

## **Response of the Global Legal Entity Identifier Foundation (GLEIF) to the Blockchain White Paper on the technical applications of Blockchain to the United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT) deliverables**

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**The Global Legal Entity Identifier Foundation (GLEIF) is pleased to provide comments to the Blockchain White Paper on the technical applications of Blockchain to the United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT) deliverables. GLEIF will focus its comments on the use of the Legal Entity Identifier (LEI) in the white paper.**

First some background on the LEI.

The development of a system to uniquely identify legal entities globally had its beginnings in the 2008 financial crisis. Regulators worldwide acknowledged their inability to identify parties to transactions across markets, products, and regions for regulatory reporting and supervision. This hindered the ability to evaluate systemic and emerging risk, to identify trends, and to take corrective steps. Recognizing this gap, authorities, working with the private sector, have developed the framework of a Global LEI System (GLEIS) that will, through the issuance of unique LEIs, unambiguously identify legal entities engaged in financial transactions. Although the initial introduction of the LEI was for financial regulatory purposes, the usefulness of the LEI can be leveraged for any purpose in identity management for legal entities both by the public and private sectors spanning all industries and sectors.

The LEI initiative is driven by the Financial Stability Board (FSB) on behalf of the finance ministers and governors of central banks represented in the Group of Twenty (G20). In 2011, the G20 called on the FSB to take the lead in developing recommendations for a global LEI and a supporting governance structure. The related FSB recommendations endorsed by the G20 in 2012 led to the development of the Global LEI System that provides unique identification of legal entities participating in financial transactions across the globe and the subsequent establishment of the GLEIF by the FSB in 2014. The GLEIF is overseen by a committee of currently 71 global regulators and 18 observers, known as the LEI Regulatory Oversight Committee (LEI ROC).

The LEI itself is a 20-digit, alpha-numeric code based on the ISO 17442 standard developed by the International Organization for Standardization (ISO). The code connects to key reference information that enables clear and unique identification of legal entities participating in financial transactions including their ownership structure. Moreover, the LEI provides freely accessible look up (identification) of the parties to transactions. The complete database of LEIs and the associated LEI reference data is available free of any charge or barrier to anyone on the web. GLEIF operates under the Open Data Charter terms, which means the data can be used by all users without limitations.

To create trust in automated transactions, the first step is to be able to offer reliable digital identities in order to allow any party to know the identity of the counterparty. This includes but is not limited to supply chain, digital markets, trade finance, and many more. An alternative approach would be an anonymous system, where the true identity behind a digital ID is not revealed to the public at all. In the

following GLEIF assumes that UN/CEFACT wishes to implement solutions with identity information linked to transactions, both public or authorized on request.

Use of the LEI is fit for purpose to support the digital identification needs for legal entities of the supply chain and trade finance for the following reasons:

- As a universally unique identifier for counterparties to financial transactions, based on an international standard, the LEI itself can be considered a relevant attribute in many applications where authenticated transactions are relevant.
- The LEI is a quality-controlled unique identifier supported by a transparent infrastructure of local identity validation and a centralized open data challenge service.
- The LEI provides standardized reference data including now information on direct and ultimate parent organizations. Ultimately it will show any eligible entity in a network of ownership and other relationships.
- The LEI acts as a “bridging identifier” between databases/platforms. It requires no special access arrangements to use the LEI data and no concern to expose any confidential information.

Digital identity is usually linked to the use of cryptographic algorithms for the creation of private/public key pairs. Prominent examples are digital certificates and several blockchain implementations. The LEI as part of a digital identity would bind the identity to authorized representative(s) of the legal entities involved in the physical supply chain and the associated trade finance process. For instance, standard digital certificates would be used to cryptographically secure data in electronic form, which is attached to or logically associated with other data in electronic form to ensure the latter’s origin and integrity.

- Transactions signed with such a certificate could be unambiguously tracked back to the originator (to identify legal entities in frameworks for resource discovery and in an inter-ledger notary protocol).
- Validation and verification of individuals or groups need to be done anyway. Using the LEI allows validation and verification only once, and not multiple times, as it is today.
- Blockchain / distributed ledgers should consider using these digital certificates and the underlying standards (ITU X.509/ ISO IEC 9594).
- A distributed ledger also could be used to manage the digital certificates themselves.

Access to the data records of legal entities is no further away than querying the distributed LEI Repository by means of local access to a database clone or via a standard Application Programming Interface (API) to verify the identity of the entity whose LEI is embedded in the digital certificate.

The major advantage of such an approach would be the segregation of identity management and authentication/authorization. Identity management includes the global standardization of validation of any legal entity data against publicly available authoritative sources, e.g. business and tax registries. The LEI provides a global standard for the representation of identity as well as a standard validation rule set. Both are subject of a very detailed compliance program in order to ensure proper issuance/maintenance of LEIs and data quality.

In the event of emerging blockchain applications not being based on the LEI standard, it would basically mean the creation of multiple identification methods, requiring error prone mapping initiatives, expensive API development cross blockchain and therefore increased costs and inferior data quality, thus inferior reliability.

The white paper outlines a hypothetical example in Annex 2. The steps in this example in which the LEI could be leveraged are highlighted (in bold) and explained below (in italics).

**Wine producer Perfect Pinot Ltd. is a registered business on the Australian national business register at [abr.gov.au](http://abr.gov.au) with Australian Business Number (ABN) 111222 and is located in New South Wales (NSW).**

*The data record of the LEI includes a reference to the business registry and the national number (subject to distribution restrictions) of the legal entity. GLEIF maintains under global regulatory oversight a list of about 650 dedicated registries used for data validation. Further, the existing network of LEI issuers include several business registries as accredited LEI issuers.*

**Perfect Pinot Ltd. produced and bottled 100,000 bottles of its 2016 vintage. Each bottle has a unique serial number identified by a signed Quick Reference code (QR code) on each bottle using a system from Smart Tags Inc.**

*GLEIF has undertaken an initiative to develop a semantically correct model of LEI/reference data. QR codes are in scope for this development. GLEIF also works with GS1 Global to map LEIs to GLNs to identify legal entities behind physical goods.*

- Smart Tags Inc. writes the batch of QR codes to an Ethereum blockchain anchored goods provenance system that they run on behalf of wine producers.
- Wine exporter Fine Reds (ABN 222333) negotiates an export deal with Chinese wine importer Hunan Wines which is registered on the China National Enterprise Credit Information system with an Administration for Industry and Commerce number (AIC number) 444555.

**Hunan Wines places an order for 1,000 bottles of Perfect Pinot Ltd. with Fine Reds. Using a resource discovery framework, Fine Reds' platform looks up the Hunan Wines platform and e-invoicing internet address and sends the commercial invoice directly to the target platform in accordance with UN/CEFACT semantic standards.**

**Because Fine Reds and Hunan Wines are on different platforms and because the commercial invoice is one of the foundations of trust, the invoice is also notarized/registered on a public blockchain using an inter ledger notary framework. Hunan Wines indicates their acceptance of the invoice (also notarized).**

*The invoice can be digitally signed with the LEI of Fine Reds embedded in its digital certificate, using an inter-ledger notary protocol, verifying the identity of the company preparing and sending the invoice as one of the foundations of trust.*

*Similarly, Hunan Wines can accept/approve the invoice using its digital certificate with its embedded LEI using an inter-ledger notary protocol.*

**Fine Reds grants permission to access the notarized invoice to their bank which provides lower cost trade finance when transactions are notarized.**

*Fine Reds can grant permission to its bank using its digital certificate with its embedded LEI using an inter-ledger notary protocol, further driving the cost of this process down while increasing the level of trust in an automated, verifiable manner.*

The conditions of carriage require that the wine remains under 25 degrees and above 5 degrees centigrade during the shipment, so Fine Reds engages the services of Cool Shippers for freight forwarding. Cool Shippers have instrumented containers with IoT temperature sensors and Global Positioning System (GPS) tracking.

**Cool Shippers provides Fine Reds with the container ID and Fine Reds uses a resource discovery framework to find the container web internet address and subscribe to the container data feed.**

*Cool Shippers can send the container ID to Fine Reds signed with its digital certificate with its embedded LEI. Fine Reds can subscribe to the container data feed by using its digital certificate with its embedded LEI to verify its identity to the container data feed platform.*

**Cool Shippers provides the signed and notarized invoice and the smart tags blockchain reference to the NSW chamber of commerce which verifies the data and issues an automated and signed certificate of origin which is registered on a blockchain.**

*Cool Shippers can provide the signed and notarized invoice and the smart tags blockchain reference to the chamber of commerce digitally signed by its digital certificate with its embedded LEI.*

**Cool Shippers creates a consignment reference using their logistics platform and provides the consignment ID to Australian customs via an authenticated session established by the single window API. Australian customs uses the resource discovery framework to locate the consignment data and subscribes to data feeds about the consignment.**

**The consignment data includes a reference to the notarized invoice, the container ID, the carrier ID, and the certificate of origin ID. So Australian customs can discover full data about each entity, verify integrity, and create an approved export declaration. The export declaration (with links to supporting data) is recorded as a smart contract on an inter-organization ledger.**

*Cool Shippers can provide the required consignment data to customs accompanied by its digital certificate with its embedded LEI. Similarly, customs can sign the export declaration with by its digital certificate with its embedded LEI.*

- The importer clicks a button to review and approve all export & shipping documentation and submit the import declaration.

**China Hunan province customs authority observes a new import declaration. China customs verifies the trade documents and confirms that Fine Reds and Hunan Wines have a sufficient history of high integrity trading. The consignment is pre-cleared by Hunan customs.**

*Customs can record its pre-clearance of the consignment by digitally signing the import declaration with its digital certificate with its embedded LEI.*

- On arrival in Dadukou Port, the container data feed indicates that the cargo has landed and unpacked. The temperature history is notarized and confirms that temperature has remained below 25 and above 5 degrees centigrade for the duration of the journey.

**When the pallet of wine is scanned into Hunan Wines warehouse, the consignment resource IoT device emits the “received” event. This, together with other notarized transactions is sufficient information for Fine Wines’ bank to release an invoice finance payment at very reasonable terms.**

**Hunan Wines releases the Perfect Pinot Ltd. wine to a number of retail outlets in Hunan province. A customer buys a bottle and scans the QR code on the bottle. The smart tags platform confirms the authenticity of the wine and records the scanning event against the specific bottle serial number.**

*The identity of the legal entity Fine Wines can be contained in the QR code through its LEI even down to the consumer level.*

The proposed use of the LEI creates another advantage. While distributed ledger technology could be used to allow the recording of then immutable transactions and settlement using the hash generated by using digital certificates, the bulk of the digitally signed data could be stored either on chain or in databases. Volume considerations would probably suggest storing the data in available SQL or non-SQL databases. The digitally signed content would ensure the integrity of the data with the associated transactions. This model would also allow distributed storage of data and access management.

GLEIF looks forward to extending the usefulness and applicability of the LEI to support identity verification and management in the supply chain and accompanying trade finance process and welcomes the opportunity to discuss this approach in more detail within the context of the implementation of Blockchain by UN/CEFACT. GLEIF would be delighted to discuss the use of the LEI and related questions in a meeting or webinar.