2021

openIDL

Request for Information (RFI) Response:

North Dakota Insurance Department

Request for Information (RFI)
Solicitation Number: 401-21-01
Date of Issue: September 17, 2021
"*The identification of uninsured drivers using blockchain technology.*"

Response Due Date: October 17, 2021

openIDL

Responding Party Information

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Introduction

The open Insurance Data Link (openIDL), (https://openidl.org/) is an open-source technology and governance project of the Linux Foundation. The Linux Foundation (https://www.linuxfoundation.org/) and open-source solutions are the result of over 25 years of industry and government collaboration to provide trusted, cost effective, technology solutions. Open-source technology is the foundation of the Internet and emerging data security solutions.

While states, federal government and even private companies often begin development of technology solutions with formal procurement for a proprietary solution, the development of the infrastructure for a blockchain platform and the continued development through a community of users will depend upon the ability of the participants in the network to participate, adopt and leverage the solutions**. Our response to this Request for Information is predicated upon the introduction of state participation in the development of a blockchain network through the open-source community of the Linux Foundation**.[1] There will be many opportunities to use openIDL and other blockchain networks with proprietary applications built on top of the infrastructure, but the focus now should be on continuing to extend the base infrastructure and guide the development of the network in the open-source community. openIDL is not a single vendor, proprietary solution, but an open-source solution that provides a transparent, flexible platform for developing cost effective solutions where data or information is needed to solve a problem (like the true cost to a state for uninsured motorist.) We anticipate openIDL may appear somewhat different in terms of the system, costs, timelines and overall proposal than may be received from other organizations. The underlying technology platform has already been built and contributed to the openIDL community, eliminating infrastructure development cost. What is needed now, through this Proof of Concept, is to test the openIDL platform through a network of users you have selected in the 10 insurance companies for this specific purpose. Once this POC is successfully deployed on the openIDL technology platform, the expansion of this POC to a working blockchain network should be through the openIDL open-source community.

Background

openIDL, as a community-driven project, is responding to the RFI in close collaboration with the American Association of Insurance Services (AAIS), a licensed national advisory organization and statistical agent operating as a data intermediary between state insurance regulators and our member insurance companies in the property and casualty insurance market. As an advisory organization and statistical agent, AAIS began to bring participants together in design thinking sessions in early 2018 around modernizing the flow of data in the insurance industry. openIDL was developed by AAIS in collaboration with many insurance industry stakeholders including the North Dakota Department of Insurance to explore reporting insurance data to insurance regulators through a blockchain technology. From those design thinking sessions, the openIDL platform was built with the Linux Foundation's open-source Hyperledger Fabric to develop the base infrastructure that could be used to solve a wide range of data exchange and reporting issues. The first successful Proof of Concept (POC) was completed in May this year around reporting information sought from insurance carriers on the business interruption coverage during the COVID-19 Pandemic (see "*openIDL COVID19 BI POC FINAL REV 8-18.pdf*" in

[1] A detailed review of the participation in open source communities for the Financial Services Industry can be found at https://www.linuxfoundation.org/tools/the-2021-state-of-open-source-in-financial-services/

Enclosures). During the completion of the Business Interruption POC, openIDL was accepted as a project under the Linux Foundation, the code base of the platform was refined for deployment in multiple environments and contributed to the open-source community.

The COVID-19 BI POC demonstrated the capability of the technology platform to solve the company data privacy and information quality challenges facing the insurance industry and regulators. Improving this data stream is necessary to be able to tackle the gaps in information exchange, like the uninsured motorist's identification problem, and support the evolution of risk transfer/insurance products. This information will inform our collective mitigation and insurance solution strategies as well as enable new opportunities to address risks that need innovative solutions.

The purpose of our proposed solution is not to solely provide a onetime solution to address uninsured motorist reporting but to also demonstrate how this solution can address broader data privacy, security and timeliness concerns. In the following pages we look forward to illustrating the value to the State of North Dakota in using openIDL as an open, community supported platform as a transparent, efficient, and objective mechanism for regulatory operations.

Technical Response

This technical response is focused on the stated need to identify uninsured motorists linking North Dakota DOT registered VINs to the 10 personal auto carrier's insured vehicles.

The following sections outline the system description, schedule, costs and user interface as designed to solve data exchange and reporting issues experienced in the insurance industry applied for this POC.

The impact and expectations of specific users within the State of North Dakota, as well as the other critical constituents in the system will be addressed, including:

1. openIDL and the Linux Foundation – providing the open-source technology, community supported, network operations and transparent governance of the platform used to ensure data privacy and information quality.
2. Insurance Carriers – to include first the top 10 largest, but ultimately include all private passenger auto carriers in North Dakota providing insurance verification through a cost effective solution.
3. North Dakota Department of Motor Vehicles (DMV) – maintaining the registry of known vehicles in North Dakota.
4. North Dakota Department of Insurance (DOI) – requiring information to be reported through a blockchain solution about the insurance marketplace.
5. Data Agents – third party organizations who are:
    a. Submitting data to the system as designees of one or more Insurance Carriers (perhaps an Applied/IVANS service or policy admin system feature).
    b. Supporting the operations of the Department or DMV, like a Carfax or risk model, to enrich the gathered industry information, enabling new insights to the risk or measuring progress towards the solution.
6. Licensed Statistical Agent(s) – openIDL proposes including at least one Statistical Agent licensed in North Dakota. AAIS is included in this proposal as merely the first licensed statistical agent in the role. Including at least one Statistical Agent will:

a. Ensure participating carrier privacy and data quality through transparent, consistent, scalable and accepted operations and existing relationships.
b. Support speed, inclusivity and sustainability by connecting the solution to and leveraging existing data streams.
c. Address implicit Anti-Trust concerns around the aggregation of data by operating within existing regulation.
d. Provide specific accountability on the statistical agent implementing the process to regulatory audit and transparent processing.

Solution Scenario

In order to link registered VINs with insured VINs, we will need to:

1. Deploy openIDL nodes with specific insurance information from the top 10 personal line auto carriers in the state. Insurers identified by the Department may deploy their own node or use a Multi-tenant Node managed by AAIS.

2. Leverage the North Dakota DOT's registered VIN database by either deploying the information to a separate node or leveraging the information in the database through the smart contract execution and analytics node environment.

3. Develop the smart contract that will connect the information and deliver match to the analytics node.

Week(s)	Activities & Milestones
1	Design Thinking for determination of the Node's Configuration
2 through 5	AAIS Deploys Multi-Tenant Node for hosted services Carriers Deploy Private Nodes and populate data
2 though 5	DOT VIN data configured in analytics node or established API to export to Analytics Node
6 through 8	Smart contract configuration for extraction to analytics node
6 through 8	Existing User interfaced extended for POC

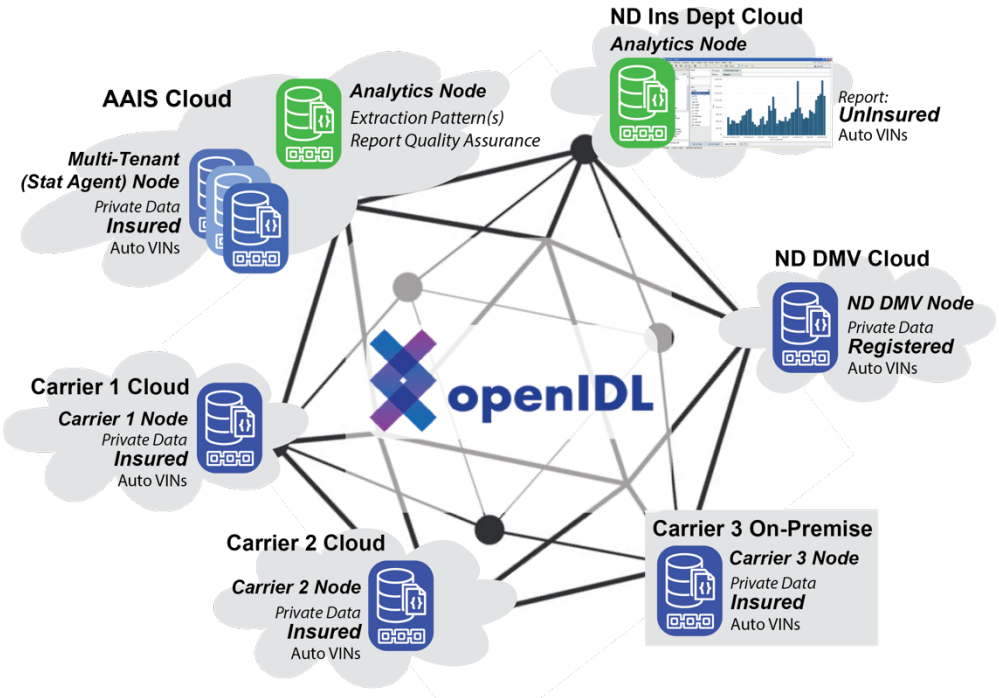
Description of System

openIDL establishes a distributed data network where Data Owners (for this POC, the vehicle Insurers or Agents acting on behalf of Insurers) establish and maintain their own trusted piece of the industry data, kept private but made available for queries on the network. That data is ready to act in concert with other community members' data (the DOT Vin data) to return timely, summarized, aggregated, and anonymized information to information seekers such as the State of North Dakota, Department of Insurance.

The use of the openIDL platform provides an interface to define context and purpose of information requests in a clear and well-defined mechanism, that allows interaction among stakeholders – untrusted amongst each other – to evaluate requests using transparent, objective "smart contracts" – software of

blockchain-assured integrity. This web-based platform gives carriers and other data providers assurance of privacy and control, and Regulators as information seekers, of the quality, timeliness, and auditability suitable of the response. The transparent governance and community supported open technology enables solutions to be improved and accelerated over time based upon the use of the system.

Each participant in the network will "stand up an openIDL node" that will represent their data and data exchange capabilities on the network as one of the above "named" Organizations (North Dakota DOI or DMV) or types of Organizations (Carrier, Data or Statistical Agent) and has the technology to support their role in the proposed solution and specific operations.

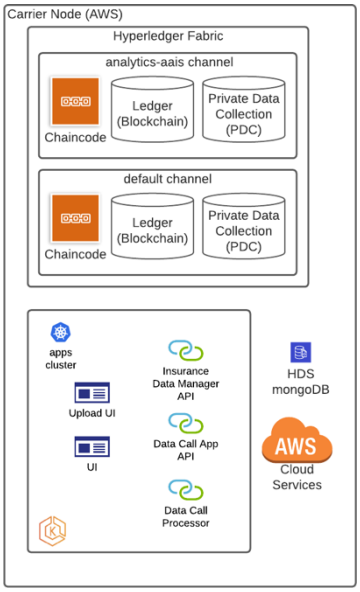


We call the software stack "*openIDL In a Box.*" The openIDL software solution is common across each participant deployment for transparency but only the functions which are relevant to that organization is permitted to interact with the system. openIDL is available as open-source technology from the openIDL.org GitHub project today. Each openIDL node installation has the potential to act in one or any of three capacities:

1. Carrier (or Insurer) Node – where the data-kept-private resides within an Insurer
2. Multi-Tenant Node – deployed by a Insurer or agent representing reporting Insurers
3. Analytics Node – where the results of a successful Data Call (query of the network) is delivered and potentially visualized through a User Interface or reported.

The last role, Analytics node, any node could perform, with proper user authorization. Only authorized Users have the "governance" role capable of changing information exchanges in the openIDL platform with consensus of members. That function is performed by elected openIDL Members deploying vetted enhancements to the platform technology. For the purposes of this POC, AAIS, as a Statistical Agent, develops the transparent query logic and specific code that is executed on the private data.

Insurer or Carrier Node



An openIDL node deployed for an Insurer contains the modules that will allow for:

1. Managing the blockchain ledgers (*channels*) that assure privacy and integrity of data and operations between participants.
2. Ingesting insurance data and assuring quality to a common format (the extract-transform-load process, or "ETL" engine).
3. Storage of ingested data in a private, secure Harmonized Data Store (HDS).
4. Web interfaces, APIs and User application to view, like and consent to interactions with the system.
5. Execution of consented, transparent "extractions" or queries of local harmonized data – regulatory "Data Calls" by the Data Call Processor.
6. Resulting data is delivered using the Private Data Collections of Hyperledger Fabric to deliver requested information – and delete it.
7. Privacy of the participating carriers and agents is assured through transparency and "opt-in" consent processes through the APIs and UIs.

Multi-Tenant Node

A Multi-Tenant Node has the same capabilities as a single Insurer Node, however it is under the direct stewardship of an agent responsible for managing the participation of a third-party insurer and trusted to maintain security and integrity across unrelated organizations' data. In today's regulatory reporting model, these are either licensed Statistical Agents, or software tools or service providers providing data directly to Regulators in the name of each Insurer.

The openIDL solution recognizes Agent organizations on the network as being trusted by Insurer organizations who do not manage their own node on the network with a "Multi-Tenant Node" configuration. It is the same construct, only ingesting, liking and consenting etc. for multiple companies using a single "openIDL in a box" configuration or one operated by a third party allowing the companies to make their own selections without managing a node themselves.

Analytics Node

An openIDL node deployed by a Regulator in our scenario, is referred to as an "Analytics Node". Analytics Nodes receive the output response from each participant Insurer consenting to a successful "Data Call". Analytics Nodes will have the potential for the above features, if deployed by an Insurer, and robust support for:

1. Data Visualization – facilitating dashboards as well as specific inquiries or listings of changed sets of data.
2. Creation of New Inquiries of the Market as "Data Calls" – interfaces only available to Regulators allow the creation of additional queries of the market to repeat, inform and improve the inquiries over time.

Organizations deploying openIDL nodes have flexibility in terms of how they can best support the technology as an enterprise. The platform was designed to be cost effective and free from expensive software licenses, scalable to any size organization and adaptable to enterprise deployment environments and cloud providers.

Infrastructure Technologies

The two open source technologies that are core to the openIDL reference implementation are ***Kubernetes*** and ***Hyperledger Fabric***.

Kubernetes

Managing the distribution, ongoing operation and scalability of a tightly trusted system of integrated applications is a complex and constantly changing challenge – and one familiar to IT organizations. Kubernetes, an open source project, has emerged as a core enterprise infrastructure technology across clouds and specific hardware configurations that allows for "infrastructure as code" deployments. A Kubernetes "cluster" serves as an application or component – like a database or User Interface (web server) or piece of the system like a certificate manager. Clusters are managed and deployed as packages of code that, with minimal configuration and manual intervention, establish the necessary environment to be up and running in minutes with all the production expectations in place.

Today Kubernetes is broadly supported by cloud providers and readily deployable on any hardware handy, using open-source tools. This means that the logic and technology stack of the infrastructure is consistent, managed and supported by the community and commercial partners. openIDL can be deployed by an organization independently, in their own environment, and scaled even automatically, leveraging common services and reinforced to meet any organization or regulatory standards. Because the Kubernetes clusters are deployed and managed completely within an organization, the organization has complete control over those facilities and their tolerances for performance, security or availability, and the organization will be accountable to provide adequate resources to the environment in the form of processing power, memory, bandwidth, and storage to perform the operations – the "commodities" of today's IT.

Hyperledger Fabric

The one core software component within the application stack, that runs on the Kubernetes infrastructure, that brings the network together and is the "backbone," is Hyperledger Fabric – the underlying enterprise blockchain, or distributed ledger technology (DLT), which is also a Linux Foundation community software and governance project.

openIDL uses Hyperledger Fabric authentication, distributed ledger "*channels*" and "*smart contract*" code for:

- Establishing and credentialing the identity of the reporting Insurer on the network
- Recording of the integrity of insurer interactions and data to the ledger, including:
    - Insurance data ingestion process execution
    - Ingested data "chunk" integrity hashes
    - "Like" or "unlike" of Data Call drafts
    - "Consent" to issued Data Calls

  - Retrieval of Extraction Patterns attached to Data calls
  - Execution of Extraction Patterns (submission of data) by Insurer nodes
- Communication of consented, extracted information securely and reliably to the Analytics Node, using Hyperledger Fabric's Private Data Collection/Gossip protocol

Security and Controls

Because the private data remains in the direct control of the data owners – Insurers – they are able to affect the controls and protections of their own data that satisfies their enterprise.

The transactional smart contract code and the managed integrity of the openIDL software and blockchain ledger ensures that each participant is accountable for the performance of their own node in the data network. The information that is transmitted between nodes or that traverses over the wire is intentionally very limited and, without broad data context and specific identifiers, is not useful or identifying if compromised. Because of the use of blockchain to assure data integrity, even if security fails, manipulated data would be detected and not introduced into the information system.

openIDL provides the ability to objectively assure that operations are performing with integrity due to the transparent code that is at the heart of the platform and the ledgers that prevent the alteration of history as well as ensuring the validity of participating organizations. This level of integrity is transparent, and can be a very low bar to begin, and raised as the mechanisms are proven and mature, to support evolving risk transfer mechanisms for innovation in auto and mobility solutions.

User Interface

Reference user interfaces and APIs are built that can be tailored to integrate the openIDL platform and node applications into any enterprise operation like an Intranet or reporting process. The bulk of the code is Javascript (Node.JS and Angular frameworks) or Go for some of the Hyperledger "chaincode" that performs operations on the channels themselves.

Specific applications for ETL (extract-transform-load) or visualization (reporting solutions) can be selected depending on the needs of the scale or technology of the participating Insurer or the desired output solutions initially or over time for Regulators. Output might begin as a periodic static report, evolve to a transactional system to facilitate bringing risk into the private market, to a increasingly real-time dashboard of metrics with drill-down capabilities to target and prevent losses and provide opportunities to provide coverage.

It is anticipated the existing web and API interfaces will be expanded to include the specific transactions and information services proposed to manage the specific uninsured vehicle challenge.

Sustainability and Value

Insurers may be required to participate for this POC, however, a more sustainable solution would be based on a mutually beneficial mechanism that supports insurance data exchange and reporting for the insurance industry activities which incentivizes the insurance market, including regulators, to create a network through the open-source community.

Once it is proven that we can successfully match the data elements of VIN, it is anticipated that additional information can be integrated to the analytics node to provide further insights that may enable a state to expand the proof concept.

Additional expanded use cases for this POC could explore increasing the value and enabling the State to know:

1. Of the known population of VINs registered, how many can be estimated to have coverage in-force:
   a. updating as the population of registered VINs changes
   b. as “covered” VINs renew or expire

2. Losses paid from Uninsured Motorist coverage in-force for those insured VINs by participating Insurers.
   a. correlation of populations and insured/uninsured subsets to actual uninsured losses.
   b. 3.The over-time population of uninsured vehicles and the correlated expectation of uninsured accidents and losses, to a narrower window of uninsured incidents.

3. Immediate acceleration in the timeliness of reporting to monthly intervals

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Cost Estimate

openIDL is no-cost technology, as open source community licensed software, and Membership in openIDL for Organizational registration to the openIDL network and the Linux Foundation is **no cost** for State and government organizations.

State Cost: There is an expectation of time commitment by representative of the State of North Dakota DOI and DOT to establish initial protocols for this POC. Consideration should also be given to the cost from any third party vendor managing the DOT VIN data for the project. The decisions to be made in design thinking around how data will flow into the opeIDL will drive the cost for managing access to the DOT VIN data based upon the complexity of that determination. Following an MVP model that assumes the State's deploying a reliable Analytics Node that is lightweight in the system design and efficient in operations, cloud costs to the State could be less than a few thousand dollars per month, including production reliability and continuity services for expansion of the POC to production.

The State may choose an approach that leverages commercial software or provides more robust data or integrations that increase the footprint of the platform in cloud terms, however that should be easily demonstrable to value from the system as it contains more data or does more frequent or complex work to surface information from the network.

Insurer Cost: The top 10 carriers that are asked to participate in this POC will also have variable cost to support the project. Insurer nodes would have low operational cost, related directly to the size of the company. There would be an initial investment of time to establish the insurance data required to support the POC. This would be minimized as the data aligns with existing patterns or standards.

AAIS has experience with nodes and tests in both IBM and AWS cloud environments and can provide some example performance profiles that be indicated depending on the specific approach.

AAIS can host a Multi-Tenant Node supporting their role as a Statistical Agent for Insurers who report and may participate through that relationship before establishing their own node on the network. AAIS is prepared to support North Dakota Insurers as the State would like them included in the data network population.

openIDL and AAIS would not require full Membership for insurers to participate in the purposes of the initial use case.

The specific and ongoing costs will be directly related to the weight of the system and the components in the direct control of the participants. Expansion of the VIN to VIN use case would be fairly standard applications to maintain, with "commodity" costs related to the scale of the nodes with respect to bandwidth, memory, processing and storage. These should be familiar and directly scale with the size of the organization, and accessible to any Insurer able to provide Private Passenger Auto coverage.

Any continued development or expansion of the initial use case in this POC should be under the Linux Foundation openIDL Project. Continued cost for Members of the openIDL network that participate through Linux Foundation Membership for insurers can be found at https://www.linuxfoundation.org/.

Enclosures

The following information is provided for further reference.

Documents

The following documents were included with this submission:

- Hyperledger Case Study: openIDL
  - *Hyperledger_CaseStudy_openIDL.pdf*
- openIDL COVID-19 Business Interruption POC Report
  - *openIDL COVID19 BI POC FINAL REV 8-18.pdf*
- The 2021 State of Open Source in Financial Services (FINOS Report)
  - *LFResearch_FINOSSurvey_Report_100721.pdf*
- Hyperledger Meetup: openIDL Architecture Presentation June 22, 2021
  - *openIDL – Architecture_HyperLedgerMeetup_22jun21.pdf*

Online References

- openIDL Public Website
  - https://www.openIDL.org
  - Regulator Membership is No Charge
  - Join Now - please contact openIDL or AAIS if you have any difficulty registering.
- openIDL Wiki – community forums, charters, events and information
  - https://wiki.openIDL.org
- openIDL Technical Steering Committee Space: governance board, meetings/notes, architecture documents, decisions and intentions
  - https://wiki.openidl.org/display/HOME/Technical+Steering+Committee
- openIDL Regulatory Reporting Steering Committee Space: governance board, meetings/notes, decisions and intentions
  - https://wiki.openidl.org/display/HOME/Regulatory+Reporting+Steering+Committee
- openIDL GitHub – reference (main) code, infrastructure and data model repositories
  - https://github.com/openidl-org
- openIDL Mailing List Registration – Board, Regulatory, Technical and Community lists
  - https://lists.openidl.org/groups
- openIDL Slack Channel
  - https://openIDL.slack.com