



# Blockchain for the Next Generation Internet



---

**ONTOCHAIN**

---

25/10/2023



Grant Agreement No.: 957338  
Call: H2020-ICT-2020-1

Topic: ICT-54-2020  
Type of action: RIA

# D4.3 ONTOCHAIN APPLICATION EXPERIMENTS

## TECHNICAL RESULTS AND SUGGESTIONS

WORK PACKAGE	WP4
TASK	T4.2
DUE DATE	31/08/2023
SUBMISSION DATE	25/10/2023
DELIVERABLE LEAD	IntelliSemantic
VERSION	1.0
AUTHORS	Alberto Ciaramella (IS), Marco Ciaramella (IS)
REVIEWERS	Thanasis Papaioannou (AUEB), Petar Kochovski (UL)
ABSTRACT	This is a report which integrates a demonstrator, i.e. the GitHub repository in which ONTOCHAIN third parties deliver they code. This report facilitates the navigation on the repository GitHub. Moreover this report defines guidelines and requirements for third parties when contributing to the GitHub repository.
KEYWORDS	blockchain software, blockchain design, blockchain implementation, blockchain testing, blockchain documentation

## Document Revision History

<b>0.8</b>	<b>23/10/2023</b>	<b>Draft release</b>	<b>M. Ciaramella and A. Ciaramella (IS)</b>
0.9	24/10/2023	Integration of the comments from Petar Kochovski (UL)	M. Ciaramella (IS)
1.0	25/10/2023	Integration of the comments from Thanasis Papaioannou (AUEB)	M. Ciaramella (IS)

## Dissemination Level

Nature of the deliverable: PU

PU Public, fully open, e.g., web

CL Classified, information as referred to in Commission Decision 2001/844/EC

CO Confidential to ONTOCHAIN project and Commission Services

## DISCLAIMER

The information, documentation and figures available in this deliverable are written by the "Trusted, traceable and transparent ontological knowledge on blockchain — ONTOCHAIN " project's consortium under EC grant agreement 957338, and do not necessarily reflect the views of the European Commission. Neither the European Union institutions and bodies nor any person acting on their behalf may be held responsible for the use which may be made of the information contained therein. The information in this document is provided "as is" and no guarantee or warranty is given that the information is fit for any particular purpose. The user thereof uses the information at its sole risk and liability. Moreover, it is clearly stated that the ONTOCHAIN Consortium reserves the right to update, amend or modify any part, section or detail of the document at any point in time without prior information.

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

## COPYRIGHT NOTICE

© 2020 ONTOCHAIN

This document may contain material that is copyrighted of certain ONTOCHAIN beneficiaries and may not be reused or adapted without permission. All ONTOCHAIN Consortium partners have agreed to the full publication of this document. The commercial use of any information contained in this document may require a license from the proprietor of that information. Reproduction for non-commercial use is authorised provided the source is acknowledged.

The ONTOCHAIN Consortium is the following:

Participant number	Participant organisation name	Short name	Country
1	EUROPEAN DYNAMICS LUXEMBOURG SA	ED	LU
2	UNIVERZA V LJUBLJANI	UL	SI
3	IEXEC BLOCKCHAIN TECH	IEXEC	FR
4	INTELLISEMANTIC SRL	IS	IT
5	ATHENS UNIVERSITY OF ECONOMICS AND BUSINESS – RESEARCH CENTER	AUEB	EL
6	ELLINOGERMANIKO EMPORIKO & VIOMICCHANIKO EPIMELITIRIO	GHCCI	EL
7	F6S NETWORK LIMITED	F6S	IE

---

## EXECUTIVE SUMMARY

---

This deliverable integrates the information included in the ONTOCHAIN repository GitHub in which ONTOCHAIN third parties deliver their results, and has also objective to facilitate the navigation in this repository.

This deliverable summarizes also the guidelines for third parties when contributing to ONTOCHAIN. These guidelines emerged from best practices experimented in the call 1, call 2 and call 3 and include design, coding, testing and documentation of the solution developed.

## TABLE OF CONTENTS

TABLE OF CONTENTS.....	7
LIST OF FIGURES.....	8
LIST OF TABLES.....	9
1 INTRODUCTION.....	11
2 THIRD PARTY PROJECTS OVERVIEW.....	12
3 BEST PRACTICES.....	16
3.1 Technical documentation.....	16
3.2 Recommended activities.....	18
3.3 Demo videos.....	19
4 CONCLUSIONS.....	19
REFERENCES.....	20

---

## LIST OF FIGURES

---

FIGURE 1: DIAGRAM OF ONTOCHAIN FUNCTIONAL ARCHITECTURE..... 13



---

## LIST OF TABLES

---

TABLE 1: OC1, OC2 and OC3 projects in summary ..... 14

## ABBREVIATIONS

<b>ABI</b>	Application Binary Interface
<b>API</b>	Application Programming Interface
<b>DAO</b>	Decentralised Autonomous Organisation
<b>DID</b>	Decentralized Identifier
<b>DLTs</b>	Distributed Ledger Technologies
<b>EVM</b>	Ethereum Virtual Machine
<b>GDPR</b>	General Data Protection Regulation
<b>IoT</b>	Internet of Things
<b>NFT</b>	Non Fungible Token
<b>NGI</b>	Next Generation Internet
<b>OC1</b>	ONTOCHAIN Call 1
<b>OC2</b>	ONTOCHAIN Call 2
<b>OC3</b>	ONTOCHAIN Call 3
<b>OWL</b>	Web Ontology Language
<b>RDF</b>	Resource Description Framework
<b>SSI</b>	Self sovereign identity
<b>W3C</b>	World Wide Web Consortium

## 1 INTRODUCTION

The project ONTOCHAIN has been structured in three calls, OC1 in the first year, OC2 in the second year and OC3 in the third year, whose objective was to deliver the code of third party projects. This code is now available on the ONTOCHAIN GitHub repository<sup>1</sup>.

This deliverable updates the D4.2 [1], which includes information related to OC1 and OC2, with information related to OC3. Hence, this deliverable complements the information delivered in GitHub by OC1, OC2 and OC3 participants, with the objective of facilitating the reuse of this code for those interested to integrate them in their applications. This deliverable also identified some guidelines suggested to the OC3 participants. These guidelines emerged also from best practices used by third party projects in OC1 and OC2.

Other complementary information about OC1, OC2 and OC3 projects and not in this deliverable are however available in other ONTOCHAIN deliverables, as:

- The deliverable D3.5 [2] provides updated specification of the ONTOCHAIN framework and architecture including components developed by third parties during OC1 and OC2 and the specification of the ONTOCHAIN pilot deployment which will be used to evaluate the project results.
- The deliverable D3.7 [3] provides updated specification of the ONTOCHAIN framework and architecture including components developed by third parties during OC3 and the specification of the ONTOCHAIN pilot deployment which will be used to evaluate the project results.
- The deliverable D4.4 [4] describes the demonstration outcomes of different projects developed by third parties in the OC2.
- The deliverable D4.5 [5] describes the demonstration outcomes of different projects developed by third parties in the OC3.
- The deliverable D4.6 [6] presents the technical evaluation of software developed in the first two years of the project, in the OC1 and in the OC2, including deployment instructions, evaluation methodology, instructions for evaluation and evaluation results.
- The deliverable D4.7 [7] presents the technical evaluation of software developed in the third year of the project, in the OC3, including deployment instructions, evaluation methodology, instructions for evaluation and evaluation results.

<sup>1</sup><https://github.com/ONTOCHAIN/>

- The deliverable D4.8 [8] presents the impact of the 13 projects selected in the ONTOCHAIN OC2 and summarizes keys results, the innovation, possibles evolution and most relevant KPIs achieved for each project.
- The deliverable D4.9 [9] presents the impact of the 14 projects selected in the ONTOCHAIN OC3 and summarizes keys results, the innovation, possibles evolution and most relevant KPIs achieved for each project. Moreover, it provides an overview of the impact of the whole ONTOCHAIN project since it includes a summary of the KPIs regarding the whole ONTOCHAIN project.

## 2 THIRD PARTY PROJECTS OVERVIEW

The project ONTOCHAIN has been structured in three calls, OC1 in the first year, OC2 in the second year and OC3 in the third year.

The whole architecture of the project ONTOCHAIN [10] is summarized in the Figure 1, authored by the University of Ljubljana, which identifies the main components of the architecture as applications, ontologies, distributed ledger, core protocols, application protocols [3].

This block diagram summarizes also the specific Open Call in which a technology or an application has been developed. The Call 3 has been devoted to applications, whilst the Call 1 and Call 2 were mostly related to technologies, as planned (including some cross-project integration developments) [11] and in the end coherent with the general view actually developed within the ONTOCHAIN project [12].

Third party projects have delivered their code in the GitHub ONTOCHAIN private repository <sup>2</sup>, which includes a directory from which codes of the different projects can be accessed.

OC1 and OC2 third party project can be further distinguished into long and short projects. OC1 short projects were asked to deliver only a feasibility study, not code. OC3 third party participants produced only long projects.

The GitHub folder of the ONTOCHAIN project includes also the code of BELLECOUR, developed by the ONTOCHAIN consortium partner iExec. The BELLECOUR sidechain is part of the iExec blockchain infrastructure: it consists of a EVM-compatible private sidechain linked to Ethereum Mainnet with a bridge <sup>3</sup>. The BELLECOUR sidechain is composed from different kinds of nodes (full, validator) <sup>4</sup>. BELLECOUR hosts the iExec worker pools, which are able to execute the Dapps, included the Trusted-

<sup>2</sup><https://github.com/ONTOCHAIN>

<sup>3</sup>iExec Glossary, <https://docs.iex.ec/help/glossary>, accessed: 22 Feb 2023

<sup>4</sup>The reference of the code on GitHub is: <https://github.com/ONTOCHAIN/bellecour-node-deployer>

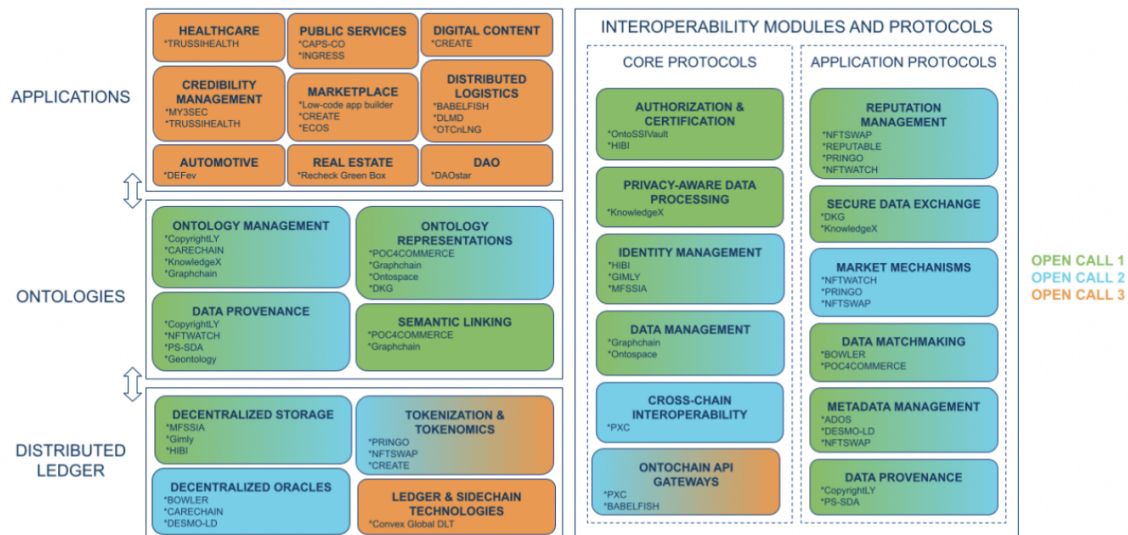


FIGURE 1: DIAGRAM OF ONTOCHAIN FUNCTIONAL ARCHITECTURE

Execution-Environment applications<sup>5</sup>. BELLECOUR will act as pilot infrastructure of ONTOCHAIN<sup>6</sup>.

The following Table 1 summarizes the content of the ONTOCHAIN repository. This table is structured into the following columns; 1) project acronym 2) project year or partner (OC1 or OC2 or OC3 or iExec) 3) kind of project(long or short) 4) direct link to the code in the ONTOCHAIN repository. In most cases the link to specific projects should be easy to identify by applying the following URL convention <https://github.com/ONTOCHAIN/<project-name>>. In any case it has been preferred to remind the whole address in the 4th column of Table 1, as a) in some projects the name used in GitHub is different from the project name or b) some projects used more than a single directory, as in the case of DESMO and PRINGO<sup>7</sup>.

The GitHub content of OC1 short projects is empty, since these projects were required only to deliver their status of the art and feasibility study, not to deliver code.

<sup>5</sup>"V7 Bellecour - Sgx Production", iExec workerpools, [https://pools.iexec.ec/pool/iexecblockchaincomputing/v7\\_bellecour\\_-\\_sgx\\_production](https://pools.iexec.ec/pool/iexecblockchaincomputing/v7_bellecour_-_sgx_production), accessed: 22 Feb 2023

<sup>6</sup>"iExec to provide Pilot Infrastructure for ONTOCHAIN", Jun 15, 2022, <https://medium.com/iexec-to-provide-pilot-infrastructure-for-ontochain-1bd19bc0b981>, accessed: 22 Feb 2023

<sup>7</sup>More specifically the project DESMO uses a main directory with different subdirectories, whilst the project PRINGO uses 3 directory at the same level.

TABLE 1: OC1, OC2 and OC3 projects in summary

Acronym	OC1 or OC2 or OC3	long or short	Address
ADOS	OC2	short	<a href="https://github.com/ONTOCHAIN/ADOS">https://github.com/ONTOCHAIN/ADOS</a>
BABELFISH	OC3	long	<a href="https://github.com/ONTOCHAIN/BABELFISH">https://github.com/ONTOCHAIN/BABELFISH</a>
BOWLER	OC2	short	<a href="https://github.com/ONTOCHAIN/BOWLER">https://github.com/ONTOCHAIN/BOWLER</a>
CAPS-CO	OC3	long	<a href="https://github.com/ONTOCHAIN/CAPS-CO">https://github.com/ONTOCHAIN/CAPS-CO</a>
CARECHAIN	OC2	short	<a href="https://github.com/ONTOCHAIN/CARECHAIN">https://github.com/ONTOCHAIN/CARECHAIN</a>
Convex Global DLT	OC3	long	<a href="https://github.com/ONTOCHAIN/Convex-Global-DLT">https://github.com/ONTOCHAIN/Convex-Global-DLT</a>
CopyrightLY	OC1	long	<a href="https://github.com/ONTOCHAIN/COPYRIGHTLY">https://github.com/ONTOCHAIN/COPYRIGHTLY</a>
CREATE	OC3	long	<a href="https://github.com/ONTOCHAIN/CREATE">https://github.com/ONTOCHAIN/CREATE</a>
DAOstar	OC3	long	<a href="https://github.com/ONTOCHAIN/DAOstar">https://github.com/ONTOCHAIN/DAOstar</a>
DART	OC1	short	<a href="https://github.com/ONTOCHAIN/DART">https://github.com/ONTOCHAIN/DART</a>
DEFev	OC3	long	<a href="https://github.com/ONTOCHAIN/DEFEV">https://github.com/ONTOCHAIN/DEFEV</a>
DESMO-LD	OC2	long	<a href="https://github.com/ONTOCHAIN/desmo">https://github.com/ONTOCHAIN/desmo</a> <sup>8</sup> .
DLMD	OC3	long	<a href="https://github.com/ONTOCHAIN/DLMD">https://github.com/ONTOCHAIN/DLMD</a> <sup>9</sup> .
DW MARKING	OC1	short	<a href="https://github.com/ONTOCHAIN/DW-MARKING">https://github.com/ONTOCHAIN/DW-MARKING</a>
ecOS	OC3	long	<a href="https://github.com/ONTOCHAIN/ECOS">https://github.com/ONTOCHAIN/ECOS</a>
GEONTOLOGY	OC2	long	<a href="https://github.com/ONTOCHAIN/GEONTOLOGY">https://github.com/ONTOCHAIN/GEONTOLOGY</a>

<sup>8</sup>This directory refers to the following directories: desmo-sdk (<https://github.com/ONTOCHAIN/desmo-sdk>), desmo-front (<https://github.com/ONTOCHAIN/desmo-front>), desmo-dapp (<https://github.com/ONTOCHAIN/desmo-dapp>), desmo-contracts (<https://github.com/ONTOCHAIN/desmo-contracts>), zion (<https://github.com/ONTOCHAIN/zion>).

<sup>9</sup>This directory refers to the following directories: DLMD NFT contracts (<https://github.com/ONTOCHAIN/DLMD-SC>), DMLDreact (<https://github.com/ONTOCHAIN/DLMD-APP>), DLMD API (<https://github.com/ONTOCHAIN/DLMD-API>)



Acronym	OC1 or OC2 or OC3	long or short	Address
GIMLY	OC1	long	<a href="https://github.com/ONTOCHAIN/ONTOSSiVault_all">https://github.com/ONTOCHAIN/ONTOSSiVault_all</a> <sup>10</sup>
GRAPHCHAIN	OC1	long	<a href="https://github.com/ONTOCHAIN/GRAPHCHAIN">https://github.com/ONTOCHAIN/GRAPHCHAIN</a>
HIBI	OC1	long	<a href="https://github.com/ONTOCHAIN/DR-HIBI">https://github.com/ONTOCHAIN/DR-HIBI</a>
INGRESS	OC3	long	<a href="https://github.com/ONTOCHAIN/INGRESS">https://github.com/ONTOCHAIN/INGRESS</a>
ISLAND	OC1	short	<a href="https://github.com/ONTOCHAIN/ISLAND">https://github.com/ONTOCHAIN/ISLAND</a>
MY3SEC	OC3	long	<a href="https://github.com/ONTOCHAIN/My3Sec">https://github.com/ONTOCHAIN/My3Sec</a>
KnowledgeX	OC1	long	<a href="https://github.com/ONTOCHAIN/KNOWLEDGEX">https://github.com/ONTOCHAIN/KNOWLEDGEX</a>
KUMO	OC1	short	<a href="https://github.com/ONTOCHAIN/KUMO">https://github.com/ONTOCHAIN/KUMO</a>
LCDP-ONT-APP	OC1	short	<a href="https://github.com/ONTOCHAIN/LCDP-ONT-APP">https://github.com/ONTOCHAIN/LCDP-ONT-APP</a>
MFSSIA	OC2	short	<a href="https://github.com/ONTOCHAIN/MFSSIA">https://github.com/ONTOCHAIN/MFSSIA</a>
NFTWATCH	OC2	short	<a href="https://github.com/ONTOCHAIN/NFTWATCH">https://github.com/ONTOCHAIN/NFTWATCH</a>
OTCnLNG	OC3	long	<a href="https://github.com/ONTOCHAIN/OTCnLNG">https://github.com/ONTOCHAIN/OTCnLNG</a> <a href="https://github.com/ONTOCHAIN/OTCnLNG-contracts">https://github.com/ONTOCHAIN/OTCnLNG-contracts</a> <sup>11</sup>
Low-code app builder	OC3	long	<a href="https://github.com/ONTOCHAIN/Low-code-app-builder">https://github.com/ONTOCHAIN/Low-code-app-builder</a>
ONTOROPA	OC1	short	<a href="https://github.com/ONTOCHAIN/ONTOROPA">https://github.com/ONTOCHAIN/ONTOROPA</a>
ONTOSPACE	OC2	short	<a href="https://github.com/ONTOCHAIN/ONTOSPACE">https://github.com/ONTOCHAIN/ONTOSPACE</a>
OriginTrail DKG	OC2	long	<a href="https://github.com/ONTOCHAIN/DKG">https://github.com/ONTOCHAIN/DKG</a>
PERUNX	OC2	long	<a href="https://github.com/ONTOCHAIN/PXC">https://github.com/ONTOCHAIN/PXC</a>
PiSwap	OC2	short	<a href="https://github.com/ONTOCHAIN/NFTSWAP">https://github.com/ONTOCHAIN/NFTSWAP</a>
POC4COMMERCE	OC1	long	<a href="https://github.com/ONTOCHAIN/POC4COMMERCE">https://github.com/ONTOCHAIN/POC4COMMERCE</a>

<sup>10</sup>A section of this repository includes the Demo interface with CopyrightLY mentioned in [11].

<sup>11</sup>In this project OTCnLNG, all the directories are independent one another and at the same level.

Acronym	OC1 or OC2 or OC3	long or short	Address
PRINGO	OC2	long	<a href="https://github.com/ONTOCHAIN/PRINGO-sdk">https://github.com/ONTOCHAIN/PRINGO-sdk</a> <a href="https://github.com/ONTOCHAIN/PRINGO-backend">https://github.com/ONTOCHAIN/PRINGO-backend</a> <a href="https://github.com/ONTOCHAIN/PRINGO-frontend">https://github.com/ONTOCHAIN/PRINGO-frontend</a> <sup>12</sup>
PS-SDA	OC2	long	<a href="https://github.com/ONTOCHAIN/PS-SDA">https://github.com/ONTOCHAIN/PS-SDA</a>
ReCheck Green Box	OC3	long	<a href="https://github.com/ONTOCHAIN/ReCheck-Green-Box">https://github.com/ONTOCHAIN/ReCheck-Green-Box</a>
REPUTABLE	OC1	long	<a href="https://github.com/ONTOCHAIN/REPUTABLE">https://github.com/ONTOCHAIN/REPUTABLE</a>
SEIP	OC1	short	<a href="https://github.com/ONTOCHAIN/SEIP">https://github.com/ONTOCHAIN/SEIP</a>
SOLID-VERIF	OC1	short	<a href="https://github.com/ONTOCHAIN/SOLID-VERIF">https://github.com/ONTOCHAIN/SOLID-VERIF</a>
TENACIOUS	OC1	short	<a href="https://github.com/ONTOCHAIN/TENACIOUS">https://github.com/ONTOCHAIN/TENACIOUS</a>
TRUSSIHEALTH	OC3	long	<a href="https://github.com/ONTOCHAIN/TRUSSIHEALTH">https://github.com/ONTOCHAIN/TRUSSIHEALTH</a>
UNIPRODAPI	OC1	short	<a href="https://github.com/ONTOCHAIN/UNIPRODAPI">https://github.com/ONTOCHAIN/UNIPRODAPI</a>

### 3 BEST PRACTICES

These recommendations have been distilled from our coaching experience with the OC1 and OC2 teams and applied by the OC3 participants.

#### 3.1 TECHNICAL DOCUMENTATION

The GitHub directory of a third party project will include the following text files :

- the README.md file (mandatory), whose suggested format will be detailed in the following;
- the LICENSE file (mandatory)<sup>13, 14</sup>;

<sup>12</sup>In this project PRINGO, all the directories are independent one another and at the same level.

<sup>13</sup>Without this file, the license does not appear in metadata.

<sup>14</sup>As done for example in the project BELLECOUR node (<https://github.com/ONTOCHAIN/>)



- o the CHANGELOG file (suggested)<sup>15</sup>.

The suggested format for the README.md file is the following:

- o key info
  - o acronym;
  - o extended title;
  - o logo (optional)<sup>16</sup>;
  - o maintenance: to specify if the repository is maintained or if updates are maintained in a different repository;
  - o link to the repository in which the current version is maintained, if this situation applies;
  - o functional overview, with few sentences; for more information add a link to the specific page which details the project on the ONTOCHAIN site;
  - o prerequisites of the execution of code, as the operating system and its version, languages and versions, libraries and versions.
- o implementation
  - o minimum system requirement;
  - o architecture;
  - o main innovation;
  - o APIs with a quick functional overview and a link to SWAGGER<sup>17</sup> for more detailed information. Here is example of a REST API detailed description in SWAGGER<sup>18</sup>;
  - o ontologies;
  - o repository structure, with a description of the content of the repository, to facilitate the navigation.
- o how to

---

`bellecour-node-deployer/blob/master/LICENSE`).

<sup>15</sup>As done for example in the project DESMO (<https://github.com/ONTOCHAIN/zion/blob/main/CHANGELOG.md>).

<sup>16</sup>As done for example in the project PiSwap (<https://github.com/ONTOCHAIN/NFTSWAP>) and CREATE (<https://github.com/ONTOCHAIN/CREATE>).

<sup>17</sup><https://swagger.io/>

<sup>18</sup>[https://app.swaggerhub.com/apis/CTORRALBA/GEONTOLOGY\\_ORCHESTRATOR/1.0.0](https://app.swaggerhub.com/apis/CTORRALBA/GEONTOLOGY_ORCHESTRATOR/1.0.0)

- o compile;
- o run;
- o test.
- o contacts and acknowledgment
  - o contacts;
  - o developer team (optional, but suggested);
  - o funding, with reference to the ONTOCHAIN funding (this info is strictly mandatory).

It is suggested as a best practice to initialize the README file since the beginning of the project and to update it as the project evolves in order to document the progress of activities and to facilitate the final release of the documentation.

---

## 3.2 RECOMMENDED ACTIVITIES

---

To have a more reliable and more maintainable code it is recommended not to overlook these activities:

- o project management documentation;
- o automatic code documentation;
- o static code analysis;
- o coverage analysis and documentation;
- o continuous deployment and test.

These activities can be carried out with different tools: it is up to third parties the final decision about specific tools to use, also on the basis of their background and experience.

In any case, a preferred best practice is to rely first on Github integrated features, as the **project management documentation**, as done by CopyrightLY<sup>19</sup> and **continuous deployment**<sup>20</sup>.

The **static code analysis** can be typically tuned according to different level of accuracy suitable for the appropriate context. An example of such analyzer is the Swagger ana-

<sup>19</sup><https://github.com/rhizomik/copyrightly/projects/1>

<sup>20</sup><https://docs.github.com/en/actions/deployment/about-deployments/about-continuous-deployment>

lyzer/validator for which parses the api code giving a first level check for static errors in such code <sup>21</sup>.

Moreover, as an example of **code documentation**, included APIs, we can mention the project ECOS, which used Docusaurus <sup>22</sup>, and Mkdocs <sup>23</sup> and moreover Redocly <sup>24</sup>) for API documentation.

---

### 3.3 DEMO VIDEOS

---

The projects released demo videos in order to demonstrate the final results of the developments, included also in the respectively GitHub repositories as part of each project documentation. The demo videos are available on the Ontochain website, under the section "Demo videos" of the "Resources" page <sup>25</sup>. Moreover, those video references are documented on the deliverables D4.4 [4], D4.5 [5], D.6 [6] and D4.7 [7]. Another reference document about the project video demos, including some example of the integration across multiple projects, is also available on the mentioned working paper [11].

---

## 4 CONCLUSIONS

---

The ONTOCHAIN project, during its three open calls, selected for funding and coached 44 projects, then framed into the ONTOCHAIN view and architecture, whose results are presently available on the ONTOCHAIN GitHub repository, at <https://github.com/ONTOCHAIN>.

The best practices emerging from the coaching activities so far, as in the project and software documentation and in continuous testing and deployment, were followed and even improved also in the last call and in eventual future extensions in order to have easier to reuse and maintain solutions.

---

<sup>21</sup><https://apitools.dev/swagger-parser/docs/>

<sup>22</sup><https://docusaurus.io/>

<sup>23</sup><https://www.mkdocs.org/>

<sup>24</sup><https://github.com/Redocly/redoc>

<sup>25</sup><https://ontochain.ngi.eu/Resources>

## REFERENCES

- [1] Alberto Ciaramella and Marco Ciaramella. *D4.2 ONTOCHAIN FOUNDATIONS TECHNICAL PROPOSAL*. Apr. 2023.
- [2] Souvik Sengupta et al. *D3.5 ONTOCHAIN FRAMEWORK SPECIFICATION 2 (ONTOCHAIN project)*. Nov. 2022.
- [3] Anthon Simonet-Boulogne and Ambre Toulemonde. *D3.7 Final framework specification*. Oct. 2023.
- [4] Souvik Sengupta and Anthony Simonet-Boulogne. *D4.4 FOUNDATIONS AND APPLICATION EXPERIMENTS IMPLEMENTATION RESULTS (ONTOCHAIN project)*. Sept. 2022.
- [5] Ambre Toulemonde and Anthony Simonet-Boulogne. *D4.5 OntoChain Foundations and Application Experiments implementation results 2*. Oct. 2023.
- [6] Souvik Sengupta and Anthony Simonet-Boulogne. *D4.6 ONTOCHAIN APPLICATIONS AND FRAMEWORK EVALUATION (ONTOCHAIN project)*.
- [7] Anthony Simonet-Boulogne and Ambre Toulemonde. *D4.7 ONTOCHAIN APPLICATIONS AND FRAMEWORK EVALUATION 2*. Oct. 2023.
- [8] Souvik Sengupta, Anthony Simonet-Boulogne, and Ambre Toulemonde. *D4.8 Impact creation of ONTOCHAIN Foundations (Open Call 2), ONTOCHAIN project*.
- [9] Anthony Simonet-Boulogne, Ambre Toulemonde, and Marco Ciaramella. *D4.9 Impact creation of ONTOCHAIN Foundations (Open Call 3), ONTOCHAIN project*. 2023.
- [10] Thanasis G Papaioannou et al. "A New Blockchain Ecosystem for Trusted, Traceable and Transparent Ontological Knowledge Management: Position Paper". In: *Economics of Grids, Clouds, Systems, and Services: 18th International Conference, GECON 2021, Virtual Event, September 21–23, 2021, Proceedings 18*. Springer. 2021, pp. 93–105.
- [11] Thanasis G Papaioannou et al. *A Blockchain-based, Semantically-enriched Software Framework for Trustworthy Decentralized Applications*. online. Accessed on 6 April 2023. 2022. URL: <https://ontochain.ngi.eu/sites/default/files/resources/Ontochain-preliminary-short-technical-white-paper.pdf>.
- [12] Shkempi et al. "Semantic Blockchain Software Tools and Services for Trustworthy Applications - ONTOCHAIN". In: *2023 World Congress in Computer Science, Computer Engineering, and Applied Computing (2023)*.