   The subject of the complaint;

o   Information and evidence regarding the alleged breach.

Anonymous complaints or those not providing the mentioned information will not be considered.

Complaints should also be made within five (calendar) days since the announcement of the evaluation results to the applicants.

As a general rule, the ONTOCHAIN Team will investigate the complaints with a view to arriving at a decision to issue a formal notice or to close the case within no more than twenty days from the date of reception of the complaint, provided that all the required information has been submitted by the complainant. Whenever this time limit is exceeded, the ONTOCHAIN Consortium will inform the complainant by email of the reasons for the unforeseen delay and the subsequent steps.

8   SUPPORT SERVICES

Selected participants will receive support with the following services:

o   **Access to Infrastructure**: All the teams selected will have access if willing and needing so, to the iExec blockchain platform, for their off-chain developments (see 8.1 for more details) and to the MyIntelliPatent web application, populated with updated blockchain applications, for patent analysis and monitoring (see 8.2 for more details).
   The use of the iExec platform and of the MyIntelliPatent web application are not mandatory. Applicants shall bear in mind that interoperability of the solutions build within the ONTOCHAIN project is a paramount requirement.

- o **Business support services**: To support the teams to exploit their use cases and successfully reach the market, different trainings and sessions with mentors will be organised. Depending on the team profile, aspects such as Value Proposition, pitching or IPR (among others) will be explored.

- o **Communication support services**: Major visibility, promotion and networking opportunities are offered as part of the ONTOCHAIN project and the Next Generation Internet initiative. Selected teams will:
  - o have access to communication tool kits and co-branding materials,
  - o be showcased in the ONTOCHAIN project website,
  - o be interviewed and promoted on relevant media channels
  - o be invited to participate in top events
  - o connect with a vibrant ecosystem of innovators, investors, industry players and public authorities.

8.1 THE IEXEC COMPUTING PLATFORM

The iExec decentralized cloud marketplace https://iex.ec/ connects cloud resource sellers with cloud resource buyers, encouraging an ecosystem of decentralized and autonomous, privacy-preserving application, which allows to support a decentralized marketplace of applications, data and resources through decentralized cloud computing in Ethereum.

The platform supports public, private and federated blockchain solutions.

The platform has been developed with more than four years of efforts by iExec https://iex.ec/about-us/ , an innovative SME French company whose founders came from the Inria and the Chinese Academy of Science.

The iExec software, which can be used by ONTOCHAIN participants to base their evolutions, is available under the open source license Apache 2.0.

For more information about the code and sources you can access: http://github.com/iexecBlockchainComputing/

For example Dapps, you can access:

https://github.com/iExecBlockchainComputing/iexec-apps

A more detailed information about the platform is provided on the technical document "ONTOCHAIN background" available at https://ontochain.ngi.eu/apply

8.2 THE PATENT WEB APPLICATION MYINTELLIPATENT

MyIntelliPatent (https://www.intellisemantic.com/patent-solution.html) is a web application developed by IntelliSemantic (https://www.intellisemantic.com/) to analyse and monitor technology specific collection of patents.

Patents are a very interesting source of technical information, because they have to disclose all technical details required to replicate the invention, when the patent expires, and include the status of art and problem solved.

Moreover, the aggregate analysis of patents in a specific technical domain allows to timely discover technology trends, opportunities and threads.

Blockchain is a quickly evolving area of patenting: the paper "Blockchain patent landscaping: An expert based methodology and search query" by Nigel Clarke and alii, World Patent Information June 2020 https://doi.org/10.1016/j.wpi.2020.101964 mentions that the number of patents in the year 2018 doubled any 3 or 4 months.

Hence for the project ONTOCHAIN, IntelliSemantic will set up a dedicated and password-protected server for analysing blockchain-related patent collections, with a quarterly update of collections.

The interface exposed to the users allows three levels of views.

At the higher level view, users can access to summary tables, as the table showing the number of patents by technology (e.g. "smart contracts").
By clicking on a specific number (e.g. corresponding to "smart contracts"), the user accesses the list of patents associated to the specific feature selected.
Finally, by clicking on a specific patent, the user accesses to all details of the patent, as status of the art mentioned.

By using this interface, users can easily navigate patent information to identify the state of the art and also to make a preliminary check whether to apply for a patent or not; we should not overlook this

possibility. For more information, you can refer to the European IPR help desk, as for example IPR and Software http://iprhelpdesk.eu/event/webinar-ipr-software

On its side, IntelliSemantic, by using other functions, on a quarterly basis will collect, categorize, store and present to the users any new patents.

8.3 THE SPECIFICATION FROM THE 7 SELECTED PROJECTS OF OPEN CALL 1

In ONTOCHAIN open call 1, the 7 final projects are working on design specifications for the ONTOCHAIN Ecosystem. Their code will be available on the ONTOCHAIN internal GitHub repository. The solutions technologies that they proposed for the ONTOCHAIN framework are:

OntoSsivault: Gimly ID is a fully self-sovereign identity solution that brings trust and usability to users without compromising security and privacy of the ecosystem and its members. Gimly ID solution: a set of software applications and libraries that enable a fully self-sovereign identity to be managed in an ecosystem with transparent and user-friendly data consent and management and fully managed invisible cryptography for use with blockchain and other systems.

KnowledgeX (KX): KX is a platform that connects the owners of data and independent data scientists to generate knowledge and solve domain specific problems. KnowledgeX (KX) proposes to build a secure marketplace for data science, where data owners can outsource data science tasks to independent contractors without risking loss of data. Also KX project aims to track reputation decentrally to avoid a "lemons market" scenario where only low-quality data scientists and data owners interact.

Graphchain: is a framework for on-chain data management for Blockchains and was proposed as a foundational technology for ONTOCHAIN. It directly addresses the basic technological proposition of the ONTOCHAIN project, i.e., the synergy between ontologies and the Blockchain mechanisms. . GraphChain addresses a foundational technological challenge for ONTOCHAIN: storing on-chain data in native semantic formats.

CopyrightLY: the approach of this project focuses on building an authorship and rights management layer for ONTOCHAIN. It will provide a set of services to claim authorship, on both content and data. Moreover, it will be also possible to attach reuse terms to these claims, which will state the conditions to reuse the associated data or content. It is based on the combination of a set of blockchain smart contracts that

manage authorship claim, complaints and reuse terms, including offering, negotiating and agreeing on these reuse conditions.

HIBI: encompasses scalable blockchain, decentralized legal reputation and identity systems and interoperable semantic web technologies. This project formalizes human identity on the blockchain in a trustworthy, formalized, privacy preserving manner. It leverages the established EU framework for electronic identification and trust services (eIDAS) to accomplish this. HIBI will provide the root of trust for a generation of semantic web and EU based blockchain services by linking eIDAS compliant legal identities with blockchain-based key-pairs.

POC4COMMERCE: addresses the stated challenge of developing a consistent, unambiguous, and shared model supporting the semantic interoperability of the ONTOCHAIN heterogeneous stakeholders, by delivering a stack of the most appropriate ontologies for the building blocks of the ONTOCHAIN ecosystem in general and of eCommerce in particular. This project contributes to a shift towards a novel micro-economic model where individuals and companies cooperate and coordinate, deciding the allocation and utilization of resources, without third-parties intermediaries, instantiating the equilibrium between demand and supply.

REPUTABLE: This project addresses the requirements for an effective reputation system for ONTOCHAIN. Reputable has the potential to provide a cross-platform privacy aware reputation system which leverages blockchain technology to achieve decentralized, verifiable calculation of reputation scores.

For your proposal, you can find inspiration from the aforementioned. See also the ONTOCHAIN Open Call 2 document.

9   INTELLECTUAL PROPERTY RIGHTS (IPR)

9.1   IPR OWNERSHIP OF THE SUB-GRANTED PROJECTS

The ownership of all IPR created by the beneficiaries, via the ONTOCHAIN funding, will remain with them. Results are owned by the Party that generates them. The Sub-Grant Agreement (Annex 1) will introduce provisions concerning joint ownership of the results of the sub-granted projects.

9.2   COMMUNICATION OBLIGATIONS

Any communication or publication of the beneficiaries shall clearly indicate that the project has received funding from the European Union

via the ONTOCHAIN project, therefore displaying the EU and project logo on all printed and digital material, including websites and press releases. Moreover, beneficiaries must agree that certain information regarding the projects selected for funding can be used by ONTOCHAIN consortium for communication purposes.

10   SUPPORT FOR THE APPLICANTS

For more information about the ONTOCHAIN Open Calls, please check the Frequently Asked Questions (FAQs) section included at https://www.ONTOCHAIN.ngi.eu/faq.

For further information on the Open Call, in case of any doubt regarding the eligibility rules, the information that is to be provided in the Application Form, or if you encountered technical issues or problems with the Application Form, please contact ONTOCHAIN Technical Helpdesk email: ontochain@ngi.eu

11   INDICATIVE TIME LINES

Submission to the ONTOCHAIN Open Call 2 will open on the 15th July 2021 at 12:00 PM CEST and close on the 15th September 2021 at 17:00 CEST. Dates for the different phases are outlined below but may be subject to change if any modifications in the project's schedule occur.

The table below presents the indicative dates during which each phase of ONTOCHAIN Call 2 will take place.

Description	Indicative dates
Call Announcement	15th July 2021 at 12:00 PM CEST
Call closure	15th September 2021 at 17:00 CEST
Submission Deadline	15th September 2021 at 17:00 CEST
Evaluation Period	Until end of October 2021
Signature of Sub-grant Agreement	Until 15th November 2021
Small projects	From 15th November 2021 to 15th February 2022
Large projects	From 15th November 2021 to 15th July 2022

12 ANNEXES

ANNEX 1- INDICATIVE SUB-GRANT AGREEMENT FORM

ONTOCHAIN FUNDING SUBAGREEMENT

2ND OPEN CALL FOR PROPOSALS

STANDARD RESEARCH CONTRACT

TABLE OF CONTENT

1   CONTRACTING PARTIES

The rights and obligations contained in this Funding Agreement derived from the ONTOCHAIN Grant Agreement and Consortium Agreement.

This ONTOCHAIN Funding Agreement for providing financial support to the Selected Third Party, hereinafter referred to as the "Agreement", is entered into by and between:

EUROPEAN DYNAMICS LUXEMBOURG (ED), established in ……………, ……………, VAT number: ……………, represented for the purposes of signing the Agreement by ……………, legal representative of ED, hereinafter referred to as **"Cascade Funding Partner"**,

And

- *[if a legal entity]:*

[OFFICIAL NAME OF THE SELECTED THIRD PARTY (Acronym)],

VAT Number: [VAT]

Legal Status:[XXX]

PIC Number:[PIC NUMBER]

Name of the legal signatory: [Name]

Legal office address:[ADDRESS and COUNTRY]

- *[if a Team of Natural persons]:*

[FIRST AND LAST NAME OF THE NATURAL PERSON 1],

ID card/Passport Number: **[Number]**

Date of issue: **[Date]**

Tax payer identification Number: **[Number]**

Legal address:**[ADDRESS and COUNTRY]**

[FIRST AND LAST NAME OF THE OF THE NATURAL PERSON 2],

ID card/Passport Number: **[Number]**

Date of issue: **[Date]**

Tax payer identification Number: **[Number]**

Legal address:**[ADDRESS and COUNTRY]**

[FIRST AND LAST NAME OF THE OF THE NATURAL PERSON 3],

ID card/Passport Number: **[Number]**

Date of issue: **[Date]**

Tax payer identification Number: **[Number]**

Legal address:**[ADDRESS and COUNTRY]**

- *[if a Consortium of legal entities]:*

[OFFICIAL NAME OF THE SELECTED THIRD PARTY 1 (Acronym)], Project Manager and Authorized representative of the consortium,

VAT Number: **[VAT]**

Legal Status:**[XXX]**

PIC Number:**[PIC NUMBER]**

Name of the legal signatory: **[Name]**

Legal office address:**[ADDRESS and COUNTRY]**

[OFFICIAL NAME OF THE SELECTED THIRD PARTY 2 (Acronym)],

VAT Number: **[VAT]**

```
Legal Status: [XXX]

PIC Number: [PIC NUMBER]

Name of the legal signatory: [Name]

Legal office address: [ADDRESS and COUNTRY]

[OFFICIAL NAME OF THE SELECTED THIRD PARTY 2 (Acronym)],

VAT Number: [VAT]

Legal Status: [XXX]

PIC Number: [PIC NUMBER]

Name of the legal signatory: [Name]

Legal office address: [ADDRESS and COUNTRY]
```

Referred to as "**Selected Third Party**",

Hereinafter sometimes individually or collectively referred to as "**Party**" or "**Parties**".

Whereas European Dynamics SA and its partners according to the Ontochain Consortium Agreement, (hereinafter sometimes collectively referred as the "**ONTOCHAIN Beneficiaries**" and individually and alternatively referred as a "**ONTOCHAIN Beneficiary**") participate to the H2020 project entitled "**ONTOCHAIN - Trust traceable and transparent ontological knowledge on blockchain**" (hereinafter the "ONTOCHAIN Project");

Whereas the ONTOCHAIN Beneficiaries entered into a Grant Agreement N° 957338 with the European Commission (the "**Grant Agreement**" or "GA") and signed together in 2020 a Consortium Agreement with respect to the ONTOCHAIN Project (the "**Consortium Agreement**" or "CA").

Whereas the ONTOCHAIN Project involves financial support to selected third parties through a cascade funding scheme (hereinafter "**Cascade Funding**").

Whereas further to an open call for a specific research as described in Annex 1 "**ONTOCHAIN Specific Contract**", the Selected Third Party has been selected to implement such research.

Whereas the Selected Third Party will be in charge of the implementation of such research with also the participation of the ONTOCHAIN Beneficiaries identified in Annex 1 "**ONTOCHAIN Specific Contract**".

Whereas the Cascade Funding Partner is willing to provide technical and financial support to the Selected Third Party for the implementation of

such Research and the Selected Third Party is willing to receive such funding under the terms and conditions of this Agreement.

Whereas in accordance with the Grant Agreement and the Consortium Agreement, the Cascade Funding Partner shall sign an agreement with the Selected Third Party compliant with the GA and CA, after validation by the other Participating Partners.

Whereas the Cascade Funding Partner is responsible for the execution of this Agreement with the Selected Third Party and for the monitoring of the Research.

Now therefore it has been agreed as follows:

2   DEFINITIONS

Words beginning with a capital letter shall have the meaning defined in the preamble of the Agreement or in this Section:

- **Access Rights** means rights to use Results or Background in accordance with the stipulations of the H2020 General MGA – Multi and under the terms and conditions laid down in this Agreement.

- An **Affiliated Entity** of a ONTOCHAIN Beneficiary means any legal entity shown in Attachment 4 to the CA, directly or indirectly Controlling, Controlled by, or under common Control with that Party, for so long as such Control lasts;

- **Agreement** means this Funding Agreement, together with its Annexes.

- **Background** means any and all, data, information, know-how– whatever its form or nature (tangible or intangible), including any rights such as intellectual property rights – listed in Annex 1 "ONTOCHAIN Specific Contract" – that is Needed to implement the Project or exploit the Results and that is:

  - owned or controlled by a Party or a ONTOCHAIN Beneficiary prior to the date of signature of the Specific Contract (Annex 1); or

  - developed or acquired by a Party or a ONTOCHAIN Beneficiary independently from the work in the Research even if in parallel with the performance of the Research, but solely to the extent that such data, information, know-how and/or intellectual property rights are introduced into the Industrial Experiment by the owning Party

- **Controlled Licence Terms** means terms in any licence that require that the use, copying, modification and/or distribution of Software or another work ("Work") and/or of any work that is a modified version of or is a derivative work of such Work (in each case, "Derivative

Work") be subject, in whole or in part, to one or more of the following:

- o (where the Work or Derivative Work is Software) that the Source Code or other formats preferred for modification be made available as of right to any third party on request, whether royalty-free or not;
- o that permission to create modified versions or derivative works of the Work or Derivative Work be granted to any third party;
- o that a royalty-free licence relating to the Work or Derivative Work be granted to any third party.

For the avoidance of doubt, any Software licence that merely permits (but does not require any of) the things mentioned in a) to c) is not under Controlled Licence Terms (and so is under an Uncontrolled Licence).

- o **Exploitation** or **Exploit** means the use of results in further research activities other than those covered by the action concerned, or in developing, creating and marketing a product or process, or in creating and providing a service, or in standardisation activities;

- o **Financial Support** means the cash element of the financial support to be given by the Cascade Funding Partner to the Selected Third Party for the implementation of the Industrial Experiment as detailed in Annex 1 "ONTOCHAIN Specific Contract".

- o **Research** means the research detailed in Annex 1 "ONTOCHAIN Specific Contract" to be carried out by ONTOCHAIN Beneficiaries and the Selected Third Party.

- o **Participating Partners** means the entities and organisations participating in the Research, as listed in Annex 1.

3 CONDITIONS FROM THE GRANT AGREEMENT AND THE CONSORTIUM AGREEMENT REFLECTED IN THE AGREEMENT

The Cascade Funding Partner receives funding from the European Commission for organizing the Research. Under the ONTOCHAIN Grant Agreement or the Consortium Agreement, some of the obligations have to be imposed on the Selected Third Party. Those obligations are reflected in this Agreement. The specific obligations that the Selected Third Party must ensure are described in the Multi-Beneficiary General Model Grant Agreement (H2020 General MGA – Multi), available at: http://ec.europa.eu/research/participants/data/ref/h2020/mga/gga/h2020

-mga-gga-multi en.pdf, in articles 6, 22, 23, 35, 36, 38 and 46. These articles are part of the Agreement, by reference only.

The Selected Third Party acknowledges and agrees that these obligations comprised in this Agreement including Annex 1 and in the Multi-Beneficiary General Model are fully applicable to it and shall do everything that is necessary to comply with these obligations, it being understood that the Selected Third Party is only bound by this Agreement and not by the GA or CA.

4 TERMS AND CONDITIONS FOR THE FINANCIAL SUPPORT

4.1 The Selected Third Party shall take part in the Research in accordance with the state of the art. The Selected Third Party shall carry out the tasks according to the schedule set forth in Annex 1 "ONTOCHAIN Specific Contract" at the latest and shall report to the Cascade Funding Partner on the activities' progress in regular intervals as indicated in Annex 1 "ONTOCHAIN Specific Contract".

4.2 The Selected Third Party shall attend all group and individual coaching and mentoring sessions provided by the ONTOCHAIN Beneficiaries or the Cascade Funding Partner over the course of the Research.

4.3 The Cascade Funding Partner shall give Financial Support for the Research carried out by the Selected Third Party, within the limits and in accordance with the Guide for Applicants and schedule of payments specified in Annex 1 "ONTOCHAIN Specific Contract" and always subject to:

o A favourable resolution by the evaluators and coaches responsible for assessing the Project in each of the stages (a set of deliverables and KPIs will be set-up by coaches and sub-grantees and their achievement monitored during the projects' execution)

o The availability of funds in ONTOCHAIN bank account during the relevant payment period

o The prior written notice to the Selected Third Party of the date and amount to be transferred to its bank account

o Payments to the Selected Third Party will be made by the Cascade Funding Partner. In particular:

  o The Cascade Funding Partner reserves the right to withhold the payments in case the Selected Third Party does not fulfil with its obligations and tasks as per the Guide for Applicant.

- Banking and transaction costs related to the handling of any financial resources made available to the Selected Third Party by the Cascade Funding Partner shall be covered by the Selected Third Party.
- Payments will be released no later than fifteen (15) calendar days after the notification by the Cascade Funding Partner.
- The Selected Third Party is responsible for complying with any tax and legal obligations that might be attached to this financial contribution.

4.5 A written payment request must be sent by the Selected Third Party to the Cascade Funding Partner after reception of the favourable resolution by the evaluators and coaches.

4.6 The Selected Third Party shall complete in a comprehensive manner Annex 4 "Selected third party financial information" to the Agreement and shall notify any changes to the Cascade Funding Partner as soon as it has occurred. The Cascade Funding Partner shall not in any case be liable for any late payment incurred by a change in the financial identification of the Selected Third Party.

5   LIABILITY

5.1 The Selected Third Party shall comply with all applicable laws, rules and regulations, including, but not limited to safety, security, welfare, social security and fiscal laws, rules and regulations.

5.2 Selected Third Party shall not be entitled to act or to make legally binding declarations on behalf of the Cascade Funding Partner or any other ONTOCHAIN Beneficiary and shall indemnify all of the latter from any third party claim resulting from a breach of these obligations.

5.3 The contractual liability of the Cascade Funding Partner under this Agreement shall in any case be limited to the amount of the Financial Support provided to the Selected Third Party hereunder and the Cascade Funding Partner. The Cascade Funding Partner shall not in any case be liable for any indirect or consequential damages such as:

- loss of profits, interest, savings, shelf-space, production and business opportunities;
- lost contracts, goodwill, and anticipated savings;
- loss of or damage to reputation or to data;
- costs of recall of products; or

o any other type of indirect, incidental, punitive, special or consequential loss or damage.

5.4 This limitation of liability shall not apply in cases of wilful act or gross negligence.

5.5 The Selected Third Party shall fully and exclusively bear the risks in connection with the Research for which Financial Support is granted by the Cascade Funding Partner. The Selected Third Party shall indemnify the ONTOCHAIN Beneficiaries and the Cascade Funding Partner for all damages, penalties, costs and expenses which the ONTOCHAIN Beneficiaries or the Cascade Funding Partner as a result thereof would incur or have to pay to the European Commission or any third parties with respect to such Research financially supported and/or for any damage in general which the ONTOCHAIN Beneficiaries or the Cascade Funding Partner incur as a result thereof. In addition, should the European Commission have a right to recovery against the Cascade Funding Partner or another ONTOCHAIN Beneficiary regarding the Financial Support granted under this Agreement, the Selected Third Party shall pay the sums in question in the terms and the date specified by the Cascade Funding Partner. Moreover, the Selected Third Party shall indemnify and hold the ONTOCHAIN Beneficiaries and the Cascade Funding Partner, their respective officers, directors, employees and agents harmless from and against all repayments, loss, liability, costs, charges, claims or damages that result from or arising out of any such recovery action by the European Commission.

5.6 In respect of any information or materials (including Results and Background) supplied by one Party to another Party or to a ONTOCHAIN Beneficiary, or by a ONTOCHAIN Beneficiary involved in the applicable Research to a Party, no warranty or representation of any kind is made, given or implied as to the sufficiency, accuracy or fitness for purpose nor as to the absence of any infringement of any proprietary rights of third parties.

Therefore,

o the recipient shall in all cases be entirely and solely liable for the use to which it puts such information and materials (including Results and Background), and

o there is no liability in case of infringement of proprietary rights of a third party resulting from any Access Rights.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 957338

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6   INTELLECTUAL PROPERTY RIGHTS POLICY

The Selected Third Party acknowledges the terms of the "Intellectual Property Rights Policy" defined hereinafter. The Selected Third Party agrees that it will comply with the ONTOCHAIN Intellectual Property Rights Policy to ensure that the Cascade Funding Partner will always be able to comply with such terms towards the other ONTOCHAIN Beneficiaries.

"**Intellectual Property**" designates the Background and the Results (foreground) generated in the project.

The background of the third party(ies) is described in Annex 1 "ONTOCHAIN Specific Contract" Article 1.

The background of ONTOCHAIN partners is described in Annex 4 "ONTOCHAIN consortium background".

6.1   GENERAL PRINCIPLE REGARDING OWNERSHIP

Results are owned by the Party or by the ONTOCHAIN Beneficiary that generates them.

6.2   JOINT RESULTS

As requested in the Consortium Agreement signed between the ONTOCHAIN Beneficiaries, among which the Cascade Funding Partner, all Results generated by the Selected Third Party in the course of the Research with one or several ONTOCHAIN Beneficiaries shall be jointly owned.

Due to the mentoring and advising processes from the ONTOCHAIN Beneficiaries towards the development of the proposal by the Cascade Funding Partner, a 20% of ownership of any research and development activity outcomes excluding intellectual property rights is assigned to the ONTOCHAIN beneficiaries after the end of the subproject.

Where such Joint Result is covered by intellectual property rights, the joint owners shall execute a joint ownership agreement regarding the allocation and the terms and conditions of Exploitation of the Joint Results as soon as possible and before any industrial or commercial Exploitation.

Unless otherwise agreed:

o each of the joint owners shall be entitled to use their Jointly Owned Results for internal non-commercial research activities and

educational purposes on a royalty-free basis, and without requiring the prior consent of the other joint owner(s), and

o each of the joint owners shall be entitled to otherwise exploit the Jointly Owned Results, including by granting non-exclusive licenses to third parties (without any right to sub-license), if the other joint owners are given:

(a) at least 45 calendar days advance notice; and

(b) Fair and Reasonable conditions compensation taking into account the specific circumstances of the request for access, for example the actual

or potential value of the results or background to which access is requested and/or the scope, duration or other characteristics of the exploitation envisaged.

The joint owners shall agree on all protection measures and the division of related cost in advance.

6.3 ACCESS RIGHTS

6.3.1 For the purpose of this article 6.3, Background shall mean the Background as listed in the Research Contract and validated by the Participating Partners for the concerned Research.

The Selected Third Party endeavours to detail in Annex 1 "ONTOCHAIN Specific Contract" Article 1 the Intellectual Property under Controlled License Terms that will be used in the Research.

During the Research, the intended introduction of Intellectual Property (including, but not limited to Software) under Controlled Licence Terms in the Research requires the prior approval of the Cascade Funding Partner and of the Participating Parties to implement such introduction.

6.3.2 Due to provisions of the Consortium Agreement signed between the ONTOCHAIN Beneficiaries, Access Rights to Background and Results may be requested by the Selected Third Party from a Participating Partner only in the following case and if the following conditions are fulfilled:

Selected Third Parties have Access Rights to Background and Results if and when such Access Rights have been agreed upon on a case-by-case basis in a separate written agreement between the Selected Third Party and the ONTOCHAIN Beneficiary/ies concerned. Such separate agreement shall not affect any legitimate right of another ONTOCHAIN Beneficiary nor violate any of the provisions as set out in the GA and/or CA. The

separate agreement shall ensure that the other ONTOCHAIN Beneficiaries have access to the Background and Results of the Selected Third Parties if needed for the Implementation of the Project or Exploitation of its own Results.

Selected Third Parties which obtain Access Rights in return shall fulfil confidentiality obligations at least as stringent as the obligations stated in the Consortium Agreement to be arranged in a separate confidentiality agreement between the Selected Third Parties and the ONTOCHAIN Beneficiaries concerned.

Access Rights may be requested by the Selected Third Party up to twelve (12) months after the end of the Research.

6.3.3 The Selected Third Party shall grant Access Rights on its Background and/or Results to the ONTOCHAIN Beneficiaries as far as such Background and/or Results are needed for implementation of the Research and/or implementation of the ONTOCHAIN Project, and/or exploitation of the ONTOCHAIN Beneficiaries' Results.

> 6.3.3.1 Where any ONTOCHAIN Beneficiary has Access Rights on the Selected Third Party's Results and/or Background for implementation of the Research, such Access Rights shall be granted on a royalty-free basis.

> 6.3.3.2 Where Access Rights on Results and/or Background of the Selected Third Party are needed by ONTOCHAIN Beneficiaries in order to implement the ONTOCHAIN Project:
> o Access Rights to the Selected Third Party's Results shall be granted on a royalty-free basis and shall comprise the right to sublicense such Results to the other selected third parties participating in the ONTOCHAIN Project;

> o Access Rights to the Selected Third Party's Background shall be granted only if such Background is needed to use the Selected Third Party's Results to implement the ONTOCHAIN Project. Such Access Rights shall be granted on a royalty-free basis, and shall comprise the right to sublicense such Background to the other selected third parties participating in the research under the ONTOCHAIN project:

> o as far as these other selected third parties need to have access to such Background to use the Selected Third Party's Results to carry out their own research under the ONTOCHAIN Project; and

> o if no major interest opposes.

> 6.3.3.3 Where Access Rights on the Selected Third Party's Results and/or Background are needed by ONTOCHAIN Beneficiaries in order to exploit their Results, the conditions on which Access Rights will be

granted shall be negotiated between the Selected Third Party and the ONTOCHAIN Beneficiary concerned and agreed in a separate written agreement.

Access Rights may be requested by the ONTOCHAIN Beneficiaries up to twelve (12) months after the end of the Research.

6.4 OPEN SOURCE

Any Result (including documentation, source code and application programming interfaces) shall be published with a permissive open source licence (e.g., Apache v2.0 or equivalent) within the ONTOCHAIN file repository (ies).

7 CONFIDENTIALITY

7.1 All information in whatever form or mode of communication, which is disclosed by a Party or an ONTOCHAIN Beneficiary (the "Disclosing Partner") to the other Party or to any ONTOCHAIN Beneficiary (the "Recipient") in connection with the Project during its implementation and which has been explicitly marked as "confidential" at the time of disclosure, or when disclosed orally has been identified as confidential at the time of disclosure and has been confirmed and designated in writing within 15 calendar days from oral disclosure at the latest as confidential information by the Disclosing Party, is "Confidential Information".

7.2 The Recipients hereby undertake for a period of four (4) years after the end of the Research:

o not to use Confidential Information otherwise than for the purpose for which it was disclosed;

o not to disclose Confidential Information to any third party (other than to its Affiliated Entities and Subcontractors) without the prior written consent by the Disclosing Partner, wherein the Recipient must ensure that an arrangement is in place prior to such disclosure that subjects the Affiliated Entities and/or Subcontractors to provisions at least as strict as provided in this Section 10;

o to ensure that internal distribution of Confidential Information by a Recipient, its Affiliated Entities, Subcontractors shall take place on a strict need-to-know basis; and

o to return to the Disclosing Partner, or destroy, on request all Confidential Information that has been disclosed to the Recipients including all copies thereof and to delete all information stored in a machine readable form to the extent practically possible. The Recipients may keep a copy to the extent it is required to keep,

archive or store such Confidential Information because of compliance with applicable laws and regulations or for the proof of on-going obligations provided that the Recipient comply with the confidentiality obligations herein contained with respect to such copy for as long as the copy is retained.

7.3 The recipients shall be responsible for the fulfilment of the above obligations on the part of their employees, its Affiliated Entities or third parties involved in the Project having access to Confidential Information pursuant to this Section and shall ensure that they remain so obliged, as far as legally possible, during and after the end of the Project and/or after the termination of the contractual relationship with the employee or third party.

7.4 The above shall not apply for disclosure or use of Confidential Information, if and in so far as the Recipient can show that:

o the Confidential Information has become or becomes publicly available by means other than a breach of the Recipient's confidentiality obligations;

o the Disclosing Partner subsequently informs the Recipient that the Confidential Information is no longer confidential;

o the Confidential Information is communicated to the Recipient without any obligation of confidentiality by a third party who is to the best knowledge of the Recipient in lawful possession thereof and under no obligation of confidentiality to the Disclosing Partner;

o the disclosure or communication of the Confidential Information is foreseen by provisions of the Multi-Beneficiary General Model Grant Agreement;

o the Confidential Information, at any time, was developed by the Recipient completely independently of any such disclosure by the Disclosing Partner;

o the Confidential Information was already known to the Recipient prior to disclosure without any confidentiality obligation to the Disclosing Partner, or

o the Recipient is required to disclose the Confidential Information in order to comply with applicable laws or regulations or with a court or administrative order.

7.5 The Recipient shall apply the same degree of care with regard to the Confidential Information disclosed within the scope of the Project as with its own confidential and/or proprietary information, but in no case less than reasonable care.

7.6 Each Party shall promptly advise the other Party or the concerned ONTOCHAIN Beneficiary in writing of any unauthorised disclosure,

misappropriation or misuse of Confidential Information after it becomes aware of such unauthorised disclosure, misappropriation or misuse.

7.7 If any Party becomes aware that it will be required, or is likely to be required, to disclose Confidential Information in order to comply with applicable laws or regulations or with a court or administrative order, it shall, to the extent it is lawfully able to do so, prior to any such disclosure:

o notify the Disclosing Partner, and

o comply with the Disclosing Partner's reasonable instructions to protect the confidentiality of the information.

8 DISSEMINATION

o Each Party agrees that any dissemination activity (including publications, presentations, contributions to any standards organisation or open source code) by the Selected Third Party is subject to the prior written approval of the other Participating Partners and upon proper citation of the ONTOCHAIN project (cf. paragraph 6.4).

o By 30 days from its dissemination request the Selected Third Party will receive the approval to disseminate or the indication of how/when to proceed in the requested dissemination activity. The Selected Third Party has to be aware that a premature dissemination activity could negatively affect IPRs, as patent applications. Moreover, dissemination activities should be compliant with suggested EU commission guidelines about open access publishing.

o The Selected Third Party and the other ONTOCHAIN Beneficiaries are entitled to include the main issues and information regarding the Research in their reporting towards the European Commission, subject to prior written notification to the Cascade Funding Partner.

o Unless explicitly agreed by the Cascade Funding Partner, any dissemination of results (in any form, including electronic) must display the NGI emblem and the following text: "This project has received funding from the European Union's Horizon 2020 research and innovation program through the NGI ONTOCHAIN program under cascade funding agreement No 957338."

9   CHECKS AND AUDITS

9.1 The Selected Third Party undertakes to provide any detailed information, including information in electronic format, requested by the European Commission or by any other outside body authorised by the European Commission to check that the Research and the provisions of this Agreement are being properly implemented.

9.2 The Selected Third Party shall keep at the European Commission disposal all original documents, especially accounting and tax records, or, in exceptional and duly justified cases, certified copies of original documents relating to the Agreement, stored on any appropriate medium that ensures their integrity in accordance with the applicable national legislation, for a period of five years from the date of payment of the balance specified in the grant agreements.

9.3 The Selected Third Party agrees that the European Commission may have an audit of the use made of the Financial Support carried out either directly by the European Commission staff or by any other outside body authorised to do so on its behalf. Such audits may be carried out throughout the period of implementation of the Agreement until the balance is paid and for a period of five years from the date of payment of the balance. Where appropriate, the audit findings may lead to recovery decisions by the European Commission.

9.4 The Selected Third Party undertakes to allow European Commission staff and outside personnel authorised by the European Commission the appropriate right of access to the sites and premises of the Selected Third Party and to all the information, including information in electronic format, needed in order to conduct such audits.

9.5 In accordance with Union legislation, the European Commission, the European Anti-Fraud Office (OLAF) and the European Court of Auditors (ECA) may carry out spot checks and inspections of the documents of the Selected Third Party, and of any recipient of Cascade Finding, including at the premises of the Selected Third Party, in accordance with the procedures laid down by Union law for the protection of the financial interests of the Union against fraud and other irregularities. Where appropriate, the inspection findings may lead to recovery decisions by the European Commission. The Articles 22 and 23 of the Multi-Beneficiary General Model Grant Agreement, also apply to the Selected Third Party.

10 EXPLOITATION

As also mentioned in the previous chapter, the EU Commission gives high priority that results of RIA projects generate sustainable business. Most importantly, ONTOCHAIN aims towards the development of a sustainable blockchain ecosystem. Hence, before the end of this subproject, an exploitation agreement will be signed between the ONTOCHAIN consortium and the third party about common exploitation activities of the subproject results, subject to a negotiation process.

11 TERMINATION

1.1 The Cascade Funding Partner can terminate this Agreement with immediate effect through written notice to the Selected Third Party and to the other Participating Partners:

o if the Selected Third Party is in breach of any of its material obligations under this Agreement, which breach is not remediable, or, if remediable, has not been remedied within thirty (30) days after written notice to that effect from the party not in breach,

o if, to the extent permitted by law, the Selected Third Party is declared bankrupt, is being wound up, is having its affairs administered by the courts, has entered into an arrangement with its creditors, has suspended business activities, or is the subject of any other similar proceeding concerning those matters, or

o if the Selected Third Party is subject to an Event of Force Majeure, which prevents the Selected Third Party from correct performance of its obligations hereunder and such circumstances have lasted, or can reasonably be expected to last more than 3 months.

1.2 Access Rights granted to the Selected Third Party shall cease immediately upon the effective date of termination.

12 CONCLUDING CONDITIONS

12.1 The Parties will not sign Annex 1, and the terms of this Agreement (for the sake of clarity this includes Annex 1) will not be effective, until the Cascade Funding Partner has received written confirmation from each Participating Partner that it agrees to their content. This written confirmation can be given by each Participating Partner sending by email or facsimile to the Cascade Funding Partner.

Once each written confirmation is given by each Participating Platform Partner, any ancillary agreements, amendments, additions or modifications to this Agreement shall be made in writing and signed by the Parties, but will only become effective after the Cascade Funding Partner has received written confirmation from each Participating Partner that it agrees to their content, such written confirmation to be given in the manner set out at the above paragraph.

12.2 The Selected Third Party's consistent level in its respective field of expertise played a key role in the selection of the Selected Third Parties to implement the Research. Any total or partial transfer of provisions and the rights and duties it entails in the prior formal approval of all signatories.

12.3 Any subcontract by the Selected Third Party concerning some of its tasks under this Agreement requires the prior written consent of the Cascade Funding Partner and does not affect its own obligations resulting from this Agreement. The Selected Third Party shall secure that the subcontractor will comply with all obligations – especially coming from the Multi-Beneficiary General Model Grant Agreement, and with regard to confidentiality – resulting from this Agreement and that the results attained by the subcontractor will be available in accordance with Section 5.

12.4 The Agreement will enter into force on the date of the last signature by the Parties.

12.5 This Funding Agreement shall continue in full force and effect until complete fulfilment of all obligations undertaken by the Parties. However, this Funding Agreement or the participation of one or more Parties to it may be terminated in accordance with the terms of this Funding Agreement.

12.6 Parties that fail to meet reporting/mandatory activities deadlines must be aware that their non-respect of reporting/mandatory activities deadlines may lead to their costs being considered zero for the corresponding period and they will be excluded from the respective payment.

12.7 In the event that a breach by a Party of its obligation under this contract is identified by the Cascade funding Partner such as improper implementation of the research, the Cascade funding Partner will formally notify the considered Party to remedy this breach. If it is not remedied in reasonable time, the Cascade funding Partner may decide to declare the Party to be a defaulting Party and on the consequences thereof which may include termination of its participation and reimbursement of all or part of the financial provision.

12.8 In the event of the termination of the contract by a Party before its legal termination as set in the Annex 1, the Cascade funding Partner may decide to declare the Party to be a defaulting Party and on the consequences thereof which may include reimbursement of all or part of the financial provision.

12.9 If any provision of this Agreement is determined to be illegal or in conflict with the applicable law, the validity of the remaining provisions shall not be affected. The ineffective provision shall be replaced by an effective provision which is economically equivalent. The same shall apply in case of a gap.

12.10 This Agreement shall be governed by and construed in accordance with the laws of Belgium.

12.11 Any disagreement or dispute which may arise in connection with this Agreement and which the Parties are unable to settle by mutual agreement will be brought before the courts of Brussel, Belgium.

Done in two originals, one for each Party.

On behalf of the Cascade Funding Partner: European Dynamics SA	On behalf of the Selected Third Party (Authorized representative in case of Team/Consortium) : [Complete]
Signature of the authorized representative: Name: Title: Date:	Signature of Selected Third Party (Authorized representative in case of Team/Consortium) : Name:[Complete] Title:[Complete] Date:[Complete]

13 ANNEX 1.1 – ONTOCHAIN SPECIFIC CONTRACT

This ONTOCHAIN Specific Contract for implementation of Research by the Selected Third Party, hereinafter referred to as the "Specific Contract", is entered into by and between:

EUROPEAN DYNAMICS LUXEMBOURG (ED), established in ………………., ………………., VAT number: ………………., represented for the purposes of signing the Agreement by ………………., legal representative of ED, hereinafter referred to as **"Cascade Funding Partner"**,

and

– *[if a legal entity]:*

[OFFICIAL NAME OF THE SELECTED THIRD PARTY (Acronym)],

VAT Number: [VAT]

Legal Status:[XXX]

PIC Number:[PIC NUMBER]

Name of the legal signatory: [Name]

Legal office address:[ADDRESS and COUNTRY]

– *[if a Team of Natural persons]:*

[FIRST AND LAST NAME OF THE NATURAL PERSON 1],

ID card/Passport Number: [Number]

Date of issue: [Date]

Tax payer identification Number: [Number]

Legal address:[ADDRESS and COUNTRY]

FIRST AND LAST NAME OF THE OF THE NATURAL PERSON 2],

ID card/Passport Number: [Number]

Date of issue: [Date]

Tax payer identification Number: [Number]

Legal address:[ADDRESS and COUNTRY]

[FIRST AND LAST NAME OF THE OF THE NATURAL PERSON 3],

ID card/Passport Number: [Number]

Date of issue: **[Date]**

Tax payer identification Number: **[Number]**

Legal address:**[ADDRESS and COUNTRY]**

- [if a Consortium of legal entities]:

[OFFICIAL NAME OF THE SELECTED THIRD PARTY 1 (Acronym)], Project Manager and Authorized representative of the consortium,

VAT Number: **[VAT]**

Legal Status:**[XXX]**

PIC Number:**[PIC NUMBER]**

Name of the legal signatory: **[Name]**

Legal office address:**[ADDRESS and COUNTRY]**

[OFFICIAL NAME OF THE SELECTED THIRD PARTY 2 (Acronym)],

VAT Number: **[VAT]**

Legal Status:**[XXX]**

PIC Number:**[PIC NUMBER]**

Name of the legal signatory: **[Name]**

Legal office address:**[ADDRESS and COUNTRY]**

[OFFICIAL NAME OF THE SELECTED THIRD PARTY 2 (Acronym)],

VAT Number: **[VAT]**

Legal Status:**[XXX]**

PIC Number:**[PIC NUMBER]**

Name of the legal signatory: **[Name]**

Legal office address:**[ADDRESS and COUNTRY]**

Hereinafter referred to as "**Selected Third Party**";

Hereinafter sometimes individually or collectively referred to as "Party" or "Parties".

Whereas the Cascade Funding Partner and the Selected Third Party have agreed the main terms and conditions to implement the Research in the course of the ONTOCHAIN Project by signing the Standard Research Contract to which this Specific Contract is annexed.

Now therefore it has been agreed as follows:

1.ENTRY INTO FORCE

The specific contract shall enter into force on the day of its signature by the last Contracting Party as a rules of thumbs no more than 15 days after the announcement of the selection. The Cascade Funding Project Manager/ Authorized representative of the consortium shall sign this contract, only after all of the following documents have been received from the Selected Third Party:

- [if a legal entity]:

-The original signed Declaration of Honour (as given in Annex 6 of the Standard Research Contract) by the Project Manager/Authorized representative;

-The SME Declaration form (as given in Annex 7 of the Standard Research Contract);

-The copy of the original Extract of SME;

-The Proof of VAT;

-The Bank Information Form (as given in Annex 3 of this Contract).

-The Estimated budget for the action (as given in Annex 2 of this Contract)

- [if a Team of Natural persons]:

-The original signed Declaration of Honour (as given in Annex 6 of the Standard Research Contract) by the Project Manager/Authorized representative;

-Copy of ID-card or Passport of the legal representative(s) of the Team;

-Bank Information Form (as given in Annex 3 of this Contract).

-Estimated budget for the action (as given in Annex 2 of this Contract)

-A copy of the signed team agreement with the denomination of the Authorized representative.

- **[if a Consortium of legal entities]:**

-The original signed Declaration of Honour (as given in Annex 6 of the Standard Research Contract) by the Project Manager/Authorized representative;

-SME Declaration form (as given in Annex 7 of the Standard Research Contract) if applicable;

-Copy of the original Extract of SME if applicable;

-Proof of VAT;

-Bank Information Form (as given in Annex 3 of this Contract).

-Estimated budget for the action (as given in Annex 3 of this Contract)

-If a group of legal entity, copy of the signed consortium agreement with the denomination of the Authorized representative.

All documents shall be sent to the Cascade Funding Partner via email to the following address: caroline.barelle@eurodyn.com as a rules of thumbs no more than 15 days after the announcement of the selection

2. TERMS AND CONDITIONS FOR THE RESEARCH

The Selected Third Party shall implement the Research in accordance with the following:

Description of the Research	
Acronym	
Full Title	
ONTOCHAIN call identification	ONTOCHAIN Open Call 2 Protocol suite and software ecosystem foundations
Starting date of the Research:	
Duration of the Research:	[check] 5 months [check] 10 months
Date of selection of the Selected Third Party(ies)	

Participating Partners involved in the Research	
Cascade Funding Project Manager	European Dynamics Luxembourg SA
Name & surname	Caroline Barelle

Tel:	+35 220 40 08 90
Email:	caroline.barelle@eurodyn.com
Selected Third Party 1 Project Manager Authorized representative	**[Complete]**
Role	The authorized representative is the intermediary between the party (ies) and the Cascade funding project Manager. In particular, the authorized representative shall be responsible for : -Setting a team agreement of all the Third Party(ies) Partners involved in the Research if relevant -Monitoring compliance with obligations stipulated in this contract. -Keeping partners when relevant, updated. -Collecting, reviewing and submitting reports/deliverables and specific requested documents to the Cascade funding project Manager on time. -Transmitting documents and information connected with the research to any other party (ies) concerned. -Administering the financial contribution related to the research and fulfilling the financial tasks related to the research.
Name & surname	**[Complete]**
Tel:	**[Complete]**
Email:	**[Complete]**
Selected Third Party 2	**[Complete]**
Role	**[Complete]**
Name & surname of the Representative	**[Complete]**
Tel:	**[Complete]**
Email:	**[Complete]**
Selected Third Party 3	**[Complete]**
Role	**[Complete]**
Name & surname of the Representative	**[Complete]**
Tel:	**[Complete]**
Email:	**[Complete]**

Implementation of the Research	
WP 1	**[Complete]**
Task 1.1	**[Complete]**
Starting date	**[Complete]**
Duration	**[Complete]**
Objectives	**[Complete]**
Description	**[Complete]**

Expected outcomes	**[Complete]**
Deliverable	**[Complete]**
Task 1.2	**[Complete]**
Starting date	**[Complete]**
Duration	**[Complete]**
Objectives	**[Complete]**
Description	**[Complete]**
Expected outcomes	**[Complete]**
Deliverable	**[Complete]**
WP 2	**[Complete]**
Task 2.1	**[Complete]**
Starting date	**[Complete]**
Duration	**[Complete]**
Objectives	**[Complete]**
Description	**[Complete]**
Expected outcomes	**[Complete]**
Deliverable	**[Complete]**
Task 2.2	**[Complete]**
Starting date	**[Complete]**
Duration	**[Complete]**
Objectives	**[Complete]**
Description	**[Complete]**
Expected outcomes	**[Complete]**
Deliverable	**[Complete]**
[Add as many tasks as necessary]	

The expected research outcomes are listed hereafter

Expected research outcomes
[Complete] **Expected results in terms of Research**
[Complete] **Expected results in terms of IPR, software, know-how**

The following deliverables are mandatory and requested in addition to those listed in the description of implementation of the research. They are linked to the release of the funding.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 957338

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Mandatory deliverables and reports				
Deliverable (number)	**Deliverable/ Report name**	**Delivery date**		
		LP	**SP**	
D1	Detailed technical specification of the solution and software implementation work plan	M2	M1	
D2	Software deployment and use case scenario	M4	M2	
D3	Implementation, deployment, testing, demonstration and validation	M8	M4	
D4	Modularised software components ready for distribution	M10	M5	

The following complementary activities are also linked to the release of the funding.

Mandatory complementary activities
The selected third Party(ies) attend several mandatory internal events organised with the ONTOCHAIN Consortium: **-Kick-off event devoted to knowing the different Third Parties and their foreseen contribution to ONTOCHAIN.**   **- Meeting for the set-up of clear KPIs that will be linked to the funding of the selected Third party (ies).**   **- Midterm event devoted to the follow up of the progress of the Third Party (ies) according to the defined KPIs with pitch contest where the Third Party (ies) will present their projects outcomes in particular their prototype and their deployment scenarios.**   **-Final event with pitch contest where the Third Parties will present their solution in particular their modularised software components ready for distribution**

The IPR background of the third party (ies) is described hereafter:

Third party(ies) IPR Background	
Selected Third Party Partner 1 - Project Manager	[Complete]
Selected Third Party Partner 2	[Complete if relevant]
Selected Third Party Partner 3	[Complete if relevant]

Financial conditions		
Financial Support	**LP** o **75 000€** if a team of natural persons o **100 000€** if a legal entity(ies) or combination of legal entities or combination of legal entity (ies) and individual(s)	**SP** o **45 000€** if a team of natural persons o **60 000€** if a legal entity(ies) or combination of legal entities or combination of legal entity (ies) and individual(s)
Schedule of payment	**LP** **Pre-financing:**M1 **Interim payment:**M5 **Final payment:**M10	**SP** **Pre-financing:**M1 **Interim payment:**M3 **Final payment:**M5
Payment conditions	o **Pre-financing:** After KPIs definition, and attendance to a welcome event where teams, partners and coaches will know each other (attendance mandatory), a pre-financing of 30% of the total amount of phase 1 will be released. o **Interim payment:** based on concrete results. A 100% completion of the KPIs unlock the total of the 2nd payment which is 30% of the total amount of phase 1. A lower completion of the tasks will launch the proportional payment. If the KPIs are met by less than a 50% the payment will be retained until the end of the Phase 1. If less than a 25%, the teams will be automatically disqualified from the process. o **Final payment:** Following the same logic as before, teams will be paid according to their overall completion of KPIs (remaining 40%) at the end of phase 1. Only in the case of an underperformance below 25%, the team will be automatically disqualified, and no further payment released. Overall, failing to meet any of the research conditions and milestones aforementioned may result to an early discontinuation of the project and the corresponding disruption of the funding	

2.MISCELLANEOUS

3.1 This Specific Research Contract, supplemented by the Standard Research Contract and its Annexes 1 to 8 included, constitutes the sole and complete understanding of the Parties with respect to its subject matter and supersedes all prior or contemporaneous communications between the Parties concerning such subject matter. This Specific Research Contract will be governed and construed according to the choice of governing and constructive law set forth in the Standard Research Contract.

3.2 Save to the extent expressly modified in this Specific Research Contract, all of the terms of the Standard Contract and Annexes 1-8 included shall apply to this Specific Contract. Save to the extent expressly specified in this Specific Contract, all capitalized terms used in this Specific Contract which are defined in the Standard Research Contract shall have the meaning given in the Standard Research Contract.

3.3 The terms of Clause 11.1 of the Standard Research Contract will apply to the signing and enforceability of this Specific Research Contract.

Done in two originals, one for each Party.

On behalf of the Cascade Funding Partner: European Dynamics SA.	On behalf of the Selected Third Party: [Complete]
Signature of the authorized representative: Name: Title: Date:	Signature of the authorized representative: [Complete] Name:[Complete] Title:[Complete] Date:[Complete]

14 ANNEX 1.2 ESTIMATED BUDGET FOR THE ACTION

Expenditures	Total in EUR
A.1. Staff costs (where applicable)	[Complete]
A.2. Travel and subsistence	[Complete]
A.3. Equipment and materials	[Complete]
A.5. Conferences and seminars	[Complete]
Total	[Complete]
Revenues	Total in EUR
R.1. ONTOCHAIN Grant	[Complete]
R.2. Income generated by the action	[Complete]
Total	[Complete]

All amounts should be provided in euro.

Staff costs will be calculated on the basis of the actual daily salary/fees of the employee/service provider, multiplied by the number of days to be spent on the project. This calculation may include, if necessary, all the normal charges paid by the employer, such as social security contributions and related costs, but must exclude any bonus, incentive and profit-sharing arrangements or running costs. Staff costs may not exceed the normal costs for each staff category in the country concerned.

Name of the Authorized representative of the Selected Third Party (ies):

[Complete]

Function of the Authorized representative of the Selected Third Party (ies):

[Complete]

Signature of Authorized representative the Selected Third Party (ies):

[Complete]

15 ANNEX 1.3 – SELECTED THIRD PARTY FINANCIAL INFORMATION

H2020 HORSE Funding Agreement

ANNEX 4 - SELECTED THIRD PARTY 'S FINANCIAL IDENTIFICATION

FINANCIAL IDENTIFICATION

PRIVACY STATEMENT   http://ec.europa.eu/budget/contracts_grants/info_contracts/financial_id/financial_id_en.cfm#en

Please use CAPITAL LETTERS and LATIN CHARACTERS when filling in the form.

BANKING DETAILS ①

ACCOUNT NAME ②	
IBAN/ACCOUNT NUMBER ③	
CURRENCY	
BIC/SWIFT CODE	BRANCH CODE ④
BANK NAME	

ADDRESS OF BANK BRANCH

STREET & NUMBER		
TOWN/CITY	POSTCODE	
COUNTRY		

ACCOUNT HOLDER'S DATA
AS DECLARED TO THE BANK

ACCOUNT HOLDER		
STREET & NUMBER		
TOWN/CITY	POSTCODE	
COUNTRY		
REMARK		

BANK STAMP + SIGNATURE OF BANK REPRESENTATIVE ⑤	DATE (Obligatory)
	SIGNATURE OF ACCOUNT HOLDER (Obligatory)

① Enter the final bank data and not the data of the intermediary bank.

② This does not refer to the type of account. The account name is usually the one of the account holder. However, the account holder may have chosen to give a different name to its bank account.

③ Fill in the IBAN Code (International Bank Account Number) if it exists in the country where your bank is established

④ Only applicable for US (ABA code), for AU/NZ (BSB code) and for CA (Transit code). Does not apply for other countries.

⑤ It is preferable to attach a copy of RECENT bank statement. Please note that the bank statement has to confirm all the information listed above under 'ACCOUNT NAME', 'ACCOUNT NUMBER/IBAN' and 'BANK NAME'. With an attached statement, the stamp of the bank and the signature of the bank's representative are not required. The signature of the account-holder and the date are ALWAYS mandatory.

16 ANNEX 1.4 – ONTOCHAIN CONSORTIUM BACKGROUND

Background description	Specific limitations for the Implementation	Specific limitations for the Exploitation
Source code and documentation for iEXEC compute software (iexec-worker, iexec-core, iexec-common)	Free of charge for all third parties, distributed under Apache v2.0 license	Free of charge for all third parties, distributed under Apache v2.0 license
Source code and documentation for iEXEC off-chain services and tools (iexec-sdk, iexec-sms, iexec-results-proxy,iexec-deploy)	Free of charge for all third parties, distributed under Apache v2.0 license	Free of charge for all third parties, distributed under Apache v2.0 license
Source code and documentation for iEXEC Proof-of-Contribution protocol and smart contracts (PoCo)	Free of charge for all third parties, distributed under Apache v2.0 license	Free of charge for all third parties, distributed under Apache v2.0 license
Source code and documentation for iEXEC sample applications (iexec-apps)	Free of charge for all third parties, distributed under Apache v2.0 license	Free of charge for all third parties, distributed under Apache v2.0 license
Source code and documentation for iEXEC Explorer frontend (iexec-explorer-ui, iexec-explorer-api)	Disclosure under NDA. Any disclosure needs confidentiality provision.	Excluded

The patent analysis and monitor web application tool MyIntelliPatent	ONTOCHAIN third parties will be entitled to access the web application for free (after typing their password), and to the data collected, which will be quarterly updated by IntelliSemantic, with the possibility to export them.	- If necessary, ONTICHAIN third parties will be entitled to access the web application for free, with the final content available at the end of the project ONTOCHAIN, for 3 years after the end of the project.
-accessed from a dedicated server of IntelliSemantic though your client and protected with a project group password		
-configured by IntelliSemantic in read-only mode (i.e. with the profile "not annotating user") to access information about blockchain technologies and applications		-Following quarterly updates and/or eventual more powerful configurations (as "annotating user"), if required, will be provided following a third party order.
-populated by IntelliSemantic with an initial collection representing the Status of the Art and updated quarterly for the whole duration of the project.		

17 ANNEX 1.5 – THIRD PARTY(IES) PROPOSAL

[to be integrated]

18   ANNEX 1.6- DECLARATION OF HONOUR

APPLICANT DECLARATION OF HONOUR

Title of the proposal:

_____

On behalf of

_____(Name of the third party) established in _____, (legal address), SME VAT number_____,[1] represented for the purposes of signing and submitting the proposal and the Declaration of Honor by _____ _____ (Name of the legal representative),

By signing this document, I declare that

1) I have the power of legally binding the above mentioned party on submitting this proposal.

2) The above mentioned party has not submitted any other proposal under ONTOCHAIN Open Call #2 – Foundation. In case the above mentioned party has submitted more than one proposal in this Open Call, all associated proposals will be automatically excluded from the evaluation process.

3) The party(ies)that I legally represent is(are) fully aware and duly accept all ONTOCHAIN rules and conditions as expressed in ONTOCHAIN Open Call documents and all Annexes, and will fully respect any evaluation decision and proposal selection under ONTOCHAIN activities.

4) If relevant, the information included in the Annex 7: SME Declaration Form is true and legally binding.

5) All provided information in this declaration is true and legally binding.

Third party(ies) representative Contact Information:

Title (Mr, Mrs, Dr.)	[Complete]
Name	[Complete]
Surname	[Complete]
Position in the organisation (If relevant)	[Complete]
Full Address	[Complete]
Country	[Complete]
Email Address	[Complete]
Telephone	[Complete]
Mobile	[Complete]
Signature and stamp of the organisation (if relevant)	[Complete]

DECLARATION OF HONOR ON EXCLUSION CRITERIA AND

ABSENCE OF CONFLICT OF INTEREST

By signing this declaration of honour, I declare that all provided information below is true and legally binding both for me and for the organisations that I legally represent:

1. I declare that me and/or the organisations that I legally represent (If relevant) is not in one of the following situations:

a) it is bankrupt or being wound up, is having its affairs administered by the courts, has entered into an arrangement with creditors, has suspended business activities, is the subject of proceedings concerning those matters, or is in any analogous situation arising from a similar procedure provided for in national legislation or regulations;

b) it or persons having powers of representation, decision making or control over it have been convicted of an offence concerning their professional conduct by a judgment which has the force of res judicata;

c) it has been guilty of grave professional misconduct proven by any means which the contracting authority can justify including by decisions of the European Investment Bank and international organizations;

d) it is not in compliance with its obligations relating to the payment of social security contributions or the payment of taxes in accordance with the legal provisions of the country in which it is established or with those of the country of the contracting authority or those of the country where the contract is to be performed, to be proved by the deliverance of official documents issued by the local authorities, according to the local applicable rules;

e) it or persons having powers of representation, decision making or control over it have been the subject of a judgment which has the force of res judicata for fraud, corruption, involvement in a criminal organization or any other illegal activity, where such illegal activity is detrimental to the Union's financial interests;

f) is subject to an administrative penalty for being guilty of misrepresenting the information required by the contracting authority as a condition of participation in a grant award procedure or another procurement procedure or failing to supply

this information or having been declared to be in serious breach of its obligations under contracts or grants covered by the Union's budget.

2.   I declare that the natural persons with power of representation, decision-making or control over the above-mentioned SME are not in the situations referred to in a) to f) above;

3.   I declare that:

    a)   Neither myself or any person (s)/organisation (s) that I represent is (are) subject to an ONTOCHAIN conflict of interest;

    b)   I have not made false declarations in supplying the information required by participation in the Open Call of ONTOCHAIN Project or does not fail to supply this information;

    c)   I am not in one of the situations of exclusion, referred to in the abovementioned points a) to f).

    d)   I am aware and fully accept all ONTOCHAIN condition and rules as expressed in ONTOCHAIN Open Call documents.

4.   I certify that I or the organisation(s) that I represent:

o Is (are) committed to participate in the abovementioned project;

o has stable and sufficient sources of funding to maintain its activity throughout its participation in the above-mentioned project and to provide any counterpart funding necessary;

o has or will have the necessary resources as and when needed to carry out its involvement in the above-mentioned project.

Full name: _____	**Signature and stamp (if applicable)** **[Complete]**
On behalf of SME: _____	
Done at (place)_____ **the (day)**_____**(month)**_____**(year)**	

[1] VAT is mandatory during the contract preparation for legal entities. Failure of providing a valid VAT of the specific SME will result in automatic rejection of the proposal.

19 ANNEX 1.7- SME DECLARATION FORM

Declaration of SME Status

Precise identification of the SME:

Name or Business name	[Complete]
Address (of registered office)	[Complete]
Registration / VAT number	[Complete]
Names and titles of the principal director(s)[1]	[Complete]

Type of enterprise:

Tick to indicate which case(s) applies to the applicant enterprise:

☐	**Autonomous enterprise**	My enterprise holds less than 25% (capital or voting rights) in another enterprise and/or another enterprise holds less than 25% in mine. * *Note: there are exceptions for certain types of investors. See Article 3(2)(D) in the Annex of Commission Recommendation 2003/361/EC.*
☐	**Partner enterprise**	My enterprise holds at least 25%, but no more than 50% in another enterprise and/or another enterprise holds at least 25%, but no more than 50%, in mine.
☐	**Linked enterprise**	My enterprise holds more than 50% of the shareholders' or members' voting rights in another enterprise and/or another enterprise holds more than 50% in mine.

Data used to determine the category of enterprise:

Calculated according to Article 6 of the Annex to the Commission Recommendation 2003/361/EC on the SME definition.

Reference period (*):		
Headcount (AWU[3])	Annual turnover (€)(**)	Balance sheet total (€)(**)
[Complete]	[Complete]	[Complete]

   (*)   All data must be relating to the last approved accounting period and calculated on an annual basis. In the case of newly-established enterprises whose accounts have not yet been approved, the data to apply shall be derived from a reliable estimate made in the course of the financial year.

   (**) EUR 1000

Signature

Name and position of the signatory, being authorised to represent the enterprise:

[Complete]…………………………………………………………………………………………………

"I declare on my honour the accuracy of this declaration."

"I declare on my honour that in case of change affecting my SME status, I will immediately inform the Agency."

"I declare having taken knowledge of the Commission Recommendation 2003/361/EC on the SME definition."

Done at (date and place):   [Complete]………………………………………………………………………………

 Signature:

[Complete]

---

[1] Chairman(CEO), Director-General or equivalent.

[2] Annual Working Units = number of full-time equivalent employees.

ANNEX 2- ADMINISTRATIVE FORM

Find hereafter the list of administrative information that you need to fill directly in the F6S portal to apply.

ADMINISTRATIVE FORM

This administrative form has the following mandatory sections:

o   SECTION 1: Proposal identification

o   SECTION 2: Subdomain selection

o   SECTION 3: Administrative Data

o   SECTION 4: Proposal Description

o   SECTION 5: Final questions

Documents to be reviewed when preparing the application:

o   ONTOCHAIN Background, a document describing the ONTOCHAIN project context, available at: https://ontochain.ngi.eu/apply.

o   ONTOCHAIN Open Call 2 Text, a document that provides the technical details for the ONTOCHAIN Open call 2 available at: https://ontochain.ngi.eu/apply

o   Guide for Applicant, defining the Open Call Terms & Conditions available at: https://ontochain.ngi.eu/apply

o   Proposal Description Template, a mandatory and editable document to describe your proposal, available at: https://ontochain.ngi.eu/apply.

o   ONTOCHAIN Additional Applicant(s) Template, only needed if your proposal involves more than 3 individuals (Natural persons) or/and more than 3 organisations (Legal entities), available at: https://ontochain.ngi.eu/apply.

o   Indicative Sub-grant Agreement Form, a template of the sub-grant agreement that the selected applicants will be requested to sign, available at: https://ontochain.ngi.eu/apply. It is not necessary to send this document at the time of application.

If you have any questions, feel free to contact the ONTOCHAIN team (ontochain@ngi.eu). Failure to provide the required information in all sections will result in disqualification.

SECTION 1: PROPOSAL IDENTIFICATION

1. Proposal Title *

2. Proposal Acronym *

3. Keywords *

Please select the keywords related to your proposal

- ☐ Trustworthy hardware & manufacturing
- ☐ Network & Transport infrastructure (Including routing, P2P & VPN)
- ☐ Software Engineering (Including protocols, interoperability and fundamentals e.g.cryptography, algorithms, proofs)
- ☐ Operating Systems, firmware and virtualisation
- ☐ Measurement, monitoring, analysis & abuse handling
- ☐ Middleware, distribution, deployment, operations, DNS, authorisation, authentication, reputation systems
- ☐ Decentralised solutions, blockchain, distributed ledger
- ☐ Data & AI
- ☐ Services & Applications (e.g. email, instant messaging, search, video chat, collaboration, community)
- ☐ Vertical applications
- ☐ Trustworthiness (Including: transparency, auditability and security)
- ☐ Resilient, robust and dependable
- ☐ Privacy and confidentiality
- ☐ Empowerment and self-determination
- ☐ Inclusiveness, accessibility diversity and democracy
- ☐ Permission less innovation, decentralisation and level playing field
- ☐ Social good, fairness and ethical behaviour
- ☐ Sustainability/Eco-friendliness
- ☐ Well-balanced economy

SECTION 2: TOPIC SELECTION

4. There are six different topics that you can choose from to apply to ONTOCHAIN. If your project fits more than one topic, please select the most relevant one. *

- ☐ Decentralized Oracles for ONTOCHAIN
- ☐ Market Mechanisms for ONTOCHAIN
- ☐ ONTOCHAIN Interoperability & API Gateways
- ☐ ONTOCHAIN Network Design and Scalability
- ☐ Semantic Based Marketplaces for ONTOCHAIN
- ☐ Data Provenance in ONTOCHAIN
- ☐ Open topic

SECTION 3: ADMINISTRATIVE DATA APPLICANT(S)

5. You are applying as: *

Notice that as team of individuals (two or more natural persons), you will get a maximum of 56 250€ in case of small project or 108 750€ in case of large project.
Any other configuration involving legal entities can obtain up to 75 000€ in case of small project or 145 000 € in case of large project.
The funding will be automatically calculated according to the selection below.

- ☐ A single organization (legal entity)
- ☐ A group of individuals (team)
- ☐ A group of organisations (consortium)
- ☐ A group of individual(s) and organisation(s)

APPLICANT(S) INFORMATION (INDIVIDUAL(S))

Please fill in the following information about the individual(s) applying as a natural person(s).

WARNING: if in the previous question you indicated you apply as a legal entity, or consortium, do not fill the Individuals section.

Individual - Natural person 1

6. Name

7. Surname

8. E-mail

9. ID type (Citizen card, passport, or other)

10.   ID number

11.   Country of residence/work

12.   Has been funded by the European Commission through H2020 before? (Grant or subgrant)

- ☐ Yes
- ☐ No

13.   Has been funded by other NGI projects?

- ☐ Yes
- ☐ No

If yes, please indicate which one, explain the overlaps and differences with the current proposal and indicate the total funding amount received.

14. Has recently applied to an NGI call or another EC funding instrument that is under evaluation or plans to apply to?

☐ Yes
☐ No

If yes, please indicate which one and explain the overlaps and differences with the current proposal

Individual – Natural person 2

15. Name

16. Surname

17. E-mail

18. ID type (Citizen card, passport, or other)

19. ID number

20. Country of residence/work

21. Has been funded by the European Commission through H2020 before? (Grant or sub grant)

☐ Yes
☐ No

If yes, please indicate which one and explain the overlaps and differences with the current proposal

22. Has been funded by other NGI projects?

☐ Yes
☐ No

If yes, please indicate which one, explain the overlaps and differences with the current proposal and indicate the total funding amount received.

23. Has recently applied to an NGI call or another EC funding instrument that is under evaluation or plans to apply to?

☐ Yes
☐ No

If yes, please indicate which one and explain the overlaps and differences with the current proposal

Individual – Natural person 3

24. Name

25. Surname

26. E-mail

27. ID type (Citizen card, passport, or other)

28. ID number

29. Country of residence/work

30. Has been funded by the European Commission through H2020 before? (Grant or subgrant)

☐ Yes
☐ No

31. Has been funded by other NGI projects?

☐ Yes
☐ No

If yes, please indicate which one, explain the overlaps and differences with the current proposal and indicate the total funding amount received.

32. Has recently applied to an NGI call or another EC funding instrument that is under evaluation or plans to apply to?

☐ Yes
☐ No

If yes, please indicate which one and explain the overlaps and differences with the current proposal

APPLICANT(S) INFORMATION (ORGANISATION(S))

Please fill in the following information about the organisation(s) applying as legal entity/ies

Organisation – Legal entity 1

33. Entity legal name

34. Legal status of your organisation

- ☐ –Secondary or Higher education establishment
- ☐ –Research organisation
- ☐ –SME
- ☐ –Large enterprise
- ☐ –Public Body
- ☐ –A non-for profit organisation, association, NGO
- ☐ –Foundation
- ☐ –International organisation
- ☐ –Other? Please specify

35. Country

36. VAT number

37. Incorporation year

38. Contact person email

39. Has the legal entity been funded by the European Commission before? (Grant or subgrant)

- ☐ Yes
- ☐ No

40. Has the legal entity been funded by other NGI projects?

- ☐ Yes
- ☐ No

If yes, please indicate which one, explain the overlaps and differences with the current proposal and indicate the total funding amount received.

41. Has the legal recently applied to an NGI call or another EC funding instrument that is under evaluation or plans to apply to?

- ☐ Yes
- ☐ No

If yes, please indicate which one and explain the overlaps and differences with the current proposal

Organisation – Legal entity 2

42. Entity legal name

43. Legal status of your organisation

- ☐ –Secondary or Higher education establishment
- ☐ –Research organisation
- ☐ –SME

- ☐ -Large enterprise
- ☐ -Public Body
- ☐ -A non-for profit organisation, association, NGO
- ☐ -Foundation
- ☐ -International organisation
- ☐ -Other? Please specify

44. Country

45. VAT number

46. Incorporation year

47. Contact person email

48. Has the legal entity been funded by the European Commission before? (Grant or subgrant)

- ☐ Yes
- ☐ No

49. Has the legal entity been funded by other NGI projects?

- ☐ Yes
- ☐ No

If yes, please indicate which one, explain the overlaps and differences with the current proposal and indicate the total funding amount received.

50. Has the legal recently applied to an NGI call or another EC funding instrument that is under evaluation or plans to apply to?

- ☐ Yes
- ☐ No

If yes, please indicate which one and explain the overlaps and differences with the current proposal

Organisation – Legal entity 3

51. Entity legal name

52. Legal status of your organisation

- ☐ -Secondary or Higher education establishment
- ☐ -Research organisation
- ☐ -SME
- ☐ -Large enterprise
- ☐ -Public Body
- ☐ -A non-for profit organisation, association, NGO

☐ -Foundation
☐ -International organisation
☐ -Other? Please specify

53. Country

54. VAT number

55. Incorporation year

56. Contact person email

57. Has the legal entity been funded by the European Commission before? (Grant or subgrant)

☐ Yes
☐ No

58. Has the legal entity been funded by other NGI projects?

☐ Yes
☐ No

If yes, please indicate which one, explain the overlaps and differences with the current proposal and indicate the total funding amount received.

59. Has the legal recently applied to an NGI call or another EC funding instrument that is under evaluation or plans to apply to?

☐ Yes
☐ No

If yes, please indicate which one and explain the overlaps and differences with the current proposal

Additional Applicant(s)?

60. If your proposal has more than 3 applicants participating as individuals (Natural persons) or/and more than 3 applicants participating as organisations (Legal entities), please upload the Annex 3 – Additional Applicant(s) Template, filled with the information about the applicant(s) that did not fit in this form. (Max file size 30MB.)

UPLOAD FILE

CONTACT PERSON (COORDINATOR)

Contact person for the proposal and coordination of the project

Notice that the result of the evaluation will be sent to this person.

61. Full Name *

62. Entity (If applicable) *

63. E-mail *

64. Phone number * (Include country code)

SECTION 4: ETHICS

4.1. HUMAN EMBRYOS/FOETUSES

65. Does your innovation project involve Human Embryonic Stem Cells (hESCs)? *

☐ Yes
☐ No

66. Does your innovation project involve the use of human embryos? *

☐ Yes
☐ No

67. Does your innovation project involve the use of human foetal tissues / cells? *

☐ Yes
☐ No

4.2. HUMANS

68. Does your innovation project involve human participants? *

☐ Yes
☐ No

69. Are they volunteers for social or human sciences research? *

☐ Yes
☐ No

70. Are they persons unable to give informed consent? *

☐ Yes
☐ No

71. Are they vulnerable individuals or groups? *

☐ Yes

☐ No

72. Are they children/minors? *

☐ Yes
☐ No

73. Are they patients? *

☐ Yes
☐ No

74. Are they healthy volunteers for medical studies? *

☐ Yes
☐ No

75. Does your innovation project involve physical interventions on the study participants? *

☐ Yes
☐ No

4.3. HUMAN CELLS / TISSUES

76. Does your innovation project involve human cells or tissues (other than from Human Embryos/ Foetuses? *

☐ Yes
☐ No

4.4. PERSONAL DATA

77. Does your innovation project involve personal data collection and/or processing? *

☐ Yes
☐ No

78. Does it involve the collection and/or processing of sensitive personal data (e.g: health, sexual lifestyle, ethnicity, political opinion, religious or philosophical conviction)? *

☐ Yes
☐ No

79. Does it involve processing of genetic information? *

☐ Yes
☐ No

80. Does it involve tracking or observation of participants? *

☐ Yes
☐ No

81. Does your innovation project involve further processing of previously collected personal data (secondary use)? *

☐ Yes
☐ No

4.5. ANIMALS

82. Does your innovation project involve animals? *

☐ Yes
☐ No

4.6. THIRD COUNTRIES

83. In case non-EU countries are involved, do the innovation project related activities undertaken in these countries raise potential ethics issues? *

☐ Yes
☐ No

84. Do you plan to use local resources (e.g. animal and/or human tissue samples, genetic material, live animals, human remains, materials of historical value, endangered fauna or flora samples, etc.)? *

☐ Yes
☐ No

85. Do you plan to import any material – including personal data – from non-EU countries into the EU? *

☐ Yes
☐ No

86. Do you plan to export any material – including personal data – from the EU to non-EU countries? *

☐ Yes
☐ No

87. In case your innovation project involves low and/or lower middle income countries, are any benefits-sharing actions planned? Are they children/minors? *

- ☐ Yes
- ☐ No

88. Could the situation in the country put the individuals taking part in the innovation project at risk? *

- ☐ Yes
- ☐ No

4.7. ENVIRONMENT & HEALTH and SAFETY

89. Does your innovation project involve the use of elements that may cause harm to the environment, to animals or plants? *

- ☐ Yes
- ☐ No

90. Does your innovation project deal with endangered fauna and/or flora and/or protected areas? *

- ☐ Yes
- ☐ No

91. Does your innovation project involve the use of elements that may cause harm to humans, including innovation project staff? *

- ☐ Yes
- ☐ No

4.8. DUAL USE

92. Does your innovation project involve dual-use items in the sense of Regulation 428/2009, or other items for which an authorisation is required? *

- ☐ Yes
- ☐ No

4.9. EXCLUSIVE FOCUS ON CIVIL APPLICATIONS

93. Could your innovation project raise concerns regarding the exclusive focus on civil applications? *

- ☐ Yes
- ☐ No

4.10. MISUSE

94. Does your innovation project have the potential for misuse of innovation project results? *

    ☐ Yes
    ☐ No

4.11. OTHER ETHICS ISSUES

95. Are there any other ethics issues that should be taken into consideration? *

    ☐ Yes
    ☐ No

96. If yes, please specify

97. Ethics issues *

    ☐ I confirm that I have taken into account all ethics issues described above

SECTION 5: PROPOSAL DESCRIPTION

98. Please upload your proposal in Portable Document Format (pdf). Use the official template available at: https://ontochain.ngi.eu/apply. Applicants using other kind of template/ document structure will be automatically ineligible.

UPLOAD PROPOSAL (Max file size 30MB.)*

SECTION 6: FINAL QUESTIONS

99. Acceptance of the ONTOCHAIN Open Call Terms & Conditions Full call documents available at ontochain.ngi.eu*

    ☐ By ticking this box, I/we confirm that we have reviewed, accept and comply with the ONTOCHAIN Open Call Terms & Conditions as defined in the Guide for Applicant

100. Authorisation to apply in the name of

    ☐ By ticking this box, I confirm the information submitted within this application is true. I am authorised to apply in the name of my entity/group of natural persons.

101. Conflict of interest avoidance with ONTOCHAIN consortium

☐ By ticking this box, I confirm the members of the team involved in the proposal are not employees of any of the legal partners or their associated/linked-entities identified in the Grant Agreement No. 957338 with the EC.

102. Fraudulent behaviour avoidance

☐ By ticking this box, I confirm the organisation(s) or individual(s) applying do not have convictions for fraudulent behaviour, other financial irregularities, unethical or illegal business practices.

103. Bankruptcy information

☐ By ticking this box, I confirm the participating organisation(s) do(es) not have been declared bankrupt or have initiated bankruptcy procedures.

104. Multiple submissions

☐ By ticking this box, I confirm that all the members involved in the proposal (natural persons/legal entities) are only submitting one proposal under this open call

105. European Commission Regulation No 651/2014, art. 2.18

☐ By ticking this box, I confirm the applicant(s) is not under liquidation or is not an enterprise under difficulty accordingly to the Commission Regulation No 651/2014, art. 2.18,

106. Originality and freedom to operate

☐ By ticking this box, I confirm the project is based on original works and going forward any foreseen developments are free from third party rights, or they are clearly stated

107. Applicant(s) eligibility

☐ By ticking this box, I confirm the applicant(s) is not excluded from the possibility of obtaining EU funding under the provisions of both national and EU law, or by a decision of both national or EU authority,

108. ONTOCHAIN Sub-grant Agreement

☐ By ticking this box, I confirm the principal investigator involved in the proposal agrees with the terms presented in the Indicative Sub-grant Agreement Form.

109. Double funding and operational capacity

☐ By ticking this box, I confirm the applicant(s) has not received funding for a similar project and that the applicant(s) has enough Operational Capacity to carry out the work. In addition, the applicant(s) gives consent to the ONTOCHAIN consortium to share the needed information (such as entities names and project details (abstract or the full proposal)) with other NGI RIAs projects for the only purpose of cross-checking that there is no double funding or operational capacity conflict.

110. How did you hear about ONTOCHAIN?

☐ News/Media
☐ Event
☐ E-mail
☐ NGI portal
☐ Referral
☐ Social media
☐ Through an ONTOCHAIN partner
☐ F6S portal
☐ European Commission portal
☐ Other

PROPOSAL DESCRIPTION TEMPLATE

SECOND OPEN CALL FOR PROPOSALS

Closing dates for proposals: 15th September 2021, 17:00 CEST

GENERAL INSTRUCTIONS ON THE TEMPLATE

This template is to be used for the ONTOCHAIN Call #2 submission procedure.

The structure of this template must be followed when preparing your proposal. It has been designed to ensure that the important aspects of your planned work are presented in a way that will enable the experts to make an effective assessment against the evaluation criteria.

Please be aware that proposals will be evaluated as they were submitted, rather than on their potential if certain changes were to be made. This means that only proposals that successfully address all the required aspects will have a chance of being funded. There will be no possibility for significant changes to content, budget and team composition during grant preparation.

It is important to note that all proposals should be submitted for large projects with respective objectives and work plan. However, all proposals should also clearly list the functionality that is going to be provided by each one of them, if they get selected as short projects.

Total page limit: Sections 1, 2 and 3, together, should not be longer than 10 pages.
All tables, figures, references and any other element pertaining to these sections must be included as an integral part of these sections and are thus counted against this page limit.
The total page limit will be applied automatically; therefore you must **remove this instruction page** before submitting.

After the deadline, excess pages (in over-long proposals/applications) will not be taken into consideration by the experts.

The proposal is a self-contained document. Experts will be instructed to ignore hyperlinks to information that is specifically designed to expand the proposal, thus circumventing the page limit. Please, do not consider the page limit as a target! It is in your interest to keep your text as concise as possible, since experts rarely view unnecessarily long proposals in a positive light.

The following formatting conditions apply: The reference font for the body text is Arial. The use of a different font for the body text is not advised and is subject to the cumulative conditions that the font is legible and that its use does not significantly shorten the representation of the proposal in number of pages compared to using the reference font (for example with a view to bypass the page limit). The minimum font size allowed is 11 points.

Standard character spacing and a minimum of single line spacing is to be used. Text elements other than the body text, such as headers, foot/end notes, captions, formula's, may deviate, but must be legible.
The page size is A4, and all margins (top, bottom, left, right) should be at least 20 mm.
Delete the guidance text in blue in each section.

Acronym of your proposal

Full title of your proposal

Indicate to which main topic you are applying for.
If you address more than one topic, please indicate which the secondary ones are

TABLE 1: TOPIC SELECTION

Topic	Main topic (x)	Secondary topic (x)
Decentralized Oracles for ONTOCHAIN		
Market Mechanisms for ONTOCHAIN		
ONTOCHAIN Interoperability & API Gateways		
ONTOCHAIN Network Design and Scalability		
Semantic Based Marketplaces for ONTOCHAIN		

Data Provenance in ONTOCHAIN		
Open Topic		

20   TABLE OF CONTENTS

Page count starts here--

1. PROJECT SUMMARY

(Maximum 300 words)

-Describe your proposal at high level. It has to be clear which one of the six ONTOCHAIN Call 2 topics your proposal is focusing.

Please note that this information may be used for dissemination purposes (only if your proposal is accepted and funded by the ONTOCHAIN program).

2. APPLICANT BACKGROUND

(Maximum 1 page)

ORGANISATION PROFILE (IF APPLICABLE, IN CASE A SINGLE ORGANISATION APPLY)

-Describe the organisation proposing the collaboration (size of organization, type of organization, how many people, capital, and market), main expertise and business area.

-List the members of your organisation that will directly work on the project (name, job title, main expertise & role in the project).

-Describe the main publications, projects, product/service portfolio, patents and relevant contributions in line with your proposal.

-Explain how your organisation profile matches the expertise needed for the ONTOCHAIN 2nd Call and especially according to the topic you have selected.

TEAM/CONSORTIUM PROFILE (IF APPLICABLE, IN CASE A TEAM OF NATURAL PERSONS/ CONSORTIUM OF LEGAL ENTITIES APPLY)

-Describe the natural persons/organisations part of the team/consortium proposing the collaboration (size of organization, type of organization, how many people, capital, and market if applicable), their main expertise and their business area.
-For each participating organisations, list the members of the organisation that will directly work on the project (name, job title, main expertise & role in the project).
-Describe the main publications, projects, product/service portfolio, patents and relevant contributions of the different natural persons/organisations part of the team/consortium in line with your proposal.
-Describe the team/consortium partners' synergies and their relevance for the proposed project, selected topic and ONTOCHAIN 2nd Call.

3. DETAILED PROPOSAL DESCRIPTION
(Maximum 8 pages)

3.1 CONCEPT AND OBJECTIVES

(Maximum 1 page)
-Describe the specific objectives of your proposal and explain the overall concept underpinning your proposed solution considering the ONTOCHAIN overall goals of trustworthy content handling and trustworthy data /service exchange

It should be clear:
- What are the needs?
- What ONTOCHAIN challenge you are solving with your proposal and how?
- What existing solutions (including your own) from the industry and from the scientific literature partly address the challenges?
- What new value proposition you are offering?
- What would be the benefits for ONTOCHAIN Large Scale Pilot.

3.2 PROPOSAL SOLUTION

(Maximum 2 pages)
-Give a description of the product/prototype with which you want to face the challenge.

-Indicate:

- How the solution will approach the challenge. You should particularly take care of the relevance of your solution according to the ONTOCHAIN architecture/specifications and explain how it can be integrate to the whole ONTOCHAIN ecosystem.
- What is the main differentiator of your proposition compared to the state of the art? You should put emphasis on its originality and innovation aspects.
- Explain the maturity of your product/prototype and the expected maturity at the end of the project (current and expected Technology Readiness Level)
- What will be the approach to validate your proof of concept? Indicate the size of the deployment, the test you intend to conduct (number of users, flat, devices …)

3.3 EXPECTED IMPACT

(Maximum 2 pages)
-Describe how your proposal will contribute to:
- The objectives of the ONTOCHAIN project
- Add value to the ONTOCHAIN project.
- Create industrial impact at the European level and worldwide.
- Enhance your own business/competitiveness, with the help of the ONTOCHAIN ecosystem.
- Create socio- economic and environmental impact when relevant

- Present your dissemination and communication plan to maximise the impact foreseen
- Provide a description of your Data Management Plan

3.4 BUSINESS MODEL AND SUSTAINABILITY

(Maximum 1 page)
-What is the business potential of the proposal?
-What is the business model? Explain how you will make money with this product or service (revenue model, etc.).
-Explain the next steps towards economic sustainability of your project and towards deploying your solution at a larger scale.

3.6 IMPLEMENTATION

(Maximum 2 pages)

- Provide an overview of your overall work plan considering the 10 months' timeframe of ONTOCHAIN Open Call 2 .

-Provide the functionality that are going to be delivered if the proposal is selected as short projects 5 months duration.

-Describe the activities that you will carry out in order to implement your project: objective, duration, implementation steps, resources available. Illustrate the timing of your activities using a Gantt diagram or similar.

Use the table hereafter in order to help you present the requested information.

TABLE 2: EXAMPLE TABLE

Work plan tasks	Description	Starting Month	Ending Month

–Deliverables and milestones
Please add a list of deliverables and milestones (e.g. documents, reports, user manual, a tool …) using the provided table.

TABLE 3: TABLE OF DELIVERABLES AND MILESTONES

Nº	Deliverable or milestone name	Description	Type	Delivery Month

-Indicate how you intend to manage your activities including progress monitoring and risks management procedures

Pages count finishes here --

Acronym of your proposal

Full title of your proposal

1. ADDITIONAL APPLICANT(S) PARTICIPATING AS INDIVIDUAL(S) (NATURAL PERSON)

Information type	Fill this column
Name:	
Surname:	
E-mail:	
ID type of document:	
ID number:	
Country of residence/work:	
Has been funded by the European Commission through H2020 before? (Grant or subgrant) (Yes/No)	
Has been funded by other NGI project? (Yes/No) If yes, please indicate which one and explain the overlaps and differences with the current proposal.	
Has recently applied to an NGI call or another EC funding instrument that is under evaluation or plans to apply to? (Yes/No) If yes, please indicate which one and explain the overlaps and differences with the current proposal.	

Copy and add as many tables as applicants participating as natural persons which did not fit in the F6S form.

2. ADDITIONAL APPLICANT(S) PARTICIPATING AS ORGANISATION(S) (LEGAL ENTITY)

Information type	Fill this column
Entity legal name	

Legal status of your organisation (Indicate only one type)
  1. Secondary or Higher education establishment
  2. Research organisation
  3. Large enterprise
  4. Small or medium enterprise
  5. Public body
  6. A non-profit organisation, association, NGO
  7. Foundation
  8. International organisation
  9. Other	

VAT number	
Incorporation year	
Contact person email	
Country	
Has the legal entity been funded by the European Commission through H2020 before? (Grant or subgrant) (Yes/No)	
Has the legal entity been funded by other NGI project? (Yes/No) If yes, please indicate which one and explain the overlaps and differences with the current proposal.	
Has the legal recently applied to an NGI call or another EC funding instrument that is under evaluation or plans to apply to? (Yes/No) If yes, please indicate which one and explain the overlaps and differences with the current proposal.	

Copy and add as many tables as applicants participating as legal entities which did not fit in the F6S form.

ANNEX 3 – ONTOCHAIN ADMINISTRATIVE FORM AND ADDITIONAL APPLICANT'S TEMPLATE

It corresponds to the Annex 2 and Annex 4 of the ONTOCHAIN Guide for Applicant

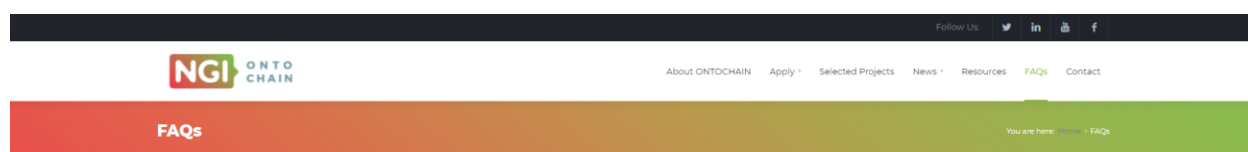# ANNEX 4 – ONTOCHAIN PROPOSAL DESCRIPTION TEMPLATE

It corresponds to the Annex 3 of the ONTOCHAIN Guide for Applicant

ANNEX 5 – THE ONTOCHAIN INDICATIVE SUB-GRANT AGREEMENT FORM

It corresponds to the Annex 1 of the ONTOCHAIN Guide for Applicant

ANNEX 6- ONTOCHAIN FREQUENTLY ASKED QUESTION (FAQS)

The FAQs are reported on the ONTOCHAIN website: FAQs | ONTOCHAIN (ngi.eu)

Who is eligible?

▸ **What is a cascade funding?**

▸ **Can a legal entity or a natural person benefit of other funding for the same project on top of the one received with ONTOCHAIN?**

▸ **Can a legal entity or natural person based in UK apply to ONTOCHAIN?**

▸ **What are the countries eligible for funding under the ONTOCHAIN Action?**

▸ **Who is eligible for the three open calls?**

How to participate?

▸ **How do I apply?**

▸ **Can I submit several projects to one specific call?**

▸ **Can I apply with a Small Project?**

▸ **Can I apply for the three calls?**

▸ **What is the deadline to apply for the first call?**

▸ **What is the deadline to apply for the second call?**

▸ **What are the funding criteria?**

▸ **What information is required for the application?**

▸ **Will ONTOCHAIN mandates to build on specific protocols?**

▸ **When will I hear back for my application?**

How the evaluation process works?

▸ **How will my application be evaluated?**

▸ **Who are the evaluators?**

Granted projects

▶ **What is the maximum funding amount applicants to ONTOCHAIN Open Call 2 can receive if they have already been funded in ONTOCHAIN**

▶ **How and when will I get paid?**

▶ **Will the funding count as de minimis aid?**

▶ **Do I have to keep track of my expenses for justifying the costs?**

▶ **Is subcontracting allowed?**

▶ **Is it allowed for the beneficiary to change team members during the project?**