

IP landscape in blockchain

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NEXT GENERATION INTERNET

Agenda

- ONTOCHAIN project overview
- Blockchain overview
- Blockchain patents landscaping
- Questions and answers

ONTOCHAIN PROJECT OVERVIEW

- ONTOCHAIN project
- ONTOCHAIN partners
- ONTOCHAIN selected projects first call
- benefits for selected projects

ONTOCHAIN

- ONTOCHAIN (<http://ontochain.ngi.eu>) is a Horizon 2020 Next Generation Internet Research and Innovation project *to develop a new blockchain architecture enhanced by semantics, with applications*
- A 3 years project, from 01/09/2020 to 31/08/2023
- A cascade funding project, which activates three calls to third party applicants, to extend progressively the architecture and applications:
 - call 1 (2020-2021), for research to establish the framework,
 - call 2 (2021-2022), for software ecosystem foundations,
 - call 3 (2022-2023), for applications and

ONTOCHAIN PARTNERS

PARTNER	MAIN ROLE	Country
European Dynamics	PROJECT MANAGEMENT	LU
Lubiana University	RESEARCH	
iEXEC blockchain tech	RESEARCH	FR
IntelliSemantic	RESEARCH	IT
Athens University	RESEARCH	GR
Hellenic – German Chamber of Commerce and Industry	DISSEMINATION	GR
F6S	DISSEMINATION	IE

ONTOCHAIN SELECTED PROJECTS 1st Call



BENEFITS FOR SELECTED PROJECTS

- 4,2 Million euro funding distributed in 3 calls (50 projects about)
- coaching provided by ONTOCHAIN research partners
- support based on partners background, including:
 - free use of the iEXEC blockchain platform, a decentralized cloud solution running on Ethereum
 - free use of the patent based technical intelligence solution MyIntelliPatent by IntelliSemantic, populated with blockchain patents, *which is detailed in this presentation*

BLOCKCHAIN OVERVIEW

- Blockchain in essence
- Blockchain history
- Why Blockchain: top reasons
- Blockchain architecture
- Blockchain challenges

Blockchain in essence

- Blockchain is a specific type of database, which stores data in blocks that are then chained together.
- As new data comes in, it is entered into a new block, which is chained onto to previous block.
- A blockchain is immutable, hence data entered are irreversible.
- A blockchain is used in a decentralized way so that no single person or group has control—rather, all users collectively retain control.

Blockchain history

- The first generation: Digital Currencies (2009). The “blockchain era” sparkled in 2008 with a landmark paper by Satoshi Nakamoto (a fictitious name) which suggested the first blockchain architecture which can be used for cryptocurrency transactions.

 - The first and still most used cryptocurrency is Bitcoin.

- The second generation: Smart Contracts (2015). A smart contract is an agreement between two users in the form of computer code, stored in blockchain and enabling new kind of applications, including logistics, e-Commerce, digital rights management in a decentralized architecture

 - The most popular blockchain for smart contracts is Ethereum



Blockchain history and ONTOCHAIN

- The third generation (today). Different challenges are faced by researchers today, as the scalability. These research advances trigger a third generation of blockchain solutions.
- ONTOCHAIN is positioned on research frontiers, since:
 - it aims at a third generation blockchain solution and applications
 - it aims at integrating the semantic web in blockchain architectures
 - the semantic web itself is in a transition phase to more computationally efficient big data style solutions.

Why blockchain: top reasons

Blockchain solutions can enable:

- a more trustworthy internet
 - trustworthy identities
 - trustworthy contents and information exchanges
- a safer and more human centric internet
 - privacy protection
 - self sovereign identities
- a more sustainable internet
 - fair rewards for quality contributions and services

Blockchain: architectural layers (examples)

A blockchain solution can be structured in different layers, as:

1. Application: Finance, logistic, ecommerce etc.
2. Usecase(s): Self sovereign identity, Digital rights management, Reputation, Privacy etc.
3. The infrastructure: smart contracts, distributed oracles etc.
4. The network: on chain, off chain, sidechain etc.
5. Protocols: Ethereum, Hyperledger etc.

*This taxonomy has been used for patents landscaping
(see next section)*



Blockchain challenges (examples)

Blockchain challenges can be structured by different classes of problems, as :

A. Fault: Byzantine fault etc.

B. Attack: 51% attack, Eclipse attack, Sybil attack

C. Testing: Audit etc.

This taxonomy has been used for patents landscaping (see next section)

BLOCKCHAIN PATENTS LANDSCAPING

- why to use patent information
- patent information uses
- blockchain patents landscaping
- blockchain patents landscaping with MIP
- navigating MIP
- what can be inferred
- conclusions and follow up

Why to use patent information

- patent documents are:
 - of value, since the inventor applies to a patent if he/she thinks that the solution is new and innovative
 - Informative: patent documents should in fact include:
 - the prior art
 - the technical problem (defined and solved)
 - solution examples
- it is claimed that 70%-80% of technical information can be found only in patent documents, *although this claim is technology dependent*

Patent information uses

- for specific searches, as:
 - prior art searching: is my new invention so innovative than it is patentable?
- for monitoring, i.e. for identifying quickly new documents
 - from a list of competitors
 - in a specific technology area
- for landscaping, i.e. for identifying key facts and trends
 - from a list of competitors
 - in a specific technology area, *e.g. in blockchain*

Paper based and tool based landscaping

- Different papers today provide patent based blockchain landscaping
 - a significant contribution is “Blockchain patent landscaping” in World Patent Information, June 2020, by N. Clarke (EPO) and alli., which identifies that blockchain patents are booming, with the most significant contributions from China and US
- All papers provide the static landscape at publication time
- This presentation illustrates a tool based landscaping which
 - can provide interactively different kind of views on user requests

MyIntelliPatent (MIP) overview

- MIP is a patent search, monitoring and landscaping tool which:
 - collects in its memory patents from external data bases, by default the EPO patent data base
 - presents different kind of dynamic visualizations to facilitate the analysis of patents collected
- the collection phase is accessed by curators, relying on a wider set of interfaces and commands
- the presentation phase is accessed by final users, with a more focused and specialized user interface
- curator and final user roles are distinguished by the entry password

The blockchain technology landscape with MIP

- The blockchain technology landscape demonstrated in the following is based on a specific MIP system, populated in advance by blockchain patents and accessed through the final user interface
- only the final user interface and the related most relevant interactions are detailed here
- this presentation does not cover the procedures and commands used by the curator for collecting and preparing the collection of blockchain patents

The final user interface overview

- the final user interface includes three main pages, which represent 3 progressive refinements of results, i.e.:
 - the Dashboard page, which provides aggregate tables, as for example the table which summarizes the number of patent applications by years for most active applicants
 - the Search Statistics page, which allows to visualize specific lists of documents, e.g. the list of IBM patent applications in the year 2018
 - the Analyze patent, which allows to analyze a specific patent.

The final user interface overview (1, example)

MyIntelliPatent 1.3.10b¹⁶⁹⁹ Powered by IntelliSemantic disk usage 26%

Using Patent Data of the *EPO Database*

Topic Mode Configuration intellisemantic

User View Dashboard Search / Statistics AU2021101541 – Analyze PDF and Images

Dashboards in orange are oriented to technology experts, Dashboards in blue are oriented to application experts

Custom Dashboards

Table Topic/Priority Year Table Single Applicant/Priority Year

Restrictions [Default view] [Back to default view] [Make selections] [Remove all the restrictions]

Technical rating Application rating

From publication date To publication date

(yyyy or yyyy-mm or yyyy-mm-dd)

Results table [To access the patent lists, please select a value of patent counts in the table]

	< 2010	2013	2014	2015	2016	2017	2018	2019	2020	2021	all years
(none)	1			3	1	10	29	34	33		111
2-Digital_rights_management	1				6	9	52	56	27		151

The example shows

- the page Dashboard selected
- the table Topic/year selected

Only the top of the screen can be included

MIP navigation: the Dashboard page (1)

- The Dashboard page includes two tables:
 - the table which shows the trend of main application topics (e.g. “distributed applications”
 - main application topics are further integrated by their corresponding level in the taxonomy of blockchain concepts, e.g. the concept oracle is extended as 3-oracle, and this facilitates the identification of concepts for technologist
 - the table which shows the trend of main applicants (e.g. IBM) by year

MIP navigation: the Dashboard page (1,example)

Results table

[To access the patent lists, please select a value of patent counts in the table]

Export current patent report

	< 2010	2013	2014	2015	2016	2017	2018	2019	2020	2021	all years
(none)	1			3	1	10	29	34	33		111
2-Digital_rights_management	1				6	9	52	56	27		151
2-Information_privacy	1			1	2	9	28	21	38	1	101
3-Oracle				4	1	8	13	15	26		67
3-Smart_contract		1		2	6	34	88	310	289	3	733
3-distributed_application					1	1	11	8	14		35
4-Consensus_Protocol						7	20	10	2		39
4-Layers_Integration_				1	2	1	6	2	1		13
B-miner			1	6	2	15	31	45	24	1	125
all tag classes	3	1	1	17	21	94	278	501	454	5	1284

To show the topics/year trend

- select the page Dashboard

- select the table Topic/year

The table is shown in the middle of the screen



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MIP navigation: the Dashboard page (2)

- both tables can be suitably restricted and resized by clicking on a parameter, hence it is possible to see the trend of:
 - main applications by year for a specific company
 - main applicants by year for a specific topic
- by clicking on a value in a table, e.g. the number of IBM applications in the year 2018, the page Search Statistic is entered, and the list of the corresponding patents is selected

MIP navigation: the Dashboard page (2,example)

Results table

[To access the patent lists, please select a value of patent counts in the table]

Export current patent report

	2016	2017	2018	2019	all years
2-Information_privacy		2			2
3-Oracle				1	1
3-Smart_contract		1	3	29	33
4-Layers_Integration_			1		1
B-miner	1	1		1	3
all tag classes	1	4	4	31	36

single applicants

IBM (36)

to identify the topic/year profile of a specific applicant

■ restrict the topic/year for this specific applicant, e.g. IBM

The middle and bottom of the screen is shown

A significant increase of "smart contracts" patents in the year 2019 for IBM can be inferred

MIP navigation: the Search Statistics page

- The Search Statistics page is entered automatically by selecting a specific value on the Dashboard page and shows the list of patents corresponding to this value, with summary data, as the title and the abstract
- By clicking on a specific patent of this list, the Analyze page is entered, to analyze complete patent documents
- The Search Statistics page allows to apply further restrictions, not detailed in this presentation

MIP navigation: the Search Statistics page (demo)

MyIntelliPatent 1.3.10b^{1.699} Powered by IntelliSemantic
Using Patent Data of the *EPO Database*

disk usage 26%

intellisemantic

Topic Mode Configuration
User View

Dashboard Search / Statistics US2021157783 - Analyze PDF and Images Help

Commands

Export current patent table [How-to]

Order by:

completeness priority date incoming citations family size search score

Range filter: publication date

from [] to [] Filter
(yyyy or yyyy-mm or yyyy-mm-dd) (yyyy or yyyy-mm or yyyy-mm-dd)

Select filters (below):

[Why to use select filters]
[How to: combine properties in the same filter]
[How to: combine selections in different filters]
[How to: AND selection]
[Why: NOT selection]
[How to: NOT selection]
[How to: deselection]

Select minimal filters

ANNOTATION STATUS [switch to OR mode]
NOT ANNOTATED (29)

Results (lists, tables, charts, distributions)

[How to access a patent]
[How to access equivalent or cited]
[How to access tags]
[How to scroll lists or tables]
[How to download charts or distributions]

abstract + annotations list cited + equivalents + IPC + tags list patent family metadata (table)
patent family abstracts (table) years and IPC chart tags/priority-years distribution
cover pages list

< 1 2 3 >
1 - 10 of 29 RESULTS
elapsed time: 31ms Export this page to CSV PATENTS PER PAGE: 10

DYNAMIC UPDATES OF DECENTRALIZED INVOICES
US2021157783
Applicants: IBM [US]
An example operation may include one or more of detecting, by a blockchain (BC) node, a contract update on a blockchain, determining, by the BC node, at least one charge affected by the contract update, executing, by the BC node, a smart contract to re-generate an invoice based on the at least one charge, and recording the invoice on a ledger of the blockchain.

OPTIMIZATION OF TRUSTED INVOICING
US2021158411
Applicants: IBM [US]
An example operation may include one or more of monitoring, by a blockchain node, a delivery of a service to a first node from a second node based on a service contract and on

By clicking on the number of IBM patents in the year 2019 in the Dashboard page, the Search Statistics automatically entered, showing the list of these 29 patents, on the right section



MIP navigation: the Analyze page

- The Analyze page is entered automatically by selecting a specific patent on the Search Statistics page and provides access to this patent, allowing:
 - to select specific information of this patent, as abstract, designs, claims, description
 - to navigate between patents according to different criteria, the most common of which is to scan the list of selected patents
 - by a license extension (not in the standard ONTOCHAIN package), it is possible also to add scores and comments to specific patents

MIP navigation: the Analyse page (demo)

MyIntelliPatent 1.3.10b¹⁶⁹⁹ Powered by IntelliSemantic disk usage 26%

Using Patent Data of the *EPO Database*

Topic Mode Configuration intellisemantic

User View Dashboard Search / Statistics WO2021073950 - Analyze PDF and Images Help

UPSTREAM VISIBILITY IN SUPPLY-CHAIN

WO2021073950

Applicants: IBM [US], IBM UK [GB]
SUBTOPICS: smart contract

▼ Abstract

An example operation may include one or more of acquiring, by a retailer node, an inventory data from a supplier node over a blockchain network, receiving, by the retailer node, outstanding orders data of the supplier node, generating, by the retailer node, an order distribution policy based on the inventory data and the outstanding orders data, and executing a smart contract to order goods from the supplier node based on the ordering policy.

☆☆☆☆ technical rating
☆☆☆☆ application rating

▼ annotations and links

There are currently no annotations on this patent

SEARCH STATISTICS PATENTS NAVIGATION

Init Scan Next Patent Previous Patent

Scanned: 8 - To Scan: 21

GO TO PATENT

PATENT ID: Submit

Enter a patent id (e.g. WO2011033457) and hit Submit to analyze it

SIMILAR PATENTS NAVIGATION

Init Similar Next Similar Previous Similar

Press "Init Similar" to start navigation

Claims

[How to scroll]

WHAT IS CLAIMED IS:

1. A system, comprising: a processor of a retailer node; a memory on which are stored machine readable instructions that when executed by the processor, cause the processor to: acquire an inventory data from a supplier node over a blockchain network; receive outstanding orders data of the supplier node; generate an order distribution policy based on the inventory data and the outstanding orders data; and execute a smart contract to order goods from the supplier node based on the order distribution policy.

- By clicking on a patent in the Dashboard page, the Analyze page is entered at this patent
- it is possible to access to different patent sections, as abstract, claims

■ it is possible to search between patents of the



Suggested uses for MIP for blockchain: landscaping

- to identify trends related to applicants and topics
- to analyze patents in a specific topic of your interest for the Status of the Art
 - as blockchain based digital rights management
- to refine the analysis of a patent list with peculiar proxies
 - e.g. showing a sharp increase of patent applications
- to refine the analysis of a patent with peculiar proxies
 - e.g. an highly cited patent

Suggested uses for MIP for blockchain: monitoring

- to identify timely new trends
 - new or more active applicants
 - new or more popular topics
 - or a combination of topics/applicants

A quarterly update of the data base seems adequate

Conclusions and follow up

- time for questions and answers now !!
 - 10 minutes
- after this presentation
 - if you are between ONTOCHAIN 1st call selected projects, you will be regularly updated through ONTOCHAIN Slack channel
 - otherwise, If you are interested to more information about this solution and service, including access to the demo, you can send an e-mail to info@intellisemantic.com

34 *Moreover, stay tuned for the coming ONTOCHAIN 2nd call!!!*

STAY UPDATE
AND GET INVOLVED!



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