



February 28, 2014

Secretariat to the Financial Stability Board  
Bank for International Settlements  
Centralbahnplatz 2  
CH-4002 Basel  
Switzerland

via email to: [fsb@bis.org](mailto:fsb@bis.org)

**To the Financial Stability Board,**

We respectfully submit this response to your consultative paper as a follow up to the paper we presented to the FSB Aggregation Feasibility Study Group's (AFSG's) Outreach Workshop Meeting in Basel, Switzerland on November 13, 2013 (see attached) and our paper on the Global Identification of Counterparties and Other Financial Market Participants presented to the FSB's Global LEI working group on January 20, 2013 (also attached).

Sincerely,

Handwritten signature of Allan D. Grody in blue ink.

**Allan D. Grody**

President: Financial InterGroup Holdings Ltd, and  
Former Adjunct Professor, Leonard N. Stern  
Graduate School of Business, New York University

Handwritten signature of Peter J. Hughes in blue ink.

**Peter J Hughes FCA**

Managing Director: Financial InterGroup (UK) Ltd, and  
Visiting Research Fellow, Leeds University Business  
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Special thanks to Dr. Daniel Reininger, President and CEO of Semandex Networks, Inc. for his critical insights and reviews of drafts of this document and his continued support of this project.

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## Response to Financial Stability Board's Consultative Paper:

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### Feasibility Study on Approaches to Aggregate OTC Derivatives Trade Repository Data

The objectives for this feasibility study are succinctly laid out in the FSB's consultative paper ([http://www.financialstabilityboard.org/publications/r\\_140204.htm](http://www.financialstabilityboard.org/publications/r_140204.htm)) at page 10 in discussing the twenty-two (22) Trade Repositories (TRs) now in operation or in their formative planning stage:

*“Even once reporting requirements are in place in all jurisdictions, no single authority or body will have a truly global view of the OTC derivatives market, even on an anonymised or aggregate-level basis, unless a global aggregation mechanism is developed.”*

To the significance of the absence of such aggregation capability for regulatory oversight, at page 13:

*“For these mandates, a global aggregation solution is essential for providing adequate transparency to the official sector concerning the OTC derivatives market. Currently, no authority has a complete overview of the risks in OTC derivatives markets or is able to examine the global network of OTC derivatives transactions in depth. Essential to aggregation is an ability to combine like data elements reflected in transactions and positions.”*

To the significance of data standards, at page 29:

*“The development of global standards for derivatives data and their aggregation is a foundational requirement under any data aggregation model. Standards form the basis for the interoperability of derivatives data; they are agnostic to choice of aggregation option as they are a prerequisite for every option.”*

The essential pillars for combining financial transactions are two unique and standardized identifiers as reflected in computer readable codes, the identity of the financial counterparty and the identity of the instrument or contract entered into between the counterparties. A third identifier, one which allows for identifying the actual transaction between the parties, is essential for maintaining the integrity of the transaction details when those transactions are aggregated into positions. In trade repositories such transaction level identification is essential because of the long tenor of the individual transactions and

the exposures that remain open on individual transactions between the counterparties. It is also essential to eliminate double counting of transactions, an issue we will address later. To the point of global identification standards, at page 35 of the consultative paper:

*“The following data elements have been identified in the Data Report as key to the aggregation process.*

- *Counterparty identifier*
- *Product identifier/product identification taxonomy*
- *Transaction/trade identifier”*

Unlike many other industries, the ‘parts’ inventory (instrument and contract meta-data) and the global supply chain of clients and intermediaries (legal entities), while all defined digitally are defined differently, not only in different local markets and different trade repositories but amongst business units within the same firm. This is so even though they are used for precisely the same purpose: requesting price quotes; assembling orders into trades; executing trades with counterparties; clearing, settling and paying for these trades through various intermediaries; and aggregating this information for reporting to regulators and other stakeholders.

It is not surprising then that after the financial crisis of 2007-2008 local regulators and the FSB asked for a global identification standard for clients and products. This consultative paper also recognizes the need for standardizing data tags for standard data elements. This has been accepted by all as the means to efficiently process, aggregate and track financial transactions. Standard counterparty identifiers are an essential early pillar of the FSB’s mandate to bring transparency to financial markets, analyze systemic risk and, thus, fulfil its mandate from the G20 to stabilize the global economy.

These objectives, however, are dependent on the ability to use the standard counterparty identifiers (the Legal Entity Identifier – LEI) to aggregate associated transaction and risk data and to redact certain confidential information on counterparties where required by privacy restrictions. From the FSB’s Recommendation of June 8, 2012 on the Global Legal Entity Identifier System (underlining added):

*“In particular, the FSB recommends the rapid development of the standards for LEI reference data on ownership and corporate hierarchies, as these data are essential to achieve one of the key objectives of risk aggregation for the global LEI system. The FSB consequently recommends that work is taken forward urgently to develop proposals and, if necessary, global standards for additional reference data on the direct and ultimate parents of legal entities to address the current operational constraints that prevent timely and effective data aggregation.”*

*“The next step in this work will need to address the challenge that some jurisdictions may not, at least immediately, be able to share such information due to confidentiality and privacy restrictions. That will also affect where such data can be stored in the*

*global LEI system (locally or centrally). Ideally, legal and technical arrangements can be put in place to enable sharing of confidential information and additional scrutiny.”*

Further, the FSB’s current Feasibility Study, while not setting out to propose changes to the data reported to TRs or the data held by TRs, does wish to consider changes where necessary or desirable to achieve aggregation. Specifically:

*“It notes where relevant improvements in market practices or infrastructure (e.g. introduction of a global Unique Product Identifier (UPI) or Unique Transaction Identifier (UTI)) that would assist the aggregation process, and it recognises where relevant that the aggregation option chosen may have impacts on TRs, market participants, related data providers, authorities and other stakeholders.”*

These three identifiers (the LEI, UPI and UTI) were first defined by regulators in consultative documents at the end of 2010 by the newly installed US Treasury’s Office of Financial Research, the CFTC and the SEC. Its US implementation was later moved to the FSB for global implementation. Our proposal, issued with others at that time, responded to the request for an integrated solution asked for by these three agencies for these three identifiers – the LEI (then known as the Unique Counterparty Identifier –UCI), the UTI (then known as the Unique Swaps Identifier – USI) and the UPI. Those responses are in the public record of each agency. To quote the CFTC in 2010:

*“Without such unique identifiers, and the ability to aggregate data across multiple markets, entities, and transactions that they would provide, the enhanced monitoring of systemic risk and greater market transparency that are fundamental goals of Dodd-Frank cannot be fully achieved.”*

Our proposed approach for swaps data aggregation reflects our work on these three global identifiers. The same access mechanism suggested for the Global LEI System (GLEIS), which also has access issues of multiple pre-LOUs (Local Operating Units) supporting local pre-LEI registries, obtains for local TR data storage and global aggregation.

The approach we are proposing is a variant of Option 2 (the Central Index model) and builds off of the FSB’s desired implementation of the final version of the GLEIS described in the FSBs Recommendation of June 8, 2012 on the Global Legal Entity Identifier System on page 4 at footnote 3:

*“The COU will support the maintenance of a ‘logically’ centralised database of identifiers and corresponding reference data – as with the Internet, the database will appear to users to be from a single seamless system, but again as with the Internet, the data will be physically stored on different systems across the globe. Technology will deliver the logical centralisation.”*

The COU (Central Operating Unit) is the pivotal operational arm of the global LEI system and has yet to be designed or stood up. Its importance is noted by the FSB:

*“In particular, the COU has responsibility for ensuring the application of uniform global operational standards and protocols that deliver: global uniqueness of the LEI; seamless, open access to the global LEI and to high quality reference data for users (with the depth of access controlled by appropriate access rights); as well as protocols and methods for how local systems can connect to the COU, including the necessary support of the local systems.”*

It was wise for the FSB to use the Internet as a design concept. The Internet has been built as a resilient network with multiple points of failure easily reconciled through rerouting messages dynamically around any such individual or multiple node failures. The Internet is designed to keep the whole of the infrastructure continually accessible. It is a remarkably agile federated network and data storage mechanism for a robust implementation of the LEI system, for the UPI system, and for TR access, storage and aggregation, and beyond that to systemic risk analysis.

Our response on a proposed variant to Option 2 is summarized below, reflecting on both the COU and the Central Index as variants of the same concept:

We suggest disbursing the Central Index as the locator index directory at each TR. As the need arises to search outside a local TR the system will ‘dial’ the corresponding TR. In this scenario the Central Index of Option 2 - or the COU of the GLEIS - functions as an aggregator of the data directory and pushes a copy to each TR (or to each pre-LOU). For those familiar with the Internet’s Domain Name System (DNS) this is its exact replication for TR and pre-LOU access. Most companies today have local DNS services that can resolve domain address lookups without going outside to higher-order servers in the network. Observing a federated solution for data access in this way it is constructed as a peer-to-peer network of TRs (and pre-LOUs) where the central index (COU) is used for building the ‘routing tables’ that get distributed to the ‘routers’ at the TRs and pre-LOUs.

This is the same general direction we have proposed to the FSB as it considers the LEI system beyond its current interim state of ‘business card’ registration and identification of counterparty legal entities and swap market participants. Further we have proposed for the LEI system a rapid data aggregation capability while providing the capability to accommodate privacy concerns. These two objectives are stated by the FSB as essential, not only for systemic risk analysis but for the immediate challenge of aggregation of swaps transactions (creation and continuation data) within and across multiple Trade Repositories.

This implementation approach interconnects the TRs using publish/subscribe (pub/sub) channels for each TR, counterparty or product registry (our LEI proposal has the UPI residing alongside the LEI under

standard protocols in common registries). The publishers produce the query messages and the consumers (or subscribers – regulators or other authorized entities) access and process them.

There can also be a mechanism for TRs to query other TRs by publishing their queries on a query channel (a control channel for TRs). The query will state which channel the issuing TR will “tune into” in order to receive responses from the responding TR. To those who are familiar with the design of financial industry market data and trading systems these approaches will be familiar.

The publish/subscribe approach based on counterparty and later product channels and supra (all country, region, market, regulator, exchange, etc.) structures is a method to keep all the TRs in communication with each other without needing all inquiries to go through the Central Index, a central controller or a central repository. The Central Index of Option 2 could still be the holder of the golden copy of all control or routing data by “listening” to all channels but not forcing each TR to go through the Central Index. It also allows access to TR data to be parsed out to regulators on a permissioning and/or need to know basis. It can store multiple versions of permissioning to include access to: positions; transactions; to certain TRs and not others, etc. To note this point in the FSB’s consultative paper, at page 30:

*“In the case of data aggregation framework of TR-based data access, the complexity of servicing a request for execution increases since the data might be stored in different physical locations, subject to different access rights, subject to different data standards and technology solutions, with possibly different access right methods and storage schemes.*

*Regardless of the chosen system of data aggregation and regardless of its physical implementation, the general form of a request has to be defined as well as the protocol for analysing and interpreting it to allow meaningless aggregation of the data.”*

Further, in this scenario when retrieving information about a specific counterparty (or contract) a query is published to the TR on the corresponding counterparty (or contract) channel. That query will be “routed” to the right TR. The advantage of this implementation is that a TR or pre-LOU holding counterparty metadata may want to publish information about a specific counterparty as an update to those who need to be informed, whether of a merger, or a bankruptcy, or some other economic or corporate event that requires an update to the TRs and pre-LEI (UPI) registries.

For example a corporate event that changes the capital structure of an existing company could also affect the control of the company and the economic terms of the contract. Bankruptcies and reference entity corporate reorganizations can have the same effect on contracts. That would require that the controlling entity’s LEI that is used for rolling-up to an aggregated view of multiple LEIs associated with multiple counterparties needs to be changed, actually substituted with the new LEI.

LEI data would need to be rapidly accessed and updated across all the pre-LOUs holding the pre-LEI data for all the controlling entity's (ultimate or immediate parent's) sub-component pre-LEIs. It can also be used to update economic data of contract information in TRs if both TRs and pre-LOUs adhere to the same protocols (the 'network card' concept recommended by the FSB for the GLEIS) or share the same platform architecture (the 'plug-in' architecture also found in the FSB's recommendations for the GLEIS).

A further benefit of coordinating pre-LOU data with TR data is the ability to reach out to the hierarchies of LEIs eventually to be stored in LEI registries and to the anonymized LEIs that our GLEIS proposal has allowed for. In this later regard, anonymized data coordinated through the GLEIS would make aggregation possible for both anonymized and named counterparties. The point is made by the FSB in their consultative paper at page 16 (bold lettering included as recorded in the source document):

*"Records can be **fully anonymised**, where the counterparty name or public identifier (such as Legal Entity Identifier (LEI)) is redacted. This type of anonymisation is simple and can be performed on different datasets of raw transaction events prior to concatenation."*

Another point, made by the FSB at page 16, is made moot if the TR platforms/protocols are eventually coordinated, as we are proposing, through access to both the anonymised and named LEIs:

*"It has to be highlighted that once raw transaction event data are fully anonymised, the derivation of position data or other summing by counterparty is not possible."*

A final point made by the FSB at page 16 on anonymised data likewise becomes moot as our proposed UTI contains no reference to identifying participants. At its core the UTI is a sequential number allocated from a randomly selected pool of non-repeating sequential digits:

*"Also it has to be emphasised that, as mentioned above, removing duplicates from fully anonymised data would be impossible. In particular, full anonymisation implies also the removal of UTIs from the data because they are based on codes that identify participants."*

Standardizing reference and valuation data of swaps transactions (and other financial transactions) is the subject of much work. Today it is being carried out under the simple idea of harmonization of disparate data formats, what technologists call 'normalizing the data'. Each standards organization is attempting to offer standardized tagging conventions using different techniques to accompany data elements associated with the industry's financial transactions. Tags accompany each data element comprising a financial transaction. They are used by computers to read this data in much the same way as a laser is used to read and interpret the codes contained in a barcode on a physical product.

In the identification space of the LEI and UPI these efforts all have a single goal of transforming legally drafted definitions of products, business entities and contractual relationships from paper or word-

processed documents into digital form. The originating source of this information is documents – offering memorandum, prospectuses, corporate resolutions, master agreements, collateral agreements, trust agreements, articles of incorporation, etc. It would, therefore, seem reasonable that the preferred method to transform this information into computer readable form is to use the standard of the eXtensible Markup Language (XML) for Reports, the eXtensible Business Reporting Language (XBRL) for this transformation. Three quarters of the globe’s regulators already use XBRL to transform regulatory information reported to them in this way.

In the transactional space data is not created from paper documents. Data is simply typed into or retrieved from a computer in an existing data format. Information such as a price, or a buy or sell indicator, or an amount or quantity, and many other codes and input items are placed into existing computer generated templates. Here such standards as FpML (Financial Product Markup Language) and FixML (Financial Information Exchange Markup Language) are in broad use in the financial industry. Each can be incorporated into XBRL as well as stand apart, depending upon the application.

The biggest challenge is to conform to a common nomenclature, a set of nouns that describe in the smallest number of characters possible what industry members conclude is the best description of the data element the tags describe. This is a task yet to be carried out. It would seem logical to do so under FSB oversight and, where necessary, regulatory mandate to assure conformity. To this end the FIBO (Financial Industry Business Object) language, the most recent attempt at standard tagging nomenclature has shown promise. It along with FpML and FixML, perhaps data vendors and others, should form the basis for a Working Group under FSB oversight to bring finality to a harmonized tagging nomenclature. The point of an ineffective implementation of harmonization of disparate data formats is discussed by the FSB at page 37:

*“Harmonisation of fields would be critical under any option to achieve useful aggregation.*

*“While many vendors and technologists propose their own translation mechanisms or tools to aggregate data in disparate data stores and formats, such aggregation is prone to significant margins of error.”*

In earlier submissions to the FSB and in the recent paper we presented to the FSB’s Trade Data Aggregation Working Group for their workshop in preparation of this consultative paper, we described a system for aggregating data across multiple Trade Repositories using an alternative but conforming LEI code construction, the U3 LEI. It meets all Financial Stability Board (FSB), Regulatory Oversight Committee (ROC) and International Standards Organization (ISO) LEI 17442:2012 requirements.

Its advantage over the code and system being considered to this point (the ‘pre’-LEI in the ‘interim’ GLEIS) is that it will also provide desired capabilities not yet accommodated in the GLEIS pre-LEI design. These include:

- data aggregation;

- relationship hierarchies;
- corporate-event maintenance; and, importantly,
- privacy redaction; and
- a more efficient process for LEI duplication elimination.

It also provides a mechanism for eliminating transaction duplication when aggregating swaps transactions from multiple TRs. In fact, it eliminates duplicate UTIs in the first instance and also eliminates reference to the participant as part of the UTI, thus facilitating anonymity where desired (see further discussion later in this document). Finally, we have demonstrated how the U3 LEI allows a seamless ‘transition’ from the current initializing phase of the LEI system to the ‘final’ GLEIS phase as desired by the ROC.

These desired capabilities are still being worked through by the ROC and their Private Sector Preparatory Group (the PSPG, which we are a member of) and are essential for aggregating swaps transactions efficiently within and across TRs. We have previously demonstrated how to perform these activities to the FSB and the ROC in the LEI Work Group forum and in our demonstration to the CFTC for their consideration in being selected as a facilities operator to manage their pre-LOU, now the CICI (CFTC Interim Compliant Identifier) Utility.

We believe that the GLEIS system should, as required by the FSB, be built as an intelligent network on Internet principles. We have proposed utilizing an equivalent Domain Name System (DNS) for self-registering and resolving counterparty names into codes and codes into names. We have offered to create a pilot with world class technology companies from existing components. Its design includes an LEI code that is constructed to accomplish all of the objectives set out in the Charter of the Regulatory Oversight Committee for the Global Legal Entity Identifier System of November 5, 2012 as described below:

*“Recognizing the need to develop and maintain for the broad public good a Global LEI System that is to be used: (a) by authorities of any jurisdiction or financial sector to, assess systemic risk and maintain financial stability, conduct market surveillance and enforcement, supervise market participants, conduct resolution activities, prepare high quality financial data, and to undertake other official functions; and (b) by the private sector to support improved risk management, increased operational efficiency, more accurate calculation of exposures, and other needs.”*

Further, the system as described herein accommodates the comprehensive scope of the LEI of which identifying counterparties in swaps transactions is but one element. As stated by the FSB in their June 8, 2012 paper A Global Legal Entity Identifier for Financial Markets (underlining added):

*“The term ‘legal entity’ refers to a legal person or structure organised under the laws of any jurisdiction. Legal entities include, but are not limited to, unique parties that are legally responsible for the performance of financial transactions or have the legal right*

*in their jurisdiction to enter independently into legal contracts, regardless of whether they are incorporated or constituted in some other way (e.g. trust, partnership, contractual, etc). It excludes natural persons, but includes governmental organizations; and supranationals, defined as governmental or non-governmental entities established by international law or treaty or incorporated at an international level. Examples of eligible legal entities include, without limitation: all financial intermediaries; banks and finance companies; all entities that issue equity, debt or other securities for other capital structures; all entities listed on an exchange; all entities that trade stock or debt; investment vehicles, including mutual funds, pension funds and alternative investment vehicles constituted as corporate entities or collective investment agreements (including umbrella funds as well as funds under an umbrella structure, hedge funds, private equities, etc); all entities under the purview of a financial regulator and their affiliates, subsidiaries and holding companies; and counterparties to financial transactions.”*

To date, the GLEIS is focused exclusively on identification of counterparty and supply chain intermediaries operating in the swaps industry. In the short term it may prove fit for limited local regulatory purposes. However, considerable risk, data quality issues and manual processing may be the result for its more global use in data aggregation across multiple TRs. To deploy the final GLEIS for data aggregation globally across multiple TRs, the design features embodied herein may prove to be essential. Design and procedural flaws have already caused over 20,000 local pre-LEIs in the US to be withdrawn and 3,000 archived that have been used in regulatory reporting.

The added features embodied in the U3 (unique, unambiguous and universal) LEI should allow the pre-LEIs to move from today's planned use as an ancillary field for local regulatory reporting to a primary data key (as that term is used in describing search and index keys for computer readable and accessible data). It will also allow for identification across the entire global supply chain of swaps market participants and, eventually, as required by the FSB, across ALL financial market participants in ALL contracts and instruments.

The expedient for satisfying the regulatory push for transparency in the swaps markets globally, and for being able to observe risk exposures building up across counterparties may require a cumbersome (and costly and higher risk) intermediate solution for TR data aggregation. Compromise is already present in the interim GLEIS in the form of normalization of disparate data formats and the mechanism of file transfers across all the pre-LOUs (there are twenty-two now). This may be the intermediate state for TR data aggregation as well. Normalization of data formats amongst TRs is already being worked on in industry/regulatory sponsored working groups in the US and the EU.

However, without unique transaction level identifiers no amount of data normalization will eliminate transaction duplicates. The FSB's consultative paper comments on this point at page 15:

*If a global system of UTIs were in place, these could be used to match and eliminate the duplicates.*

Here we have proposed a logically centralized approach to inquiry at each instance of the need to create a UTI. A core transaction generator method, one based upon a sequentially assigned number, not a randomly generated code at each point of transaction entry as is current best practice, would be accessed. A simple application developed for global use with appropriate security safeguards would be activated for access as each swaps transaction is organized and a local service operator (pre-LOU, TR) coordinated with the core transaction generator would provide the unique UTI.

Why is data normalization an expedient solution rather than a final solution? Normalization at the back end is no substitute for standardization at the front end. With a global standards body, as the FSB is, prodding the industry we should be able to do better, deferring self-interest in preserving our legacy past for the common interest of our risk adjusted financial system future.

With all TRs having common identifiers for their counterparties and products, and indexing their data locally for access by regulators and other approved inquirers, one can envision the equivalent of a Google or Yahoo or Bing accessing this data in real-time and performing ad-hoc queries on the fly. It is common to do this on unstructured data globally and present lists to be comprehended by humans. It is easily understood that the same mechanism performed on structured data (common identifiers and data tags) can present both aggregated and analyzed data on the fly in real-time based upon a query.

However, the following passage at page 32 of the FSB's consultative paper, while aspiring to a final solution may present both a short-sightedness and a capitulation to the status quo, failing to comport to the ambitions of local regulators and global standards bodies such as the FSB, IOSCO, CPSS, IMF and the World Bank to properly and finally risk adjust the financial system (underlying added):

*"To ensure completeness of data for aggregation, the surest and most efficient way would have been for all TRs to collect and populate the same set of data elements. However, since such a unique TR data specification is not currently envisaged at an international level, a second best consists of ensuring that the data can be translated into a consistent standard. This still entails, though, significant constraints regarding specifications of the data stored by TRs"*

To this point, the FSB consultative paper at page 34 contradicts itself by stating:

*"The risk that different jurisdictions might endorse incompatible approaches makes it highly desirable that the various authorities attempt to coordinate their approaches so that the necessary standardisation is achieved for the data aggregation mechanism. Such coordination would be valuable to all the aggregation models under consideration."*

A further suggestion brought up in the consultative paper is related to the FSB's maintenance of its Data Hub overseen by the BIS. Supervisors collect data from their local activities of 20 SIFIs (Systemically

Important Financial Institutions). Data is organized by supervisors from local data collection efforts, mostly inconsistent at the source but standard reporting templates are then applied. While the Data Hub is designed to be a connector among regulators, it is suggested that the aggregation mechanism of the Data Hub could be directly connected to TRs, albeit under regulatory oversight. Alternatively, the public-private governance model of the GLEIS could obtain for the TRs, a model that we support both for governance and for technical and operational parallels between the storage, access and aggregation of data in the GLEIS and the TRs. Below is an excerpt on this later point made at page 20 of the consultative paper:

*“The analysis also builds upon the discussion of the International Data Hub relating to global systemically important banks (G-SIBs) and the LEI global initiative.”*

Finally, and most significantly, the technology of legacy systems and entrenched technology cultures should not encumber the future state of financial reform. This is especially true as the backbone of that future is based upon the new technologies of tomorrow that are here today.

To this final point, the FSB’s consultative paper at page 13 states:

*“The complex set of needs of various authorities’ calls for an aggregation mechanism providing flexibility and fitted for evolutionary requests as financial markets and products evolve. It is also equally important for such a mechanism to be evolutionary in nature in order to respond to evolving needs for aggregated data by authorities.”*

To conclude, the FSB’s objectives for this project and its allied LEI initiative is truly historic. The FSB is steering regulators and the global financial industry toward an end state, probably over many years, of a transparent and risk adjusted financial system. Hurried legislation, conceptualized in crisis mode, written into law as process rules by regulators and now meeting the test of implementation in automated systems must stand up to the test of performance, availability and security as all mission critical systems must. Automated systems are fragile, those built in haste without a core design are even more so.

We await the results of this Feasibility Study on Approaches to Aggregate OTC Derivatives Trade Repository Data and appreciate the considerations given to our proposals to assist in its core design.

**Prepared for the FSB Aggregation Feasibility Study Group (AFSG)  
Outreach Workshop Meeting  
Basel, Switzerland**

**13 November 2013**

## Pathway to Data Aggregation for Swaps Data Repositories (SDRs)

Utilizing the Unique Counterparty Identifier (aka Legal Entity Identifier)



proposing

**An Alternative ISO Conforming Legal Entity Identifier (LEI)  
and a  
Virtual Global LEI Registry**

for the  
**Global LEI System (GLEIS)**

to enable

Standardizing Data

at the

Content and Aggregation Level

for

Swaps Data Repositories

In the aftermath of the financial crisis there is now a realistic expectation of realizing both regulators interest in data transparency for systemic risk analysis and the financial industry's digital destiny of real-time straight-through processing (STP).

However, the industry has significant data and data aggregation issues to resolve before such objectives can be met. Unlike many other industries, the 'parts' inventory (reference data) and the global supply chain of clients and intermediaries (legal entities) while all defined digitally, are defined differently, even though they are used in a digital sense to assemble, trade and pay for the same products (financial transactions). A global identification standard for clients and products and the use of standard tags for standard data elements has been accepted by all as the means to efficiently process and aggregate financial transactions. Standard counterparty identifiers are an essential early pillar of the FSB's mandate to stabilize the global economy.

These objectives, however, are dependent on the ability to use the standard counterparty identifiers (the Legal Entity Identifier – LEI) to aggregate associated transaction and risk data and to redact certain confidential information on counterparties where required by privacy restrictions. From the FSB's Recommendation of June 8, 2012 on the "Global Legal Entity Identifier System":

*"In particular, the FSB recommends the rapid development of the standards for LEI reference data on ownership and corporate hierarchies, as these data are essential to achieve one of the key objectives of risk aggregation for the global LEI system. The FSB consequently recommends that work is taken forward urgently to develop proposals and, if necessary, global standards for additional reference data on the direct and ultimate parents of legal entities to address the current operational constraints that prevent timely and effective data aggregation."*

*"The next step in this work will need to address the challenge that some jurisdictions may not, at least immediately, be able to share such information due to confidentiality and privacy restrictions. That will also affect where such data can be stored in the global LEI system (locally or centrally). Ideally, legal and technical arrangements can be put in place to enable sharing of confidential information and additional scrutiny."*

Our proposed design of the Global LEI System (GLEIS) extends the LEI development beyond its current interim state of 'business card' identification of legal entities toward rapid deployment of data aggregation capabilities and relieving privacy concerns. These two objectives are stated by the FSB as essential, not only for systemic risk analysis but for the immediate challenge of aggregation of swaps transactions (creation and continuation data) within and across multiple swaps data repositories.

Standardizing reference data for swaps transactions (and other financial transactions) is the subject of much work. Each standards organization is attempting to standardize tagging conventions using different techniques to accompany data elements associated with the industry's financial transactions. These efforts all have a single goal; to transform legally drafted definitions of products, business entities and contractual relationships from paper or word processed documents into digital form. The initiating source of this information is documents – offering memorandum, prospectuses, corporate resolutions, master agreements, collateral agreements, trust agreements, articles of incorporation, etc. It is, therefore, preferred to use the standard of the eXtensible Markup Language (XML) for Reports, the eXtensible Business Reporting Language (XBRL) for this transformation.

XBRL is well accepted globally for regulatory reporting and filers are increasingly becoming comfortable in using the standard. Further, the XBRL tags can be translated into other semantic and taxonomy based languages for downstream uses in data processing and communications systems as the tags become standardized. When applied to standards of meaning and formats associated with reference data (metadata) for legal entities (e.g. business classification, country of domicile, ownership interest, etc.) and products (reset date, tenor, ex-date, etc.) computers can digest, process, aggregate and distribute information seamlessly and efficiently.

In this paper we describe a system for aggregating data across multiple Swaps Data Repositories using an alternative but conforming LEI code construction, the U3 LEI meeting all Financial Stability Board (FSB), Regulatory Oversight Committee (ROC) and International Standards Organization (ISO) LEI 17442:2012 requirements. Its advantage over the code being considered to this point (the 'pre'-LEI in the 'interim' GLEIS) is that it will also provide desired capabilities not yet accommodated in the GLEIS pre-LEI design. This includes data aggregation, relationship hierarchies, corporate event maintenance and privacy redaction. The U3 LEI will also allow a seamless 'transition' from the current initializing phase of the system to the 'final' GLEIS phase as desired by the ROC.

These desired capabilities are still being worked through by the ROC and their Private Sector Participant Group (the PSPG, which we are a member of) and are essential for aggregating swaps transactions efficiently within and across SDRs. We have previously demonstrated how to perform these activities to the FSB and the ROC in the LEI Work Group forum and are again presenting these capabilities to the FSB in the new forum of the FSB Aggregation Feasibility Working Group.

The U3 LEI has its roots in the design of the Global Financial Industry Identifier System back in 2005 when it was organized as a joint venture project in a private sector initiative known as the Global Data and Standards Alliance. We refer to the project components as the U3 Global Identification System™ and the Central Counterparty for Data Management (CCDM)™.

The U3 LEI identification system will establish and process identifiers and their associated 'business card' data. The CCDM is intended to digest, process, aggregate and distribute standard tagged reference data (metadata) using the same design principles and operating in tandem with the GLEIS and its Virtual Global LEI Registry. Both are subject of published academic papers and trade articles that has been presented to the industry and regulators. The CCDM is a robust and standardized data base for legal entity metadata and for instrument and contract metadata pointed to and accessible through the GLEIS.

The presentation that follows describes a GLEIS system built as an intelligent network on Internet principles and a GLEIS equivalent of the Domain Name Server (DNS) system of the World Wide Web. We have offered to create a pilot with world class technology companies from existing components. Its design includes an LEI code that is constructed to accomplish all of the objectives set out in the "Charter of the Regulatory Oversight Committee for the Global Legal Entity Identifier System of Nov 5, 2012"

*"Recognizing the need to develop and maintain for the broad public good a Global LEI System that is to be used: (a) by authorities of any jurisdiction or financial sector to, assess systemic risk and maintain financial stability, conduct market surveillance and enforcement, supervise market participants, conduct resolution activities, prepare high quality financial data, and to undertake other official functions; and (b) by the private sector to support improved risk management, increased operational efficiency, more accurate calculation of exposures, and other needs."*

Further, the system as described herein accommodates the comprehensive scope of the LEI, including identifying counterparties in swaps transactions, as stated by the FSB in their June 8, 2012 paper “A Global Legal Entity Identifier for Financial Markets”:

*“The term ‘legal entity’ refers to a legal person or structure organised under the laws of any jurisdiction. Legal entities include, but are not limited to, unique parties that are legally responsible for the performance of financial transactions or have the legal right in their jurisdiction to enter independently into legal contracts, regardless of whether they are incorporated or constituted in some other way (eg trust, partnership, contractual, etc). It excludes natural persons, but includes governmental organizations; and supnationals, defined as governmental or non-governmental entities established by international law or treaty or incorporated at an international level. Examples of eligible legal entities include, without limitation: all financial intermediaries; banks and finance companies; all entities that issue equity, debt or other securities for other capital structures; all entities listed on an exchange; all entities that trade stock or debt; investment vehicles, including mutual funds, pension funds and alternative investment vehicles constituted as corporate entities or collective investment agreements (including umbrella funds as well as funds under an umbrella structure, hedge funds, private equities, etc); all entities under the purview of a financial regulator and their affiliates, subsidiaries and holding companies; and counterparties to financial transactions.”*

To date, the GLEIS is focused exclusively on identification of counterparty and supply chain intermediaries operating in the swaps industry. In the short term it may prove fit for limited local regulatory purposes. However, considerable risk, data quality issues and manual processing may be the result for its more global use in data aggregation across multiple SDRs. To deploy the GLEIS for data aggregation globally across multiple SDRs, the design features embodied herein may prove to be essential. Already design flaws have caused over 20,000 local pre-LEIs in the US to be withdrawn and 3000 archived that have been used in regulatory reporting. The added features embodied in the U3LEI should allow the pre-LEIs to move from today’s planned use as an ancillary field for local regulatory reporting to a primary data key for unique, unambiguous and universal identification across the entire global supply chain of swaps market participants and, thereafter, across all financial market participants.

**Appendix A** presents the U3 LEI as an updated coding convention that adheres to the ISO LEI 17442:2012 standard. It also describes Use Cases over a wide scope of possible aggregation scenarios.

**Appendix B** presents the technical solution of the intelligent GLEIS network and the virtualized LEI and SDR registries.

\*The CCDM™ and the U3 Identification System™ are trademarks of Financial InterGroup Holdings Ltd (FIG). FIG also holds patents and pending patents on the methods and systems described herein. Should the FSB and the ROC wish to utilize the intellectual property rights of the LEI as described herein, FIG has stated to the FSB that it expects to transfer such rights to the Global LEI Foundation as soon as it is formalized and its Board constituted in keeping with ROCs recommendations on intellectual property rights. Further information is available by contacting [agrody@FinancialInterGroup.com](mailto:agrody@FinancialInterGroup.com) or at (in US) 917 414 3608.

## Pathway to Data Aggregation for Swaps Data Repositories (SDRs)

### Utilizing the Unique Counterparty Identifier (aka the Legal Entity Identifier)

#### The U3 LEI - An Alternative ISO Conforming Legal Entity Identifier (LEI)

Use Cases represented below follow the format and requirements for Local Operating Units (LOUs) to register unique, universal and unambiguous (U3) legal entity identifiers (LEIs) into local LEI Registries. These multiple disbursed registries collectively comprise the Global Legal Entity Identifier System (GLEIS) of the ROC.

The ISO 17442:2012 code construction standard for the LEI consists of 18 alphanumeric characters and two numeric check digits calculated from the previous 18 characters. This standard has been further defined by the FSB and now the ROC as follows:

- Characters 1-4: A four character prefix allocated uniquely to each LOU.
- Characters 5-6: Two reserved characters set to zero.
- Characters 7-18: Entity-specific part of the code generated and assigned by LOUs according to transparent, sound and robust allocation policies.
- Characters 19-20: Two check digits as described in the ISO 17442 standards.

The early and still prevailing thought about the LEI code construction is that the code would never change, regardless of what happened to the legal entity associated with it. It would be the business card reference data in the LEI registry that would change to reflect new ownership, change of address, etc.

It was further recognized that mergers, acquisitions, spin-offs, etc. would cause the legal entity at a minimum to have a different ultimate parent. For purposes of an audit trail, if the code would remain the same the prior history of the legal entity would not be retrievable by accessing the code unless the code was flagged as historically archived and, either placed off line from the GLEIS, or retained in the LEI Registry as archived information.

This was thought not to be good design if the result would be a system having an auxiliary or archived set of information that was each accessible by the same LEI but would access completely different information. In fact the same LEI would permit accessing a completely different legal entity in those cases of corporate events that change the ultimate parent. This would also violate the uniqueness principle that only one LEI may be assigned to a financial market counterparty and the persistence principle that it never to be used again for another entity.

It was for this reason that the ISO LEI standard was modified to include the following reference to a new data element, the expiration date or “date of expiry” of the LEI (excerpted from the ISO 17442 LEI 17442:2012 standard definition):

“...date of expiry, the reason for the expiry should be recorded, and if applicable, the LEI of the entity that acquired the expired entity”

This requirement recognized that LEIs could be retired, perhaps placed in archived status, but would require a new LEI when corporate events caused the ultimate parent of the legal entity to change to the newly acquired legal entity. The ultimate parent (and immediate parent as well) would have to be recognized in the GLEIS to allow for data aggregation. Most importantly, the data aggregation for counterparty risk purposes would require aggregation across multiple legal entities up to the controlling entity for understanding risk exposures. This applied whether for assessing risk in a single financial enterprise, across multiple SDRs containing the same LEIs or, more broadly, in assessing the contagion of systemic risk across the same counterparty globally.

This then placed the ultimate parent at the center of the means of determining the hierarchical construct and relationships of LEIs. It would require that somewhere in the GLEIS would be the recording of an ultimate parent (or immediate parent) and changes to it to distinguish the old and new LEI, whether comprising a corporate business or commercial entity, or a controlling entity such as a special purpose vehicle or collective investment trust. It then became apparent that along with a regulatory mandate to request a LEI be registered for each financial market participant it would be necessary to request its ultimate parent.

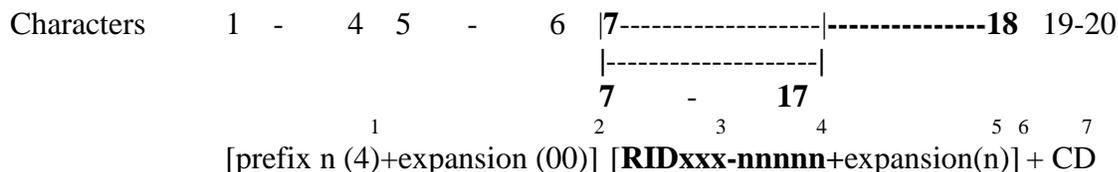
Toward this end the Dodd-Frank legislation in the US states that the US Treasury’s Office of Financial Research can command whatever data is necessary from financial market participants to carry out its mission of informing the public and the US government of the condition of the American economy. One assumes observing systemic risk through aggregating counterparty data would be its responsibility and would be the same for the FSB in its role of stabilizing the global economy.

It is for this reason, amongst others later described, we have constructed the LEI with a unique identification for the ultimate parent or ultimate controlling entity. It adheres to the principle of non-intelligence of the code by containing only a randomly assigned set of digits, Registration Identifiers (RIDs). The RID would change automatically in the GLEIS upon corporate event notification (a standard ‘app’ would be deployed across the GLEIS).

A local DNS server containing the mapping to the financial market participants’ own coded internal equivalent to the external LEI could also be used and updated automatically. This later point is extremely important as changing LEIs due to corporate events occur at precise moments in time, thus requiring synchronization between the external and internal LEI equivalents. Local LOUs could alternatively retain such information in extended LEI registries. It could also retain mapping tables to external vendor proprietary codes which likewise change at precise times.

Further, for purposes of the Use Cases, it will be useful to first present the more granular construction of the U3 LEI code. The more granular segmentation depicted below still conforms to the ISO standard agreed to by the FSB and later the ROC. It also adheres to the requirements for non-intelligence (no meaning can be parsed from the code itself), persistence (no code can ever be used for another entity), and for uniformity and consistency.

### U3 LEI - a ROC and ISO 17442:2012 Compliant LEI



Notes:

- 1 The prefix is currently assigned by the FSB and consists of 4 numeric digits. It is randomly chosen from a sequence of 100,000 numbers. Its purpose is to make all the entity specific codes assigned by each LOU globally unique when combined with the prefix + 00
- 2 Purpose not publically defined other than for expansion of code consisting of two zeros
- 3 Registration Domain (Registration Identifier - RID) consisting of six numeric digits randomly chosen and assigned as is the prefix in note 1. Its purpose is to make all the entity specific codes registered by each financial market participant globally unique
- 4 Sequence code consisting of five numeric digits assigned by the financial market participant
- 5 Re-sequencing code used for re-sequencing of code hierarchy for corporate events that change the ownership of the LEI code
- 6 Entity specific code segment as shown in Use Cases below
- 7 Check digits calculated as described in LEI ISO 17442:2012 standard

As per ROC pronouncements to date, pre-LEIs and their associated data fields are to be self-registered by financial market participants in the LEI registry system, whether centralized in a single registry or located in multiple registries. These registries are operated under regulatory mandate in each sovereign jurisdiction by appointed facilities operators (Local Operating Units – LOUs). The Central Operating Unit (COU) is to govern the standards, operations and technical details of the federation of all LOUs. The technical federation is to result in a ‘virtual’ database so a single view across multiply disbursed LEI registries would be possible. This is to be carried out utilizing a ‘network card’ within a ‘plug-in architecture’.

To date the entity-specific part of the LEI code that is being generated and assigned by LOUs has been designed by each pre-LOU as randomly generated codes placed into the entity specific portion of the code (in many cases the entire pre-LEI code is generated randomly, a result of uncoordinated early adapter decisions).

In an ownership/control structure there can be hundreds, thousands and in some cases over 10,000 LEIs organized under a single controlling entity. Without a mechanism for aggregating them into its control structures, preferably built into the code itself which we describe later, additional functionality will be required. See partial examples from two pre-LOUs containing pre-LEIs for German Postbank AG below and JP Morgan Chase & Co. on the next page:

**Partial Listing of pre-LEIs issued by a German pre-LOU for German Postbank AG**

<b>QPA2KT0GZRLD6DKRHZ40</b>	German Postbank AG
5299004D25S8SGTHNR85	German Postbank Best Invest chance
529900MSU9GH1I8Q1A55	German Postbank Best Invest growth
5299000A4W3W6SW7F947	German Postbank Business Basic
529900ACJ0HEJ87MLX69	German Postbank euro cash
5299001DF6SZJJ0E5T17	German Postbank Europe Fund shares
52990002CN0HNULFQ377	German Postbank Europe Plus Fund
529900E89XFNE6RK3916	German Postbank Europe pension funds
529900TYH44YY8WYW281	German Postbank global player
<b>K7V3K4YZRNLVZAK8WA86</b>	German Postbank International SA
529900B1ZSCSSCV13232	German Postbank Protekt Plus
5299006D03PCQ91Y3V07	German Postbank VL Invest

## Partial Listing of pre-LEIs issued by US pre-LOU for JPMorgan Chase & Co.

JP Morgan/JP Morgan Chase/ JPM Chase	Name
815DZWZKVSZI1NUHU748	JPMorgan Chase & Co.*
QO1OF94G0YPTPSETN881	Commingled Pension Trust Fund (International Equity) of JP Morgan Chase Bank, N.A.
JLL0K5ZCQGWGDKVH2F57	Commingled Pension Trust Fund (International Rates) of JP Morgan Chase Bank, N.A.
54930002MRPG4D203Z16	LUCRF Pty Ltd as Trustee for the Labour Union Co-Operative Retirement Fund as custodied by JP Morgan Nominees as nominee for JP Morgan Chase Bank
3BHFFFIGJ4I48LGUZU82	Wellington Trust Company - National Association Multiple Collective Investment Funds Trust II - JP Morgan Pension Advisers Group Emerging Markets Debt Portfolio
4UPZD66XEST55IY6C59	J.P. Morgan Securities (C.I.) Limited
5493009H2EPHG3FWFK39	J.P. Morgan Bank (Ireland) Public Limited Company
0L7IEHBDU4E5R3KF3U52	Commingled Pension Trust Fund (Emerging Markets-Fixed Income) of JPMorgan Chase Bank, N.A.
135694FS0VCYILCRE581	Commingled Pension Trust Fund (Fixed Income Sub-Advised PIMCO) of JPMorgan Chase Bank, National Association
1SOMMM7SK2U50QFO2P72	Commingled Pension Trust Fund (Mortgage Backed Securities) of JPMorgan Chase Bank, N.A.
2BIX7481YGGUUDUCU943	JPMorgan Chase Funding Inc.
37BETVJ1CAFYVBZGAG10	Commingled Pension Trust Fund (Global Opportunities) of JPMorgan Chase Bank, N.A.
3JW073HFQ5BWJ2WE6K78	Commingled Pension Trust Fund (Diversified Global) of JPMorgan Chase Bank, N.A.
3RF3Y6N71RVXLXWGX56	Commingled Pension Trust Fund (Long Credit) of JPMorgan Chase Bank, N.A.
412KRG56ILM2ITGI5742	Commingled Pension Trust Fund (High Quality Long Credit) of JPMorgan Chase Bank, N.A.
4PVD1EFQH3I8B4M7S110	Commingled Pension Trust Fund (Emerging Markets - Equity Focused) of JPMorgan Chase Bank, N.A.
54930000CYUV09A9FH65	JPMorgan Fund ICVC - JPM Cautious Managed Fund
54930000U79ZJ622LX23	Chevy Chase Funding LLC, Mortgage Backed Certificates Series 2006-3
54930002MRPG4D203Z16	LUCRF Pty Ltd as Trustee for the Labour Union Co-Operative Retirement Fund as custodied by JP Morgan Nominees as nominee for JP Morgan Chase Bank

\*This is a partial list of what are 4012 legal entities currently constituting the organizational hierarchy of JP Morgan Chase & Co.

In the U3 LEI code construction the Registration Identifiers [RIDxxx's] are selected through a random number assignment process performed at the COU. They are then distributed in bulk at onboarding of each new LOU. Each Registration Identifier is globally unique, thus eliminating any duplicate checking of codes now required by each LOU (randomly generated codes can produce duplicates, whereas randomly chosen ones do not).

The Registration Identifiers are to be assigned by an LOU to a legal entity that is either a controlling business entity (ultimate parent) as in a corporation or commercial enterprise, or a legal form of a controlling entity (ultimate controlling entity) as in a special purpose entity or collective investment trust. At this point the RID is not the LEI, it is an entity level 'prefix' for use in assignment of the remaining code component to register a LEI.

For purposes of designating a ‘controlling entity’ the ROC has initially embraced such designation that conforms to account consolidation rules based on GAAP and IFRS. As an initial way to populate the GLEIS’s hierarchical and control information, notwithstanding that later hierarchies would be needed for credit analysis and risk exposure measurements, account consolidation rules have been settled on. They are the most wide spread means to do hierarchical structures of control effectively and efficiently, and in a most timely way.

Accountants, whose professional organizations oversee these rules for materiality attestation are the most plentiful trusted professionals. They have global footprints, especially the Big 4 auditing firms. They are the professional core that regulators rely upon to interpret control meaning in GAAP and IFRS rules for final statement reporting. Increasingly these are filed electronically with regulators through XBRL enabled templates.

In order to understand the hierarchy of legal entities making up a controlling entity accountants must keep current on new and retired legal entities, and changes of control of existing entities. It seems appropriate that these same accounting professionals be involved not only in registering hierarchical information in the GLEIS but also involved to assure that originating documents conform to GLEIS LEI registration information, not unlike notaries do in confirming signatures on documents. To this end many accounting firms, including the Big 4 auditing firms, provide third party assurance services that can be delivered directly on site to larger clients or in collective remote services to smaller clients. From the March 15, 2012 FSB press release “Enhancing the contribution of external audit to financial stability”:

*“Promoting high quality international accounting and auditing standards and practices is an important aspect of the FSB’s activities. The FSB will continue to support dialogue between audit standards setters and regulators, investors, market regulators, prudential authorities, financial institutions and audit firms on improving the quality of external audit and its contribution to financial stability.”*

To accomplish LEI registration, the U3 LEI is to follow ISO standards and be assigned using “transparent, sound and robust allocation policies”. It is to be registered through self-registration by a financial market participant as required by the ROC.

We have designed the code to be exclusively numeric (for technical reasons described at the end of the Use Cases); be affixed to the Registration Identifier [RIDxxx] by the self-registering entity; and be done at a centrally designated point at that business entity vs. as is currently being done at the pre-LOUs in the interim GLEIS. This approach will facilitate coordinating the internal codes of the business entity with the external codes of the GLEIS. It will also facilitate ownership and control hierarchies and the maintenance of both the internal codes of each financial market participant and the external codes in the GLEIS. Accountants can exercise challenge and certification functions on behalf of the self-registering clients.

By inquiring through the globally unique Registration Identifier [RIDxxx] every LEI [RIDxxx-nnnnn] that is an ultimate parent/control entity can be located. This, in turn, can locate its relationships with its LEIs within its own affiliate/subsidiaries hierarchies; in partnerships and trusts with other legal entities; and within cross-ownership interests. As can be seen in the two examples above (German Postbank and JP Morgan) this is not possible to do now without creating additional functionality at the financial market participant or data vendor or regulator level. Such functionality could include creating mapping tables, or having each user, including SDRs, assigning its own form of an RID. This would only serve to organize LEIs within a single LOU or SDR, a single financial market participant or vendor, not globally as required for aggregating SDR swaps data nor for systemic risk analysis.

Also by searching each LEI (RIDxxx-nnnnn combination) one can inquire separately of each LEI. Technically each RID and unique LEI code is to be used as indexes to the information contained in the LEI registries. Finally each LEI in the LEI registries contains a pointer to its ultimate parent and immediate parent LEI as well as a pointer to the LOU that contains each LEI, thus facilitating aggregation across multiple LEI registries without resorting to external mapping tables. See current state of mapping issues as represented by a partial list of JP Morgan Chase & Co.'s external service provider mapping codes below.

### **Partial List of External Codes for JP Morgan Chase & Co.**

Service Description	Mapping Code
Alacra ID	<b>2104038</b>
Avid	<b>5474957</b>
BoardEx	<b>17528</b>
BvD Zephyr	<b>US132624428</b>
Corporate Board Member	<b>4506</b>
Capital IQ	<b>658776</b>
CICI	<b>815DZWZKVSZI1NUHU748</b>
CIK (SEC)	<b>0000019617</b>
CUSIP	<b>46625H100</b>
Deutsche Boerse AG	<b>CMC (Ticker Symbol)</b>
DUNS Number	<b>122557143</b>
FCA (UK)	<b>JPMORGAN CHASE &amp; CO</b>
Federal Reserve	<b>1039502</b>
Financial Times	<b>JPMorgan Chase &amp; Co</b>
FT.com	<b>JPMorgan Chase &amp; Co</b>
Fitch Research	<b>80089022, 89783461</b>
Hoovers	<b>10322</b>
Investext	<b>J.P. MORGAN CHASE &amp; CO., MORGAN (J.P.) &amp; CO.</b>
ISIN	<b>US46625H1005</b>
<b>London Stock Exchange</b>	<b>JPM (Ticker Symbol)</b>
Mergermarket	<b>19720</b>
Mexican Stock Exchange	<b>JPM (Ticker Symbol)</b>
Moody's Global Credit	<b>165000</b>
New York Stock Exchange	<b>JPM (Ticker Symbol)</b>
OneSource	<b>6219</b>
Perfect Information	<b>1951</b>
Reuters	<b>100045544, JPMorgan Chase &amp; Co.</b>
Revere	<b>5687</b>
RIC	<b>JPM.N (NYSE), JPM.L (LSE), etc.</b>
SEDOL	<b>2190385</b>
S&P Credit Research	<b>111719</b>
S&P Stock Reports	<b>46625H100</b>
TableBase Statistics	<b>JPMORGAN CHASE &amp; CO, MORGAN (JP) &amp; CO INC</b>
TF Disclosure	<b>J927910018, T_JPM</b>
TF Worldwide M&A	<b>46625H</b>
TF Worldwide New Issues	<b>46625H</b>
TF Market Research	<b>J.P. MORGAN CHASE &amp; CO., MORGAN (J.P.) &amp; CO.</b>
Thomson	<b>JPM</b>
Tokyo Stock Exchange	<b>86340 (Ticker Symbol)</b>
Value Line	<b>46625H10</b>

For a more complete description of the technology and process see **Appendix B**.

Base Use Case:

Multiple options for registering LEIs across the GLEIS (RIDxxx = 614141)

Centrally controlled RIDs	-----	Regionally distributed RIDs	-----	Locally registered RIDs
614141-00001	614141-00001	614141-00004	614141-00006	614141-00001-LOU#1
-00002	-00002	-00005	-00007	614141-00002-LOU#2
-00003	-00003			614141-00003-LOU#3
-00004				614141-00004-LOU#4
-00005				614141-00005-LOU#5
-00006				614141-00006-LOU#6
-00007				614141-00007-LOU#7

Specific Use Cases:

RID001 Standard hierarchical business ownership    **RID002 Unrelated Partnership (33% ownership) \*\***

\*\* This '% ownership' is contained in reference data and not shown in this Use Case

Business Entity Hierarchy	Ultimate Parent	Immediate Parent	Control Entity Hierarchy	Ultimate Parent	Immediate parent
<b>RID001-00001</b>	RID001-00001	RID001-00001	<b>RID002-00001</b>	RID002-00001	RID002-00001
RID001-00002	RID001-00001	RID001-00001			
<b>RID001-00003</b>	RID001-00001	RID001-00001			
RID001- <b>00004</b>	RID001-00001	RID001-00001	RID001- <b>00004</b>	<b>RID001-00001</b>	RID002-00001
RID001-00005	RID001-00001	RID001-00001			
RID001- <b>00006</b>	RID001-00001	RID001-00001	RID001- <b>00006</b>	<b>RID001-00001</b>	RID002-00001
RID001-00007	RID001-00001	RID001-00001	RID001- <b>00007</b>	<b>RID001-00001</b>	RID002-00001

RID003 Business ownership with sub-ownerships    RID004 Related Partnership

Business Entity	Ultimate Parent	Immediate Parent	Control Entity Hierarchy	Ultimate Parent	Immediate parent

<b>Hierarchy</b>					
RID003-00001	RID003-00001	RID003-00001	<b>RID004-00001</b>	<b>RID001-00001</b>	RID004-00001
<b>RID003-00002</b>	RID003-00001	RID003-00001			
RID003-00003	RID003-00001	<b>RID003-00002</b>			
RID003-00004	RID003-00001	<b>RID003-00002</b>	<b>RID001-00003</b>	RID001-00001	RID004-00001
RID003-00005	RID003-00001	<b>RID003-00002</b>			
<b>RID003-00006</b>	RID003-00001	RID003-00001	<b>RID001-00005</b>	RID001-00001	RID004-00001
RID003-00007	RID003-00001	RID003-00001			

RID005 Wholly owned business through ownership of subsidiary of another business owner's (RID003's) subsidiary

RID003 Subsidiary in partnership with other business owner subsidiaries with control, liability and or ultimate risk exposure

Business Entity Hierarchy	Ultimate Parent	Immediate Parent	Control Entity Hierarchy	Ultimate Parent	Immediate parent
RID005-00001	<b>RID003-00006</b>	RID005-0001	RID003-00006	<b>RID003-00001</b>	RID003-00006
			<b>RID002-00001</b>	RID002-00001	RID003-00006
			<b>RID004-00001</b>	<b>RID001-00001</b>	RID003-00006

#### Special Use Cases:

Depicted on the next page are Use Cases describing reorganizations and corporate events that affect control of a legal entity as in a merger, acquisition, spin-off, re-capitalization, etc.

Note – in the examples which follow the expansion digit of the entity specific segment of the LEI code is used to re-sequence the LEI in its new association with the acquiring business entity [RIDxxx] while retiring the old LEI. This is done automatically upon notice of corporate events by approving registering parent entities. The retired ultimate parent is retained for archival access of the retired LEI.

Merger RID001 with RID003, RID001 is the surviving entity

Business Entity Hierarchy (containing retired RID LEI)	Ultimate Parent	Immediate Parent
RID001-00001	RID001-0001	RID001-00001
RID001-00002	RID001-00001	RID001-00001
RID001-00003	RID001-00001	RID001-00001
RID001-00004	RID001-00001	RID001-00001
RID001-00005	RID001-00001	RID001-00001
RID001-00006	RID001-00001	RID001-00001
RID001-00007	RID001-00001	RID001-00001
RID001-000011 (RID003)	RID001-00001	RID001-00001

RID001-000021	(RID003)	RID001-00001	RID001-00001
RID001-000031	(RID003)	RID001-00001	RID001-000021
RID001-000041	(RID003)	RID001-00001	RID001-000021
RID001-000051	(RID003)	RID001-00001	RID001-000021
RID001-000061	(RID003)	RID001-00001	RID001-00001
RID001-000071	(RID003)	RID001-00001	RID001-00001

Merger RID001 with RID003 into New Business Entity

<b>Business Entity Hierarchy (containing retired RID LEI)</b>		<b>Ultimate Parent</b>	<b>Immediate Parent</b>
NEW001-00001	(RID001)	NEW001-00001	NEW001-00001
NEW001-00002	(RID001)	NEW001-00001	NEW001-00001
NEW001-00003	(RID001)	NEW001-00001	NEW001-00001
NEW001-00004	(RID001)	NEW001-00001	NEW001-00001
NEW001-00005	(RID001)	NEW001-00001	NEW001-00001
NEW001-00006	(RID001)	NEW001-00001	NEW001-00001
NEW001-00007	(RID001)	NEW001-00001	NEW001-00001
NEW001-000011	(RID003)	NEW001-00001	NEW001-00001
NEW001-000021	(RID003)	NEW001-00001	NEW001-00001
NEW001-000031	(RID003)	NEW001-00001	NEW001-000021
NEW001-000041	(RID003)	NEW001-00001	NEW001-000021
NEW001-000051	(RID003)	NEW001-00001	NEW001-000021
NEW001-000061	(RID003)	NEW001-00001	NEW001-00001
NEW001-000071	(RID003)	NEW001-00001	NEW001-00001

It should be obvious that in following the U3 LEI code construction, the prefix of the pre-LEIs (first four numeric digits) is not necessary to define global uniqueness. This is done through the entity specific Registration Domain [RIDxxx] which follows the same rule of construction as the prefix (randomly chosen digits). These digits, if freed up, would be more useful in allowing for both the expansion of the re-sequencing digits of LEI codes for accommodating LEI reorganizations, mergers, acquisitions, etc. and for expansion of the Registration Identifier.

Further, there are more uses for a completely numeric code construction than an alphanumeric one (low latency applications, faster sorting, more human understandability, better presentations on reports and screens, etc.). Certainly a code devoid of randomly generated alphanumeric codes, no matter the length, is better for database storage and retrieval and for minimizing re-initializing relational database indexing. Finally the two digit check digit, more helpful for transposition errors of alphanumeric codes, can be replaced by a single digit check digit, thus freeing up even more expansion for the entity specific segment, and again providing even more code expansion room to have a completely numeric code.

Finally, the U3 LEI code construction and its use in data aggregation depends on seeing the value in reorienting the exclusive relationship of assignment of codes from the current local regulator and the local facility manager (pre-LOU) it appoints, to the Central Operating Unit (COU) soon to be established. Further it anticipates the financial market participant will assign the remaining digits to the RID assigned to it, and register the complete LEI code and its business card data into the LEI registry in partnership with the LOUs.

The COU has a clear mission and role yet no technical direction at this time. It awaits the appointment of a Board to begin to give it meaning and direction in its role in the GLEIS. From the Nov. 5, 2012 “Charter Of The Regulatory Oversight Committee For The Global Legal Entity Identifier (LEI) System”:

*The mission and role of the Central Operating Unit should be to ensure the application of uniform global operational standards and protocols that deliver global uniqueness of the LEI, seamless access to the global LEI and to high quality reference data for users with depth of access controlled by appropriate access rights, as well as protocols and methods for how local systems can connect to the Central Operating Unit.*

We have always advocated for a two part entity specific code construction and assignment process conducted between regulators, their agents and financial market participants. This two part construction, where the prefix is assigned to the business entity not the LOU, is essential to accommodate requirements of sovereignty and local control, and of confidentiality and data aggregation put forward in more recent regulatory requirements.

It is our purpose in this paper to demonstrate that required capabilities for data aggregation: the establishment of business hierarchies; of consolidated group level control structures; of synchronization with internal organizational business structures; and maintaining control of changes from corporate actions within a globally federated network is best accomplished through this unique code construction method and the Federated GLEIS Technology Platform put forward in **Appendix B**.

**The Federated GLEIS Technology Platform**  
the  
**Virtual Global LEI Registry**  
and its use for  
**Data Aggregation for Swaps Data Repositories**

The following is the description of the proposed U3 Global Identification System utilizing the Domain Name System (DNS) principles of the Internet and the LEI numbering convention we have designed. The GLEIS is to be built as a secure virtual private network (VPN) overlaid ('tunneled') through the Internet. The Internet itself is built with inherent resilience there being no single point of failure and thus useful as the network architecture for the GLEIS.

The Internet's most resilient and ubiquitous application, the World Wide Web and its Domain Name Server (DNS) system is the model on which we have designed the GLEIS. If we follow the DNS analogy there are many servers to choose from all of which can, for example, resolve an LEI into an address to locate its LOU. Each server in the DNS network contains, or can get access to the same directory to locate an LEI and its reference data.

If we place the locator directory at each LOU and need to search outside a local LOU the DNS service will 'dial' the corresponding LOU. In this scenario the COU functions as an aggregator of the "who has what" data directory and pushes a copy to the LOUs. Again, this is the way DNS works. Most companies today have local DNS services that can resolve address lookups without going outside to higher-order servers in the network. If you look at the federated solution in this way it is constructed as a peer-to-peer network of LOUs where the COU level is for building the 'routing tables' that get distributed to the 'routers' at the LOU.

The Internet's Domain Name System (DNS) was originally created as an 'overlay' service on top of the plumbing (the pipes or communication infrastructure) of the Internet to support the need for computers to access 'telephone number-like' addresses from human understandable names. The DNS system maps addresses to literal names and is able to resolve one from the other. The resolution ability of DNS relies on the Internet Protocol's (IP's) address hierarchical structure: network.domain.subdomain.machine (172.16.1.162, for example) to determine the authoritative physical address of the DNS server that registered the address. The system implements a distributed database of addresses and domain names across a network of DNS servers. The service enables the operation of Internet applications such as e-mail, the World Wide Web, the Handle System and the Direct Object Identifier (DOI) system.

The DNS system 'points to' other servers by passing a requestor's query to an IP address that, for example, starts with 172 in the above example. In DNS, if the queried name server isn't authoritative for the data requested, the query will be passed on to interrogate other name servers to find and resolve the address. The system can either send a recursive query to those name servers, thereby obliging each in turn to resolve the query and return the addresses; or it could send iterative queries and possibly refer to other name servers 'closer' to the domain name it's looking for.

The closest known name servers are the servers that are authoritative for the zone closest to the domain name being looked up. If, for example, the server receives a query for “research.XYZ.com.br” it will first check whether it ‘knows’ (has its address stored in its server) the name servers for “research.XYZ.com.br”. If it does, it will send a query to one of them. If it doesn’t it will check whether it knows the name servers for “xyz.com.br” and after that “com.br” and finally “br”. The default, i.e. what server the query is guaranteed to stop at, is at the root name server zone since every name server knows the domain names and addresses of the root name servers.

The LEI implementation uses the DNS principles to resolve LEI numbers to its registrant, where each DNS or cluster of DNSs is administered by the LOU that assigns the RID portion of the LEI to companies in its jurisdiction.

In implementing the LEI on the Internet each company would have a domain name maintained on each LOU’s DNS that has authority over the LEI. The DNS would point to one or more LEI Registry servers that contain, first the LEI and its minimum data attributes, and then the more robust reference data supported by others (financial institutions, data vendors, etc.) for further defining the data attributes of the company. This later set of data attributes are useful from an operational and valuation perspective. Reference data such as tax identification numbers, indicators of tax exemptions by country, multiple mailing addresses, dates and rates associated with dividend payments and other corporate life cycle events, etc. are kept by one or more providers.

In DNS, each domain can be administered by a different organization. Each organization can then break its domain into a number of sub-domains and delegate responsibility for those sub-domains to other organizations. This should allow the implementation of a sovereign country or regional LOU administrator to be the authoritative registrar of the LEI.

As with the DNS, the webpage servers in the World Wide Web application are organized as distributed databases. RIDxxx business entity identifiers are used as key indexes into the LEI Registries. A query about an LEI to the LEI Registries, configured as a virtually organized distributed database service will prompt a specific LOU to respond.

DNS already supports many services that can also support an LEI implementation. For example the DNS service called “whois” could, in the LEI context, allow users to issue a command like “% whois 0614141123452” and the service will return the minimum LEI data attributes required by regulators. A custom approach, for example, for defining a “-f XML or FpML” flag and placing it in a query, could activate a response formatted through their respective taxonomy definitions. For example, the information provided could be:

Legal Entity: XYZ Corp  
Entity Name: XYZ Germany, GmbH  
Parent LEI: 0614141112111  
Address: 14 Blutstrasse, Frankfurt

Using a different service request a flag such as “-d 0614141123452” to the “whois” command can be created that will respond with the detailed data elements through a secure authentication challenge. When the query authenticates the requestor it could then reply with the data elements appropriate for that type of data consumer.

Another DNS service is called Name Server lookup, or “nslookup”. In the context of the LEI implementation this service could provide the address of the Registrar for a particular LEI. The requested service would be described as “%nslookup 0614141123452”. This query would return the IP address of an LEI Registry server (sovereign country LOU) that may be able to resolve the particular LEI.

The Internet, by design, has been built as a resilient network with multiple points of failure easily reconciled through rerouting messaging dynamically around any such individual or multiple node failures. The Internet is designed to keep the whole of the infrastructure continually accessible. It is a remarkably agile federated network and data storage mechanism for a robust implementation of the LEI system and beyond.

Since the Internet’s public debut its ability to keep up with the number of addresses assigned, throughput rates and transaction capacity has been challenged and its architects have risen to the occasion. Server farms are scaled on a dynamic basis to accommodate increases and declines in capacity and throughput rates. When throughput and access rates increase around a particular activity and/or in a specific region, neighboring Domain Name Servers become populated with directly resolved domain addresses decreasing the time to access the root servers. In mission-critical applications where Quality of Service provisioning is to be maintained as part of a Service Level Agreement, capacity provision, intelligent caching and server replication are used.

Address naming conventions in the Internet have been expanded to increase capacity, leaving existing names compatible with this expanded and longer numbering convention.

Internet Authentication Service Providers can be included in the DNS, creating a public/private Internet overlay service that can include either a two-factor authentication or Public Key Infrastructure (PKI) authentication. The authentication service allows access control over the “enhanced” or private layer of data attributes for the LEI so that they can be made available to certain organizations based on authenticated LEIs. In this way when an entity does a lookup on another entity, there is a public view and when both parties can be authenticated there is a private view that contains the rest of the LEI data attributes. These are registered either via the LOU Domain Name Servers or its LEI Registry. The deeper extended data attributes are administered through the vendors or other providers, the equivalent of web page servers.

When further confidentiality is required new Internet features, such as creating “hashing” algorithms for redaction of data, can be deployed. This could, for example, allow LEI hierarchical ownership structures to be aggregated without divulging the identities of ownership. Later, when a systemic trigger is evoked and indicates that a redacted entity may be the cause, the reverse key of the algorithm can be provided to the regulator within the jurisdiction of the entity’s domicile. The respective regulator can then be enabled to observe the entity’s identity and conduct on-site surveillance and due diligence.



LOUs in communication with each other without needing all inquiries to go through the COU, a central controller or a central repository as in a wheel and spoke configuration. The COU could still be the holder of the golden copy of all LEI control data by “listening” to all channels but not forcing each LOU to go through the COU.

In this scenario when one wishes to retrieve information about any one specific LEI, a query is published to the LOU on the corresponding “RID channel”. That query will be "routed" to the right LOU. The advantage of this implementation is that an LOU may want to publish information about a specific LEI as an update to those who need to be informed, whether of a merger, or a bankruptcy, or some other event that requires an update to the LOU’s registries.

For example a corporate event that changes the capital structure of an existing company could also affect the control of the company. That would require that the controlling entity’s RIDxxx of the LEI that is used for a rolling-up to an aggregated view of multiple LEIs needs to be changed, actually to be substituted for the new LEI. Each old LEI in the reference data in each LOU associated with that roll-up must be changed. In this approach each LEI will be tied to an immediate parent and at some point to an ultimate parent/ultimate control group LEI. Many multi-LEI business structures, certainly the world’s largest and systemically important financial market participants would contain multiple references to its immediate parent/ultimate parent LEI that would have to change.

The mechanism for making global changes would be through global commands across channels that communicate directly with LEIs. The mechanism to make this change is already in the LEI code itself (the Registration Domain code configuration permits this). Then simple pub/sub mechanisms could be commanded to make the change. Also using RIDs in conjunction with setting up ownership/control hierarchies would facilitate their registration into the GLEIS and thereafter could be used to effect mass changes to control hierarchies, including the ultimate parent/control entity kept in the reference data.

One other significant use of an RID channel is to effect a global change to an RID across multiple LOUs when, for example, one business entity merges with another, or one business entity acquires a component of another business entity, or one business entity spins off a component of its business (multiple LEIs). Assigning the same RID to multiple LOUs for carrying out this function is one approach using the COUs ability to populate each LOU from a central control. The same RID (not LEI) will not produce duplicate LEIs. This capability can also be affected by one LOU transferring the RID to another LOU.

Another benefit of this approach is to enable secure access control. For example when a user establishes a connection to a LOU, the publish/subscribe protocols specify a virtual host within which it intends to operate. A first level of access control is enforced at this point, with the server checking whether the user has any “permissions” to access the virtual hosts, or else rejecting the connection attempt. In this way an LOU can support virtual hosts for regulators, other country LOUs, same country LOUs, the public, etc.

A second level of access control is enforced when certain functions such as configuring, reading or writing operations are performed. A user is granted the respective permission for each or all

operations. In order to perform an operation the user must have been granted the appropriate permissions. This allows a granularity of access control as, for example, when only redacted information on a RID is to be allowed through one RID channel for a “privacy jurisdiction” not allowing immediate or ultimate parent public disclosure. At the same time non-redacted ownership information can be published and made ‘query-able’ on different channels (home country agent/regulatory access, for example) requiring different permissions. Results of such access control checks may be cached on a per-connection or per-channel basis. Hence changes to user permissions may only take effect when the user (an LOU, a regulator or the public) reconnects.

By designing the global LEI system using a pub/sub network of LEI “brokers” consisting of LOUs and a COU a more robust system can be provided beyond what a centralized or hub and spoke solution requires in passing large files from many-to-one or many-to-many. Here, because a message passing paradigm is used with queues and virtual hosts at each server, stateless asynchronous communications is allowed while the access control is state-full on a per-connection per-channel basis.

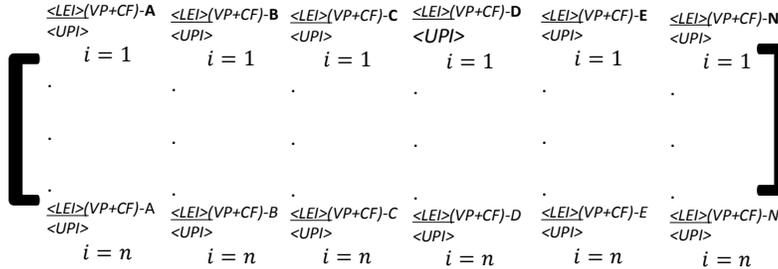
This later approach is ideal for machine-to-machine (M2M) design patterns as is used in today’s financial markets for market data and straight through processing (STP) applications which do not require “humans-in-the-loop” to login and create a state-full session for both data transfer (potentially bulk data transfers) and access controls.

To those who design financial industry market data and trading systems these approaches will be familiar. We would also like to note that provisions have been made in the proposed design of the global LEI system to store, maintain and process Unique Product Identifiers (UPIs) as required for the USA’s implementation of Swaps that has recently been placed on the global agenda by the FSB. In the interim we have provided for a market symbol/market designation code in the server component of the plug-in network architecture we have designed for the Global LEI System as required by the ROC.

This federated model, while a technical solution, makes the resolution of the geopolitical issue possible where some countries, perhaps the majority, will want to maintain their own LEI registries, perhaps behind a firewall, which is generally the case for general business registries. Sovereign states will certainly wish to control information related to legal entities and related hierarchies of business ownership in circumstances where governing statutes do not permit public disclosure and/or exporting of such information outside their control.

Finally, the same technical solutions proposed for the GLEIS can be applied to the multiple and globally disbursed Swaps Data Repositories. Swaps creation and continuation data will reside in “SDR Registries” where they can be accessed in the same manner as an LEI across all SDRs or in any combination of SDRs; and by all counterparties or by a single counterparty across all SDRs; and by many counterparties all aggregated to a single controlling entity or ultimate parent, whether in a single SDR or in all SDRs. Counterparties identified by a unique LEI in each SDR makes this possible.

## Example of Aggregation of Cash flows and Valued Positions Across Multiple LEI Control Groups\*



Where: LEI is the Global FSB LEI ISO 17442 standard and <LEI> is the data tagged LEI  
 UPI is a global product (contract, instrument) standard and <UPI> is the data tagged UPI  
 VP is the mid-price benchmarked valuation of notional values; par values; and closing price mark-to-market positions  
 CF is the net present values of future cash flows of swaps payments, dividends, interest, options and other  
 future payouts in the above (repeated below) formulaic representation:  

$$\frac{\langle \text{LEI} \rangle \langle \text{VP} + \text{CF} \rangle - A - N}{\langle \text{UPI} \rangle}$$

**\*Control Groups could be: Swaps Data Repositories; Banks and Bank Holding Companies; Systemically Important Financial Institutions; Central Counterparties; Swap Execution Facilities; Equity, Options, Futures and Single Stock Futures Exchanges and their Clearing Organizations; Collective and Alternate Investment Fund Platforms; etc.**

Availability of existing component software and database technologies, networks and Internet interfaces with all SDRs, as with all financial market participants and swaps counterparties, make this practical in the short term. This effort would be an assembly of existing parts rather than a build from scratch. We have already presented a set of neutral technology vendors prepared to work toward an operating pilot at the FSB’s LEI Demo Day in Basel, Switzerland last October 2012.

A “Final Report on the Global Identification System for Counterparties and Other Financial Market Participants” was presented to the FSB and posted to their LEI Knowledge Forum website on April 17, 2013.

# **Final Report on Global Identification Standards for Counterparties and other Financial Market Participants**

*Presented on behalf of Financial InterGroup*

*by*

*Allan D. Grody, President,  
Financial InterGroup Holdings Ltd*

*“Fixing the plumbing is the first step on a long journey toward risk adjusting the  
financial system”*

January 20, 2013

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## Abstract

Financial service industry regulators are focused on observing systemic risk across enormously complex interconnected global financial institutions. While these systemically important financial institutions continue to improve their enterprise risk management techniques and systems, regulators are now intent on adding new tools and improved methods to analyze the systemic exposures that arise across these firms. Many approaches are being considered to aggregate risk within and across financial institutions and provide for transparency of financial transactions and risk exposures. Without the ability to view the underlying positions and cash flows, valued in standard ways and aggregated by counterparty through common identifiers, neither risk triggers nor risk exposures can be observed nor can systemic threats be detected.

It has been accepted by regulators that the very first pillar of global financial reform is a standard for identifying the same financial market participant to each regulator in the same way. Getting agreement on a globally unique and standardized legal entity identifier (the LEI) is the first step.

This paper is the final report by Financial InterGroup on past and current efforts of its principles, along with industry members and sovereign regulators, newly empowered by the G20's Financial Stability Board (FSB), and soon the Regulatory Oversight Council (ROC), to develop a global identification system for such purpose. The FSB's initial focus, counterparties in over-the-counter derivatives transactions, is but the first use of the LEI. The LEI aspires to be the universal identifier for each financial market participant across all financial transactions.

In this paper we propose a government and industry partnership in which governance is shared and operating elements of the global identification system are compartmentalized for control, security and confidentiality purposes. The paper previews a global LEI code standard along with its operational and specific technical implementation. The entity-specific standard proposed is a unique, unambiguous and universal set of characters constructed around a structured, non-intelligent two part apportionment and assignment process to be conducted between regulators, their agents and financial market participants. It is shown that this two part code construction is essential to accommodate requirements of sovereignty, control and confidentiality put forward in more recent regulatory requirements. It is also shown that the establishment of business hierarchies, of consolidated group level control structures, of synchronization with internal organizational business structures, and maintaining control of changes from corporate actions to the registered legal entities within a globally federated network is best accomplished through this unique code construction method.

We conclude that the proposed global identification system satisfies all known short term and longer term regulatory requirements for the LEI. Its proposed design offers practical solutions to hierarchical, maintenance and synchronization issues while avoiding perpetuating mapping issues that have plagued the industry for decades and that other suggested solutions would engender.

It also lays the foundation for further rulemaking on issues yet to be addressed for contract and instrument identification, for corporate event identification and for data aggregation of valued positions and cash flows for systemic risk analysis, the latter being the ultimate objective of the rulemaking.

**Key Words:** Counterparty Risk, Systemic Risk, Legal Entity Identifier, Financial Crisis, Dodd-Frank

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The paper, however, is the responsibility of Financial Intergroup Holdings Ltd and, in the end, its President, Allan D. Grody who synthesized the great amount of data collected over the eight years of this project and applied the editorial judgments and decisions necessary to finalize this proposal. We are deeply grateful for over 50 individuals over these eight years who gave of their time, experience, wisdom and judgment to contribute to refining our thinking and giving us the benefit of their understanding to improve this proposal. Finally, thanks to the PSPG and IG members who contributed immensely to the further understandings that are found in this paper.

## Executive Summary

This final report is a summary of work done in two overlapping spheres of research by separate but aligned groups. Firstly, this report summarizes research done by certain members of the working group of the Private Sector Preparatory Group (PSPG) in tandem with the facilitating regulators' Implementation Group (IG). These two expert groups were commissioned by the Financial Stability Board (FSB) to inform the G20 leaders on their Global Legal Entity Identification (LEI) initiative. The FSB's work was conducted beginning in mid-July, 2012 and continues to this day.

Secondly, this report also reflects the earlier and continued work of Financial InterGroup's partners and advisory board members (see **Global Identification Standards for Counterparties and Other Financial Market Participants** at <http://ssrn.com/abstract=2016874> and **A Second Report on the Global Identification of Counterparties and Other Financial Market Participants**" – at [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2192324](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2192324) ) some of whom have also participated in the efforts of the PSPG. In both research environments they had been similarly informed by the many regulators, financial institutions, corporations and private sector market participants, data and technology vendors, standards organizations and trade associations that interacted with them. The principle researchers at Financial InterGroup have been studying the issues of financial data quality and global identification standards for eight years as a private sector initiative. They have additionally been studying the interconnected areas of data management and risk management for nearly two decades

Efforts to resolve long standing issues were first initiated by us in a private sector attempt at collaboration with industry members, standards organizations and others. It is still driven by Financial InterGroup but our collaborators are now technology companies as we look to the FSB to drive this through regulatory compulsion and as we plan for implementation.

In producing this report we have been respectful of the Chatham House rules that guide the FSB's work and that we have been asked to operate under. Any reference to FSB activities in this paper are associated with disclosed public statements of the FSB or to information which predated our invitation to advise the FSB, which continues. In this later regard our contribution to the FSB has been open and fully unabridged, posting to the FSB's Knowledge Forum as others have done. Other's summaries' of PSPG member work have acknowledged our contribution.

In this document we discuss the International Standards Organization (ISO) LEI 17442:2012 standard and possible additions to it; provide our thinking on the LEI code's construction and its importance to hierarchical relationships of LEIs; view maintenance capabilities of the LEI system's codes as essential at the initiation of the LEI system; emphasize the importance of improving data quality by at-source self-registration and local involvement of both regulators and financial market participants; speak to the criticality of business hierarchical information to

the ultimate goal of counterparty risk aggregation; and address performance and risk management criteria in the global legal entity system itself.

In summary and as detailed in the body of this report:

- we urge the information Regulatory Oversight Committee (ROC) to carry forward the aspirations of the FSB and IG for a global LEI code to conform to the high standard defined for a “uniform” and “consistent” global identity system;
- we urge the ROC, which is ultimately responsible for the final determination for any standards for the LEI, to conform the entity-specific portion of the LEI code construction to a uniform and consistent standard as required by the ROC Charter;
- we propose the Registration Domain code structure as described in this report as the uniform and consistent entity-specific portion of a LEI code construction that is both persistent and non-intelligent;
- we recommend a definitive early transitional approach to obtaining hierarchical information and in this regard define an essential reference data component, the Ultimate Parent/Ultimate Control Point LEI for early adopter and all subsequent LEI registrants to provide;
- urge an ongoing third party assurance function to be performed to permit the highest quality data to be registered at-source in the system;
- support the federated organizational and technical approach to the LEI system and, to this end, define a communications network, systems architecture, continuous updating mechanism and operational process that is fit for such purpose;
- suggest a non-G20 country venue as the ideal country for locating the COU with a back-up site in another non-G20 region; and, finally
- agree that jurisdictional citing of the governance structure of the global LEI foundation should be quickly decided, obvious precedents are indicating a preferred venue of Switzerland

Most importantly we believe that a regulatory mandate by the G20 is essential to the successful implementation of the Global LEI System (GLEIS). Without regulatory compulsion of financial market participants under G20 financial regulators’ control no further progress will be possible and the Global LEI initiative will decompose into specific country, or point in time or one-off market solutions. The LEI would become “just another number” rather than a transformational global identification system. Here we look to the case of other sectors of our global economy such as the trade supply chain and the communications industry. Unique universal bar coded identifiers and internet addresses came into existence and created immense operational efficiencies and social value without regulatory compulsion. Without judgment, the financial industry had tried to accomplish the same without resorting to regulatory compulsion for nearly three decades and failed.

We and those we have asked to collaborate with us on this project are confident that we can implement a three node (three country) federated system within a short time frame (six months under earlier minimum definitions of the GLEIS) and position it for expansion as additional sovereign nations come on board.

Finally, as this report reflects opinions and judgments of its authors, and others may differ with its conclusions, it should be subject to critical review and further analysis as warranted before being enacted as policy and/or regulation.

## Introduction

A global identification system for financial markets, of which the LEI is but the beginning, is important to both operational efficiency of financial institutions and risk adjusting the global financial system. As an industry we come late in doing this as other global identification systems already exist in other major segments of the global economy, most notably in publishing, in the trade supply chain and throughout the global communications infrastructure.

A successful outcome requires that the LEI, the federated network of LEI registries and the LEI system are supportive of a geopolitical solution wherein financial market participants, the financial industry and regulators cooperate toward common purpose bringing transparency and risk aggregation capabilities to financial transactions. Approaches to resolving this issue have long been debated with many attempts at a solution but none has succeeded.

What is different this time is that there appears to be regulatory resolve at the G20 in gaining individual sovereign country recognition and endorsement of the LEI through its operational arm, the Financial Stability Board and, in turn the Regulatory Oversight Council it has established. The ROC has the ultimate power and authority over the global LEI system. Any power delegated to the Central Operating Unit (COU), Local Operating Units (LOUs) and other entities can be reversed by the ROC. This resolve, it is hoped, will prompt cooperation of local and global financial industry participants and their regulatory overseers. Such early enthusiasm is evident in the 45 regulators and 15 observers that have signed on to observe and implement the ROC Charter when it is approved.<sup>1</sup>

Early regulation, particularly in the US, has established codes which have aspired to be LEI-like codes. We believe such codes, not yet assured that they will be admitted as fit for purpose in the Global LEI system, have the potential to short change the vision for the LEI initiative and

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<sup>1</sup> Charter of The Regulatory Oversight Committee for the Global Legal Entity Identifier (LEI) System, 5 November 2012 at [http://www.financialstabilityboard.org/publications/r\\_121105c.pdf](http://www.financialstabilityboard.org/publications/r_121105c.pdf)

continue to proliferate multiple proprietary code formats leading to embedding additional mapping tables in each financial institution which all have aspired to eliminate.

What had given the LEI initiative recent impetus toward implementation is the Commodity Futures Trading Commission's (CFTC's) early attempts at initiating swaps regulations in the US. However, there are many unintended consequences emerging in its Swap's Data Reporting and Recordkeeping regulations. Now clearer thinking has emerged, helped by both international regulators and US exchanges and clearing houses. The CFTC has now deferred most data reporting requirements through exemptive relief and no action letters. This should allow the industry and the FSB an opportunity to pause and rethink on the most critical part of the Global LEI initiative, that being the entity-specific LEI code construction itself and how it should be administered. This is quite relevant at this time as no LEI codes are yet required to be used in regulatory reporting anywhere in the world.

The FSB code prefix, a recent addition to the ISO 17442:2012 LEI code standard has left open the possibility of vendors and financial market utilities establishing "entity-specific" differently formatted codes in the code space reserved for this part of the LEI. If not properly administered this concept has the potential for causing the same problems industry members and regulators now deal with in mapping multi-format instrument codes as well as proprietary business entity identifiers to internal codes. Eventually the LEI could follow a path similar to identification schemes of instruments and contracts which are notoriously inefficient at best, duplicative of each other and certainly add huge operational costs and risk to the financial system, exactly the opposite of what was intended for the global LEI initiative. It also potentially allows the concept of a registry of existing registries to gain traction with the inherent data faults, synchronization problems, timing differences and legacy code problems.

What then is a LEI code construction that is fit for purpose? It certainly needs to be recognized for its potential use in order management and trading systems so that a proper audit trail can be discerned; in deployment in all manner of back and middle office systems where its use as data base storage and access key is paramount; and in consideration of its use in the interconnected clearance, payment and settlement systems of the industry.

We believe the Registration Domain code construction method we are proposing in this report fulfills all these requirements. In addition, this method facilitates the creation and registration of LEI driven business hierarchies and, most critically, permits firms to control and maintain internal business hierarchies in their relation to the external LEI codes registered which, in the case of multi-national companies will number in the hundreds and many in the thousands.

In addition, the LEI's are to be used in aggregating counterparties within a control structure for understanding counterparty and credit risk; for account consolidations; for credit limit management; for audit materiality attestation; and for other such risk management needs both within a firm and across firms for containing the contagion of systemic risk. A simple

representation of the uses of the Global LEI for risk data aggregation is presented on the next page:

**Systemic Risk Aggregation Matrix -  
Example of Cash Flows and Valued Positions aggregated Across Multiple LEI Control  
Groups\***

$\frac{\langle LEI \rangle (VP+CF)-A}{\langle UPI \rangle}$	$\frac{\langle LEI \rangle (VP+CF)-B}{\langle UPI \rangle}$	$\frac{\langle LEI \rangle (VP+CF)-C}{\langle UPI \rangle}$	$\frac{\langle LEI \rangle (VP+CF)-D}{\langle UPI \rangle}$	$\frac{\langle LEI \rangle (VP+CF)-E}{\langle UPI \rangle}$	$\frac{\langle LEI \rangle (VP+CF)-N}{\langle UPI \rangle}$
$i = 1$					
.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.	.	.
$\frac{\langle LEI \rangle (VP+CF)-A}{\langle UPI \rangle}$	$\frac{\langle LEI \rangle (VP+CF)-B}{\langle UPI \rangle}$	$\frac{\langle LEI \rangle (VP+CF)-C}{\langle UPI \rangle}$	$\frac{\langle LEI \rangle (VP+CF)-D}{\langle UPI \rangle}$	$\frac{\langle LEI \rangle (VP+CF)-E}{\langle UPI \rangle}$	$\frac{\langle LEI \rangle (VP+CF)-N}{\langle UPI \rangle}$
$i = n$					

Where: LEI is the Global FSB LEI ISO 17442 standard and  $\langle LEI \rangle$  is the data tagged LEI  
 UPI is a global product (contract, instrument) standard and  $\langle UPI \rangle$  is the data tagged UPI  
 VP is the mid-price benchmarked valuation of notional values; par values; and closing price mark-to-market positions  
 CF is the net present values of future cash flows of swaps payments, dividends, interest, options and other  
 future payouts in the above (repeated below) formulaic representation:  
 $\frac{\langle LEI \rangle (VP+CF)-A-N}{\langle UPI \rangle}$

\*Control Groups could be: Banks and Bank Holding Companies; Systemically Important Financial Institutions; Central Counterparties; Swap Execution Facilities; Swaps Data Repositories; Equity, Options, Futures and Single Stock Futures Exchanges and their Clearing Organizations; Collective and Alternate Investment Fund Platforms; etc.

The document presents what we believe to be a complete response to the FSB’s interest for industry members to contribute to the technical design and standards for the federated LEI system. Those requirements include: defining operational processes for secure access and control; a federated virtual data base and communications architecture; a "Plug-in network card" architecture; the mechanism for quality data sourced locally; the means to build hierarchies; the means to respect confidentiality where required; and the non-intelligent, persistent and portable code design itself.

## Background

Long overdue, a global common identification system for the financial industry as proposed by US regulators is now elevated to the status of global regulation as the G-20’s Financial Stability Board (FSB)<sup>2</sup> has accepted a mandate to oversee further work. This regulatory push was first

<sup>2</sup> US Treasury, Press Release, Office of Financial Research Issues Statement on Progress to Date and Next Steps

prompted by the US Treasury along with other US regulators<sup>3</sup>, discussed amongst data management professionals and their trade groups and standards representatives, and now commented upon by the International Organization of Securities Commissions (IOSCO) and the Bank for International Settlements (BIS's) Committee on Payment and Settlement Systems (CPSS)<sup>4 5</sup>. The global dimension of its implementation was reinforced recently at the G-20's Summit where the concept of globally unique identifiers for all financial market participants was formally incorporated into its mandate for overseeing financial reform.<sup>6</sup> The plan is to start with the common identification of legal entities (LEI's) engaged as counterparties in financial transactions, move quickly to similarly identify the OTC derivative products they trade in, and then move to identify their associated hierarchies of ownership. Thereafter, to evolve this identification system to all financial market participants and all financial instruments and contracts.

That we came this far without having such a global identification system is quite remarkable. It was only by rummaging through the records of the collapsed Lehman Brothers did regulators come to recognize what the industry had known for nearly a quarter century. Regulators had no automated means to aggregate and monitor global financial transactions across multiple financial market participants for observing the risks they were exposed to.

Regulators learned that multiple identifiers for the industry's financial market participants and products were inhibiting the aggregation of information both within financial institutions and certainly across financial institutions. Further, US regulators had the foresight to suggest that it may well benefit all governments to observe risk in their own financial sectors by accommodating such a common identification system globally.

## **The Legal Entity Identifier (LEI)**

The LEI (and its equivalents, the Commodity Futures Trading Commission's UCI – Unique Counterparty Identifier and the Securities and Exchange Commission's (SEC's) UIC - Unique Identity Code) became subject of solicitations of interest by the US Treasury's OFR<sup>7</sup>, the CFTC<sup>8</sup>

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Forward in the Global Initiative to Establish a Legal Entity Identifier (LEI), Aug. 12, 2011 at

<http://www.treasury.gov/press-center/press-releases/Pages/tg1275.aspx>

<sup>3</sup> Financial Stability Board, Press Release July 18, 2011 at

[http://www.financialstabilityboard.org/press/pr\\_110718.pdf](http://www.financialstabilityboard.org/press/pr_110718.pdf)

<sup>4</sup> CPSS and IOSCO Report on OTC derivatives data reporting and aggregation requirements, Consultative Report, August 2011, Pages 27 – 31, 52-55 at <http://www.iosco.org/library/pubdocs/pdf/IOSCOPD356.pdf>

<sup>5</sup> Report on OTC derivatives data reporting and aggregation requirements Final Report, Annex 3, January 2012 at <http://www.finextra.com/finextra-downloads/newsdocs/IOSCOPD366.pdf>

<sup>6</sup> G20 Cannes Summit final declaration, "Building Our Common Future: Renewed Collective Action for the Benefit of All", at <http://www.g20-g8.com/g8-g20/g20/english/for-the-press/news-releases/cannes-summit-final-declaration.1557.html>

<sup>7</sup> OFR US Treasury, Statement on Legal Entity Identification for Financial Contracts, Federal Register, Vol. 75, No.229, November 30, 2010 at <http://www.regulations.gov/#!documentDetail;D=TREAS-DO-2010-0008-0001>

<sup>8</sup> CFTC, Swap Data Recordkeeping and Reporting Requirements, Federal Register: December 8, 2010 (Volume 75, Number 235), at <http://www.cftc.gov/ucm/groups/public/@lrfederalregister/documents/file/2010-30476a.pdf>

and the SEC<sup>9</sup> in late 2010. Thirty-three responses were received and made public on each agency's respective website. A later solicitation, by the CPSS and IOSCO, ending in late September of this year, resulted in thirty-two responses, also made public on their website.<sup>10</sup> A US-led industry trade group, the Securities Industry and Financial Markets Association (SIFMA) initiated its own solicitation of interest at the beginning of 2011. A recommendation of solution providers followed<sup>11</sup> and in July, 2011 the OFR, the agency that was the US lead on the LEI, moved to involve the FSB, with its global mandate, to implement the LEI globally.

Observers suggest that a global identification solution will require understanding the interconnected financial industry in the context of managing a supply chain that includes regulators, issuers, data vendors, auditors, and non-financial counterparty participants as key constituents in the solution; considering solutions established in other segments of the global economy<sup>12</sup> beyond those conceptualized from precedents found in the financial industry<sup>13</sup>; looking at the Internet's overlay structures, particularly the World Wide Web, as a storage and distribution mechanism to be emulated in implementing a global LEI system and beyond;<sup>14</sup> and looking to the global standardization of financial statement reporting<sup>15</sup> as a parallel to the implementation process necessary for a global identification system.

In this last regard, it is important to recognize that corporate issuers and other financial market participants, especially listing exchanges for financial instruments and financial contracts, are usually the first to encounter new legal entities as well as new tradable products. Situated as they are at the origins of a financial transaction's life cycle, these constituent groups originate the reference data contained in new product filings, prospectuses, offering memoranda, articles of incorporation, trust agreements, master derivatives agreements, and public announcements of corporate events. Today this information is largely defined in legal terms and is manually transformed into the data attributes necessary to make this information operational by computer. This was the same in the past for financial statement reporting, until the vocabulary of generally accepted accounting principles and international financial reports of account were encapsulated into eXtensible Markup Language (XML) making it computer readable at the business application and communication layers. The global success of this effort amongst regulators and

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<sup>9</sup> SEC, Regulation SBSR – Reporting and Dissemination of Security-Based Swap Information, 17 CFR Part 240, Release No. 34-63446; File No. S7-34-10, RIN 3235-AK80 <http://www.sec.gov/rules/proposed/2010/34-63446.pdf>

<sup>10</sup> CPSS-IOSCO, Comments received on the CPSS-IOSCO consultative report on "OTC derivatives data reporting and aggregation requirements at <http://www.bis.org/publ/cpss96/comments.htm>

<sup>11</sup> SIFMA, Global Legal Entity Identifier, Industry's Process & Recommendations, July 8, 2011, at <http://www.sifma.org/lei-recommendation-process/>

<sup>12</sup> Grody A., Smucker, T., Legacy Main Street Solution proposed for Wall Street, Chief Executive Magazine, May 17, 2011 at <http://chiefexecutive.net/legacy-main-street-solution-proposed-for-wall-street>

<sup>13</sup> SIFMA, Requirements for a Global Legal Entity Identifier (LEI) Solution, May 2011 <http://www.sifma.org/LEI-Industry-Requirements/>

<sup>14</sup> Esther Dyson, Online Registries: The DNS and Beyond..., Release 1.0, Vol. 21, No. 8, Sept. 16, 2003

<sup>15</sup> Bruce, R., Financial Times, Regulators are champions of XBRL, Jan. 28, 2010 <http://www.ft.com/cms/s/0/57666f4c-0c0d-11df-96b9-00144feabdc0.html#axzz1hsrQTAIH>

filers suggests a parallel undertaking for global financial participant identification and its associated reference data.

## **Origins of Systemic Risk and the Data Issue**

The Great Depression of this past century can arguably be considered the first occurrence of global systemic risk, a financial contagion of global proportions that, like a new virus, spreads rapidly with no known antidote. However, that earlier systemic contagion occurred at a time when data was measured in pages not petabytes<sup>16</sup>; bulk paperwork was transported via postal services networked together by steamship and private courier; orders, trades and ticker tapes moved at character-per-second speed; voice conversations on the telephone were subject to misinterpretations; and wireless cables had limited capacity. Today the contagion in any form of financial transaction is transported instantaneously through light pulses at light speed over fiber, airways and via satellite.

## **The Computer and Communications Era Impacts**

The modern day variant of systemic risk can be traced to the late sixties, a time of telecomputer-connected automation of Wall Street's front and back-offices. The volume of transactions resulting from a burgeoning middle class of investors collided with a paper based clerically intense work process. This near collapse of the US's capital markets drove panic throughout the fledgling foundations of a telecomputing-led globally interconnected financial supply chain.<sup>17</sup>

The first computer-era financial product identification standard, the US-centric CUSIP numbering system for US stocks and bonds was developed in response to the paper crisis of that era<sup>18</sup>. Coincident with this event, international banks working with the new methods of telecomputing and the new reality of a post Bretton Woods floating currency exchange regime began planning the SWIFT system which would transmit payments in foreign currencies between banks. SWIFT operates today in much the same way as then, with a set of proprietary codes known as BICs to identify the banks and their branches that use its network.<sup>19</sup> SWIFT, not yet a year old at the time, saw a new purpose in planning its services - mitigating risk as the Herstatt Bank in Germany was declared bankrupt overnight between US and German time zones. Herstatt had received funds in US dollars but was unable to complete its payments to the US banks because its assets were frozen.<sup>20</sup>

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<sup>16</sup> McPartland, K., Tabb Group, Technology and Financial Reform: Data, Derivatives and Decision Making, Aug 9, 2011

<sup>17</sup> , New York Times, Market Turmoil; Averting Blizzard of Paper, Oct. 25, 1987 at <http://www.nytimes.com/1987/10/25/us/market-turmoil-averting-blizzard-of-paper.html>

<sup>18</sup> , Mr. Cusip Dies At 94, The Shareholder Service Optimizer, Qtr 1, 2008 at [http://www.optimizeronline.com/files/MR\\_CUSIP.pdf](http://www.optimizeronline.com/files/MR_CUSIP.pdf)

<sup>19</sup> SWIFT History at [http://www.swift.com/about\\_swift/company\\_information/swift\\_history.page](http://www.swift.com/about_swift/company_information/swift_history.page)

<sup>20</sup> Basel Committee on Banking Supervision, Bank Failures in Mature Economies, Working Paper No. 13, April

At about this same time long lines were forming at checkout counters in department stores and supermarkets. Inventory management and price-labeling were manual and error prone. Labor-intensive check-ins stymied delivery to outlets. Error rates, pilferage and unaccounted inventory discrepancies began to soar. The retail industry motivated itself and leveraged available technologies to create one of the fabled success stories of the information age, the creation of the Universal Product Code (UPC). The UPC was first scanned and read by computer in a supermarket in 1974 to identify Wrigley's chewing gum. The UPC, expanded to identify business entities, locations and products is now used throughout the world. It is found in the ubiquitous bar code, the RFID (Radio Frequency Identification) transmitter and now in the evolving Data Matrix Symbol.<sup>21</sup>

### **A Brief History of Systemic Contagion**

The October, 1987 market crash<sup>22</sup> was not unlike today's financial crisis, a contagion of interconnected markets and interrelated cash flows arbitrated through mathematically driven strategies that crippled the exchange based US equity, futures and options markets. Cash flows between clearing houses, central counterparties, clearing firms and investors were locked up as computers froze and trading halts were applied in ad-hoc fashion.

Brought on by a misaligned financially engineered product used to hedge market risk through a technique known as portfolio insurance, the 1987 market crash awakened regulators to the reality that they had no mechanism to aggregate and view the related transactions of all the trading parties across all the interconnected markets. A new causal variant appeared for the first time, the use of computerized mathematical models to arbitrage price discrepancies between markets. This technique, known as index arbitrage, was an early form of algorithmic trading. This was to be the first of many more mathematically driven contagions to come.

The 1999 Long Term Capital Management crisis was also created by over confidence in mathematical models left to run in real-time across globally connected markets.<sup>23</sup> Relying on past correlations and a newly minted stochastic risk management theory of Value-at-Risk, this trading strategy nearly collapsed the known global economy at that time, precipitated by Russia defaulting on some of its debt. The industry driven rescue plan instigated by the Federal Reserve prevented a disaster of near epic proportions.

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2004, [http://www.bis.org/publ/bcbs\\_wp13.pdf](http://www.bis.org/publ/bcbs_wp13.pdf)

<sup>21</sup> Bellis, M., About.com, History of bar code at [http://inventors.about.com/od/bstartinventions/a/Bar\\_Codes.htm](http://inventors.about.com/od/bstartinventions/a/Bar_Codes.htm)

<sup>22</sup> Carlson, M., Board of Governors of the Federal Reserve, A Brief History of the 1987 Stock Market Crash with a Discussion of the Federal Reserve Response, November 2006 , at <http://www.federalreserve.gov/pubs/feds/2007/200713/200713pap.pdf>

<sup>23</sup> Haubrich, J.G., Federal Reserve Bank Of Cleveland , Some Lessons on the Rescue of Long- Term Capital Management, Policy Discussion Paper, No. 19, April, 2007 at <http://www.clevelandfed.org/research/policydis/pdp19.pdf>

The earlier 1987 market crash spawned many government, industry and private studies that led to the observation that the financial industry was driven by increasingly automated processes and interconnected through global communications networks. A project of that era lasting for nearly two decades, initiated by The Group of Thirty, a private think tank made up mainly of retired heads of state and central bankers, focused on eliminating risk in the interconnected financial system.<sup>24</sup> In their 2006 final monitoring report The G-30 concluded that the implementation of reference data standards had proven difficult and that greater efforts by market infrastructure operators and international institutions with global reach would be needed to resolve this issue.<sup>25</sup>

The G-30 statement would prove prescient when in 2008 the collapse of the global financial system, in part driven by loose mortgage underwriting standards and further seeded by financially engineered derivatives products, again exposed regulators to the lack of transparency from missing data and multiple identification standards. Differently identified mortgage originators, trading counterparties, and mortgages themselves, made an audit trail from product origination through to their securitization markets impossible.<sup>26</sup> The lack of an audit trail across interconnected markets surfaced again in the “flash crash” incident of 2010.<sup>27</sup>

The risks that both incidents exposed could have been mitigated if data and identification standards were in place to aid in traceability: in the former case being able to identify a toxic sub-prime mortgage defaulted on in a tranche of a securitized bond sitting on a bank’s balance sheet; and in the latter case being able to identify the same trader and his trades, and its beneficial owner operating across different trading markets.

The problems that arose might have been more quickly resolved with a true picture of what had happened, thus minimizing damage and recovering more quickly. In the best case computers monitoring markets and financial positions could have been proactive in early warning triggers that could prevent damaging the financial system. This is, in fact, the lesson learned and the objective for the future of systemic risk analysis.

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<sup>24</sup> MacRae, D., American Banker, T+3 is A-OK with U.S., Banks Say, June 1,1995 at [http://www.americanbanker.com/magazine/105\\_6/-60042-1.html?zkPrintable=true](http://www.americanbanker.com/magazine/105_6/-60042-1.html?zkPrintable=true)

<sup>25</sup> Group of Thirty, Global Clearing and Settlement, Final Monitoring Report, 2006 at <http://www.group30.org/images/PDF/Global%20Clearing%20and%20Settlement%20Final%20Monitoring%20Report%202006.pdf>

<sup>26</sup> Financial Crisis Inquiry Commission, Final Report of the National Commission on the Causes of the Financial and Economic Crisis in the United States, The Financial Crisis Inquiry Report, Jan, 2011 at [http://cybercemetery.unt.edu/archive/fcic/20110310173545/http://c0182732.cdn1.cloudfiles.rackspacecloud.com/fcic\\_final\\_report\\_full.pdf](http://cybercemetery.unt.edu/archive/fcic/20110310173545/http://c0182732.cdn1.cloudfiles.rackspacecloud.com/fcic_final_report_full.pdf)

<sup>27</sup> Report of the Staffs of The CFTC and SEC to the Joint Advisory Committee on Emerging Regulatory Issues, Findings Regarding the Market Events of May 6, 2010, Sept. 30, 2010 at <http://www.sec.gov/news/studies/2010/marketevents-report.pdf>

## **The US Government's Role in Counterparty Identification Standards**

The US's Dodd-Frank legislation enables a new entity, a branch of the Treasury, the Office of Financial Research (OFR) to carry out research on systemic risk. In its first initiative the OFR has called for an industry-government partnership to create a global LEI system. Their notices of inquiry in anticipation of rulemaking by July 15, 2011 reached out to global leaders, practitioners and standards setters to provide the guidance and deliver on the consensus they sought from the industry for such an identification standard and system.<sup>28</sup> Furthermore, while their perch as rule makers is US centric, they had decidedly taken a global perspective through embracing the implementation as one to be carried out amongst all sovereign financial regulators.

While observing the problem as a global one, the US regulators had no mandate to reach beyond their own domestic jurisdiction. They recognized that while regulators have operated in their own local markets or sovereign jurisdictions, financial institutions operate across markets globally and know no such prescribed sovereign boundaries.

US regulators recognized that the issue is both an industry and a regulatory issue. They saw that a common set of reference identifiers for counterparties and their traded products could yield significant efficiencies in both the public and private sectors. They recognized that financial firms could eliminate the use of multiple proprietary reference systems and move to a single, widely accepted system.<sup>29</sup>

They understood that the complete automation of back-office activities, that elusive mantra the industry calls STP – straight-through-processing, still remained elusive, in part because of the absence of universal identifiers. They came to understand that real-time trading-through-to-payment, which is desired to eliminate systemic settlement risk, can only be accomplished when STP is realized.

They noted that maintaining internal identifier databases and reconciling entity identification with counterparties is expensive for large firms and disproportionately so for small firms.<sup>30</sup> The absence of standard and universal identification had led to individual firms' need for extensive mapping software and middleware to compensate for this fundamental missing infrastructure component. The consequences are enormous - huge additional cost and risk brought about by reconciling multiple identifiers across hundreds and, in the largest financial firms, thousands of automated and manual business processes.

At the same time that US regulators were identifying these fundamental and long festering data problems, the G-20's Financial Stability Board was focused on reforms in the global OTC Derivative market. They came to the same conclusions as US regulators concerning the

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<sup>28</sup> US Treasury, Statement on Legal Entity Identification for Financial Contracts, Federal Register, Vol. 75, No.229, November 30, 2010 at <http://www.regulations.gov/#!documentDetail;D=TREAS-DO-2010-0008-0001>

<sup>29</sup> See footnote 8 at page 204

<sup>30</sup> See footnote 6 at page 4

fundamental problem of data quality and lack of global data standards for counterparties and the OTC derivatives products they trade in.<sup>31</sup> The data issues were again reinforced in January, 2012 when a CPSS/IOSCO task force endorsed the LEI concept for use in the OTC Derivatives markets.<sup>32</sup>

### **Recent Failures Reveals the Significant Issue of Lack of Data Transparency**

The LEI legislation was inspired by the revelation of what was found in the records of the wreckage of the Lehman Brothers bankruptcy. No consistency in identifying Lehman as a counterparty with others; no understanding of what relationships Lehman had with others; no mechanism to associate all of Lehman's products and businesses into a total view of the exposure others had to Lehman should it fail. All who looked into the books and records of Lehman, all the regulators, the forensic accountants, the bankruptcy lawyers, the creditors and the counterparties observed a huge swamp of risk and no way of measuring what they found. And it wasn't just Lehman; it was a fundamental flaw in the infrastructure of the global financial industry – no universal identification of counterparties, their hierarchies of business ownership, the products they own, the monies they owe, the collateral they have pledged, the risks they are exposed to.

The Madoff Ponzi scheme was another example of opacity that exists in the financial system. Alleged positions held at the Depository Trust Company, at the Options Clearing Corporation and at an options dealer in London could easily have been understood as not existing if each venue had identified the same Madoff entity with the same LEI. And it could have all been done automatically and proactively, not waiting as it was to analyze spread sheets and questionnaires filled out manually!

The MF Global circumstance, still being unraveled, suggests transparency through computerized monitoring of transactions would have greatly benefited regulators if each such transaction was uniquely tagged with standard products and financial market participant identifiers. Computers monitoring transaction flows between financial institutions could have detected outflows from segregated customer funds accounts, monitored its intermediate and final destination points and flagged such activity as triggers against an ever increasing arsenal of computer detected patterns that did not fit with normal patterns. What was impossible by human detection means alone would now be increasingly available as computers scan the same product/counterparty combinations across and within financial institutions.

Faulty data and multiple identifiers for the same data also create huge operational risk. Transactions cannot be processed in any reasonably complete automated manner (the straight-

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<sup>31</sup> Financial stability Board, Implementing OTC Derivatives Market Reforms, Oct. 25, 2010 at [http://www.financialstabilityboard.org/publications/r\\_101025.pdf](http://www.financialstabilityboard.org/publications/r_101025.pdf)

<sup>32</sup> CPSS and IOSCO Report on OTC derivatives data reporting and aggregation requirements, Final Report, January, 2012 Pages 29 – 33 at <http://www.finextra.com/finextra-downloads/newsdocs/IOSCOPD366.pdf>

through-processing - STP issue)<sup>33</sup> and aggregation of data for risk and performance measurement is neither timely nor accurate. This failure is compensated for by requiring human interaction and reconciliation procedures across all the business silos that comprise a global financial institution and in all the data providers' input processing centers where hundreds of analysts interpret unstructured documents into data. It is obvious that by first identifying the same counterparty and the same traded product with a unique, unambiguous and universal code, then streamlining the processes, automating the interactions, and reducing the incidence of faulty data associated with these codes operational risk can be minimized and proper aggregation can be accomplished.

## **Global Regulation and the Industry Response**

US and other sovereign regulators realized that global standards need global oversight. The issue has now been positioned with the Financial Stability Board, a creation of the G-20 that has been given the global mandate to oversee the contagion of systemic risk. In keeping with this mandate, and recognizing its foundational role in aggregating risk measurement and systemic risk forecasting data, the G-20 has recently endorsed introducing a common global system to uniquely identify parties to financial transactions - the LEI system.<sup>34</sup>

In the US the OFR has suggested that they prefer implementers of the LEI to be chosen through an industry consensus process and be driven through not-for-profit international standards-setting bodies (IRSBs). Candidates that fit such criteria in the private sector that had come forward were the International Standards Organizations' (ISOs') Society for Worldwide International Financial Transmissions (SWIFT) that administers the Bank Identity Code (BIC); Association of National Numbering Agencies (ANNA) that administers the International Securities Identification Number (ISIN); and GS1 that administers the identification system in barcodes.

In the government sector candidates include such Standards Setting Bodies' (SSB's) as: the Basel Committee on Banking Supervision (BCBS), Committee on Payment and Settlements (CPSS), Financial Action Task Force (FATF), International Accounting Standards Board (IASB), International Association of Insurance Supervisors (IAIS), International Federation of Accountants (IFAC), International Monetary Fund (IMF), International Organization of Securities Commissions (IOSCO), Organisation for Economic Co-operation and Development (OECD), and the World Bank. The FSB itself may also be considered an SSB.

A formal solicitation of interest by the OFR was responded to in January, 2011 by thirty-three individuals and organizations - industry utilities, data vendors, software firms and database

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<sup>33</sup> Grody A., Harmantzis, F., Kaple, G., Operational Risk and Reference Data: Costs, Capital Requirements and Risk Mitigation reference at <http://ssrn.com/abstract=849224>

<sup>34</sup> See footnote 5, item 31

companies, trade associations, law firms, consultants, university professors and others that had an interest in offering a solution or opining on one.<sup>35</sup>

Two industry initiated efforts were conducted, one by a group known as the Global Data and Standards Alliance<sup>36</sup> organized by Financial InterGroup, a joint venture development company, consisting of the largest global financial institutions, standards bodies including GS1, public corporations and auditors; and the other led by SIFMA comprised of financial institutions' trade associations and their representatives.<sup>37</sup>

The SIFMA-led group recommended the combination of DTCC, SWIFT and ANNA to provide both the numbering convention and the facility to house and distribute the LEI. While reportedly some twenty data vendors, technology companies, standards bodies and others submitted their statements of interest and responded to multiple iterative requests<sup>38</sup> there was no public disclosure of respondents or responses.

The global identification convention that was recommended, identified as ISO TC68 17442, had not been completed nor had ISO working group members at that time opined on the identification number's content and construction, nor have they as of this writing, other than it is a 20 character number containing two (2) check digits.<sup>39</sup> The G-20's Financial Stability Board (FSB) is now organizing to oversee the LEI issue. This followed a robust set of presentations made to them in late September, 2011, yet to be publically disclosed, offering ideas from financial industry and non-financial industry presenters.

The same ISO 17442 LEI standard has been recommended by industry advocates at the CFTC's Technology Advisory Committee meeting<sup>40</sup> and at the *Macroprudential Toolkit: Measurement and Analysis* conference sponsored by the OFR and the Financial Stability Oversight Council<sup>41</sup>, both of which were conducted this past December, 2011. The CFTC subsequently issued a Notice of Proposed Rulemaking (NPR) on the LEI and other unique identifiers it needs to oversee the OTC derivatives markets. The CFTC had referred to the LEI as the UCI – Unique

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<sup>35</sup> Submissions of US Treasury LEI responses at

<http://www.regulations.gov/#!docketDetail;rpp=10;po=0;D=TREAS-DO-2010-0008>

<sup>36</sup> Global Data and Standards Alliance at <http://www.gs1us.org/industries/more-industries/financial-services>

<sup>37</sup> SIFMA and Other Associations Submit Comments to the US Department of Treasury on the Statement on Legal Entity Identification for Financial Contracts, at <http://www.sifma.org/issues/item.aspx?id=23198>

<sup>38</sup> SIFMA, Solicitation of Interest, Q&A, Response to Questions, Round 1, May 24, 2011, at

[http://www.sifma.org/uploadedfiles/issues/technology\\_and\\_operations/legal\\_entity\\_identifier/lei-providerquestionresponses-round1.pdf](http://www.sifma.org/uploadedfiles/issues/technology_and_operations/legal_entity_identifier/lei-providerquestionresponses-round1.pdf); Round 2, May 31, 2011, at

[http://www.sifma.org/uploadedfiles/issues/technology\\_and\\_operations/legal\\_entity\\_identifier/providerquestionresponses-round-2.pdf](http://www.sifma.org/uploadedfiles/issues/technology_and_operations/legal_entity_identifier/providerquestionresponses-round-2.pdf)

<sup>39</sup> ISO/DIS 17442 Legal Entity Identifier Definition at [http://iso.org/iso/catalogue\\_detail?csnumber=59771](http://iso.org/iso/catalogue_detail?csnumber=59771)

<sup>40</sup> CFTC, Technology Advisory Committee, Dec. 13, 2011 at

[http://www.cftc.gov/PressRoom/Events/opaevent\\_tac121311](http://www.cftc.gov/PressRoom/Events/opaevent_tac121311)

<sup>41</sup> US Treasury, The Macroprudential Toolkit: Measurement and Analysis, Dec. 1 – 2, 2011 at

<http://www.treasury.gov/initiatives/Pages/Macroprudential-Toolkit-Conference.aspx>

Counterparty Identifier but has now deferred to the OFR's term for it, the LEI.<sup>42</sup> On January 13, 2012 the CFTC posted its then final rules in the Federal Register<sup>43</sup>. In referring to the FSB's take up of the LEI issue it made the final rule on adapting the LEI subject to modification based on the FSB's recommendations as it convenes its own expert panels and finishes its work<sup>44</sup>.

The G-20's Financial Stability Board, now focused on the LEI, is interested in protecting the public's interests in representing its member finance ministers and central bankers in an appropriate governance framework. That interest resulted in further work defining requirements for the LEI in the spring of 2012 for decisions that were taken at the G-20's meeting in June, 2012.<sup>45</sup>

On March 9, 2012 the CFTC requested information on entities that could supply an "interim" LEI, referred to as the CFTC's interim counterparty identifier (CICI). The CFTC closed off their request as of March 16th and has yet to publish who the "bidders" were but approved an interim provider, DTCC and SWIFT to operate the CICI Utility. On March 28, 2012 the FSB convened a LEI Workshop in Basel Switzerland to get input from thought leaders, regulators and other stakeholders. Over 100 people attended this all day event. The event was conducted under Chatham House rules. This request for formal input followed up on an earlier submission we made in January, 2012 to the Financial Stability Board and other regulators and updates that submission which was made public on April 17, 2012 and is available as the previously referenced **Global Identification Standards for Counterparties and Other Financial Market Participants** <http://ssrn.com/abstract=2016874>. An abbreviated version of that document appeared in the spring Special Issue of the Journal of Risk Management in Financial Institutions.

## **Risk and Costs Associated with Lack of Global Identification Standards**

Standards for uniquely identifying counterparties are critical to systemic risk analysis as it will permit timely and more accurate data aggregation within and across financial institutions. Associating the counterparty identifier with valued position and cash flow data will create a first time capability to consistently and persistently aggregate and analyze data. It is expected such analysis will allow for observing early warning triggers of systemic contagion building up in the financial system.

In addition, huge duplicate expenditures exist for each firm supporting their own sourcing, cleansing and maintenance of the many reference databases within the business silos that

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<sup>42</sup> Commodity Futures Trading Commission, 17 CFR Part 45, Swap Data Recordkeeping and Reporting Requirements; Proposed Rule at <http://www.gpo.gov/fdsys/pkg/FR-2010-12-08/pdf/2010-30476.pdf>

<sup>43</sup> Commodity Futures Trading Commission, 17 CFR Part 45, RIN 3038-AD19, Swap Data Recordkeeping and Reporting Requirements **Federal Register** / Vol. 77, No. 9 / Friday, January 13, 2012 / Rules and Regulations at <http://docs.regulations.justia.com/entries/2012-01-13/2011-33199.pdf>

<sup>44</sup> See footnote 42 at page 2165

<sup>45</sup> Financial Stability Board, Press Release, January 10, 2012 at [http://www.financialstabilityboard.org/press/pr\\_100112.pdf](http://www.financialstabilityboard.org/press/pr_100112.pdf)

collectively make up global financial institutions. In research conducted before the financial crisis, the estimated cost to the largest financial firms was \$¼ to \$1 ¼ billion per firm annually.<sup>46</sup> This expense is probably larger now given the combinations of even bigger firms that ensued since the financial crisis.

With the G-20's FSB now overseeing a global implementation of the LEI it remains to be seen how the recommended industry grouping would respond in meeting the G-20's intent to assure an appropriate governance structure representing the public's interest. With other finance ministers and central bankers to be considered and confidentiality and global distribution a more prominent goal amongst sovereign regulators, perhaps it is now time to look to successful global identification implementations in other industries and economic sectors.

### **Lessons Learned from Other Global Identification Implementations**

In industries and businesses outside finance, global identification is best practice. Walmart, Federal Express and Amazon are examples of leading transformational companies that have streamlined their own businesses while driving their respective industries toward its equivalent of STP. They could not exist in their current form at such scale without the manufacturer's identity, universal product codes and unique delivery location numbers imbedded in bar codes.

The phenomenon of the Internet's order-to-ship-to-deliver process and the revolutionary ubiquitous smart phone scans at airline counters and checkout counters are at its core enabled by a simple unique computer readable numbering convention. Such identification schemes are manifest not just in bar codes, but also in internet addresses, the global positioning satellite coordinate system and the global mobile phone network's calling scheme.

The financial industry's equivalent of the bar code, the XML variant XBRL data tagging language, and the FpML data tagging language is beginning this same transformation in the financial services sector. Both FpML, extensively used in the OTC derivatives market, and XBRL, extensively used for financial statement reporting is becoming a de-facto standard. XBRL is now mandated to be used in financial statement filings to the SEC. Nearly 75% of global regulators now require some form of automated financial reports of accounts to be filed in XBRL format. The CFTC is moving to mandate similar use of FpML to define Swaps and other products.

Global identification and standard data tagging should become as foundational and have as profound an effect on financial trade as the creation of the unique numbering system in the bar code and in the Internet addressing scheme had on commercial trade. It is these examples that inform our suggestions below for the LEI standard and its assignment mechanism, distribution network and governance structure.

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<sup>46</sup> See footnote 32 at Exhibit

## A Suggested Framework for the LEI Global Standard

The LEI is to be a global standard for assigning, describing and identifying financial market participants. It is desired that the LEI system and its initial extensions to OTC derivative products be built foundationally on a “number” that is globally unique with an associated indicator of parent-child relations in their hierarchies of ownership.<sup>47</sup> Further the LEI system should protect the confidentiality of those business hierarchies and their percent ownership in jurisdictions that require this.<sup>48</sup> Beyond this is the need for a global standard for financial products, starting with swaps and other OTC derivatives contracts (the Unique Product Identifier – UPI requested by the CFTC). Standardized formats for reporting financial transaction and position data are to follow. A further component is necessary, data tags that allow a computer program to search and find the product or counterparty and then aggregate its associated values.

Below are general requirements of the LEI as advocated by regulators and industry members alike and how these may be accommodated through the global identification system proposed herein.

**Vision:** Throughout the three and a half decade search for a “reference data” solution industry thought leaders, industry institutions and, to a lesser extent, regulators have understood the significance of a globally consistent means to identify the businesses and the products that flow through the global supply chain of the financial system. This history has been recited in the earlier section “A Brief History of Systemic Contagion”. The search was and is for creating the Straight-through-Processing (STP) vision where capital and contract market trades entered into would be paid for and settled within the same day, if not in real-time anywhere in the world. Lowered infrastructure costs, reduced internal costs of financial institutions and lowered enterprise risk as well as systemic risk would ensue. In the current environment those same interests have come together to again articulate the issues but with a major difference. The regulators have now provided the impetus for solving the reference data problem. It is now part of legislation in the US and may soon be part of global regulations. Regulators have come to understand that without a global identification system for market participants and the products they transact there can be no global capability to observe systemic risk triggers.

**Governance:** One of the lynchpins of global financial reform is to attract the commitment of sovereign regulators in support of common purpose. This approach has some precedent, the Basel capital accord, the World Trade Organization, the IMF as examples. Another way is for financial institutions to agree to abide by common purpose as demonstrated in precedents of the ANNA federation and the Internet’s FIXML

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<sup>47</sup> Creating a Linchpin for Financial Data: The Need for a Legal Entity Identifier at <http://ssrn.com/abstract=1723298>

<sup>48</sup> Powell L., Montoya M., Shuvalov, E., Federal Reserve Board Wash DC, Legal Entity Identifier: What Else Do You Need to Know?, 2011 at <http://www.federalreserve.gov/pubs/feds/2011/201131/201131pap.pdf>

messaging conveyance of financial transactions. Realistically, without sovereign regulators relinquishing their sovereignty to a global regulator, or to a central but “too-big-to-fail” utility, the best practice way to implement the LEI is through a federated operating model. Such a model has precedents in the financial industry and elsewhere. It can be fostered through global consensus, administered by sovereign regulators in partnership with financial market participants, and implemented in a parallel way over the Internet, itself a federated model.

The arrival recently of the FSB as the central figure in forming global consensus around financial reform makes global implementation around this model feasible. Regulatory compulsion urged by the G20 in each of its sovereign jurisdictions and similar compulsion by each of the signatories to the ROC Charter make this practical.

The governance structure that oversees the LEI is most critical to protecting the financial system and is an important decision yet to be made. The financial system is as important to the global economy as the electric grid or the internet is to commerce. A consensus approach would be much easier to arrive at when all parties are represented in the debate and existing known issues are finalized. The governance structure would be much easier to define and more apparent after a definitive, consistent and uniform LEI code construction standard and its operational systems are agreed to. The Financial Stability Board, which has accepted the responsibility to oversee the global rollout of the LEI, soon to be transferred to the ROC should be resourced and fully operational and, thereafter, given the responsibility to issue requests for proposals to solicit bids on both the governance structure as well as the operational and technical components of the system.

**Administration and allocation:** The core of the entity-specific portion of the globally unique, unambiguous and universal LEI code (the U3 Identification system, also referred to as the Registration Domain) is the Registration Identifier (RID) one of the two parts of the LEI – see further details below. The RID is to be administered by sovereign or regional regulators, Local Operating Units (LOUs), each within their own jurisdictions, to be assigned individually to financial market participants in their jurisdiction. This global allocation to regulators is to be done once at initiation of the LEI system by the designated agent/registrar on behalf of the governance entity or by the regulator/government itself.

The Central Operating Unit (COU) empowered as the operating arm of the ROC could outsource its functions to a global standards body, or global trade association or other trusted institution (i.e. BIS, IOSCO, FSB, WFE, etc.) to centralize and administer the distribution of each core block of RID numbers to regulators or their agents (the LOUs). The distribution of each block of RIDs in this manner would precede a census on the

number of financial market participants in each jurisdiction so that a proper range of numbers for the RID could initially be assigned in each jurisdiction. Alternatively each RID can be assigned dynamically.

A data base containing the block numbers and their assigned registration authorities would be maintained by the designated trusted institution, recognizing that its activities consist of a rather simple task at initiation of the LEI initiative and at later periods when a LOU at on-boarding time would request a new block of RIDs. This centralized function would be limited to maintaining the integrity of the number sequence and assigning blocks of these numbers as each regulator and/or its designated registration authority requests a new block of RIDs. Like other global identification schemes where issuers are identified, i.e. credit card issuers, internet domain name registrars, etc., there would be no need to incorporate the Registration Authorities' (LOUs') ID even though it is only the initiating LOU, into the construction of the number itself as is now the case with the prefix concept for doing so.<sup>49</sup> The RID itself is globally unique and produces no duplicates.

**Self-registration:** This is the process by which a counterparty or issuer of securities or contract market operator or other financial market participant identifies itself through reference to its initiating documentation: articles of incorporation, broker/dealer license, bank charter, or account opening forms with a financial institution. The financial market participant or any approved certifying agent (see **Certification** below) that already obtains this information (i.e. NFA, FINRA, NYSE, DTCC, et al) could be used to register these details accurately on behalf of the financial market participant.

It is proposed that there be two components to self-registration. This is to be done to enable a control mechanism against false registration and to assure global uniqueness. The first component is the registration of a globally unique identifier (RID) as described previously. The second part of the number is self-assigned by the market participant or its designated Registration Authority (again see **Certification** below). When assigned by a market participant it frees up the business entity from always going back to the registrar (LOU) for another number each time they create a new entity. This later point is a concept used by GS1 in assigning product identifiers in the trade supply chain. It also minimizes information leakage when companies are establishing new entities in anticipation of announcing a new business formation or preparing for a new merged business entity prior to formalizing and announcing a merger.

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<sup>49</sup> Financial stability Board, Allocation of pre-LOU LEIs, 11 January 2013, at [https://www.financialstabilityboard.org/publications/r\\_121108.pdf](https://www.financialstabilityboard.org/publications/r_121108.pdf)

The RID (the first part of the LEI identifier) is to be assigned by sovereign regulators themselves and/or through their designated Registration Authorities (RAs) (LOUs) where such institutions already exist. Where acceptable, LOU status can be assigned by regulators to others, perhaps in a meaningful partnership with for example, the members of the World Federation of Exchanges or in collaboration with major public auditing firms, or some other trusted outsourcer that has operational capacity in each jurisdiction. All of these are already globally trusted organizations at the front end of the initiation process of establishing and reporting on business formations.

An obvious designee as a LOU is existing business registrars. However, using business registry codes in the entity-specific portion of the LEI code is, in our opinion a sub-optimal solution at best and not a practical long term solution. The business registries are all about any and all businesses, not financial market participants. Also, the use to be made of LEI registries and the numbering convention is quite different than general business registries and the tolerances for error and late posting to a business registry (a characteristic of existing business registries) cannot be tolerated in an LEI registry although existing business registry should be used as LEI registration reference data.

However, existing business registrars are ideal candidates for selection by local regulators as overseers of the LEI registries. The construction and organization of the LEI registries in a federated governance and operating model while conforming to Internet protocols and network federation principles (see section “System Failure, the Federated vs. Central Model and the LEI Technology Platform”) is ideally suited for governance and operation by existing local and regional business registry operators.

**Certification:** Assurances on the identity of the market participants is required. Here, we advocate for auditors, law firms and/or designated certifying agents. Perhaps such certifying designation can be bestowed on existing market center operators (exchanges), or local or global standards bodies (National Numbering Agencies as an example) or infrastructure financial market utilities. In reality auditors, law firms and listing exchanges are already at the front lines in observing the creation of legal entities and may be preferred as they would tend to minimize information leakage.

The approach for certifying LEI details whichever certifying agent is chosen, and there may be different ones chosen in each sovereign domicile, is to have an external trusted advisor comparing initiating documents to tagged details – a lawyer, auditor, an NNA principle, or perhaps the local business registrar itself performs the certification step. We strongly suggest that the auditors be considered as the certifying agents as they must make sure that the entity is properly registered as a financial market participant – assuring the LEI and the registration of the same LEI as a broker, banker, etc. is one and the same.

One of the more compelling reasons to have auditors involved early in the process of identifying and certifying the LEI is so they can identify hierarchies of ownership, a later stage in the LEI process, but an important one. Auditors need this information to perform their materiality attestation function. They now do it each year, sometimes throughout the year in an intense manual process. Doing it once for multiple purposes and having it electronically recorded in a golden copy suits everyone's purpose. It ties the same business entity to both the audited books and records of the firm, to the same information in the risk data bases, and to the same information used by financial institutions to extend credit and compute counterparty risk.

**No Intelligence-** the number itself should have no intelligence in it – no country or issuing agency code, no ability to parse the number to determine meaning. This does not mean that the number need be "dumb". As described above and in the next section, its two-part construction can be deemed "smart" while being "non-intelligent".

### **Persistence**

All changes that occur are to be contained in the associated reference data. Change the reference data, not the number and the number can persist for all times, providing a meaningful audit trail for any and all changes that occurred. While there may be a minimum set of reference data viewable, to be associated with each completed RID/LEI combination to be able to have human understanding, it does not come from the number itself. Of course, this does not obtain in cases where acquisitions or mergers occur, or subsidiaries are bought and sold between companies, or when companies are retired through bankruptcies, etc. In those cases the acquiring RID is substituted for the acquired RID. The second component of the Registration Domain identifier of the newly acquired LEIs are re-sequenced under control of the acquiring company in their respective LEI registries.. The old LEIs are placed into expired status in the reference data for audit trail purposes.

**Confidentiality** - the number itself needn't be confidential, but more importantly the parent/child relationship might need to be. This information and eventually the reporting of percent ownerships in a business ownership hierarchy are thought of by some companies and countries to be confidential information, especially those countries that have government owned businesses, have established non-taxable trade zones, have regulated secrecy of business ownership, etc. Sovereign regulators and exchanges (and their auditors) are already privileged observers of this information and would be best positioned to protect confidentiality provisions of globally agreed to and locally regulated LEI confidentiality rules.

**Legacy System Consistency** - the manifestation of the LEI in computer databases for use as search and storage keys, and for use in communication networks, should be backward

compatible with best practices proprietary standards that exist today. The consensus of such existing standards is for a standard code no greater than 11 characters. The internal number to which every firm now normalizes their multiple identifiers in their own databases will initially be the mapping source to the LEI. Eventually the LEI will become the exclusive number for both internal as well as external use. A proposed structure for the LEI's unique, unambiguous and universal identification system is further described below.

If, however, it is desired that a longer number/code space be prescribed, rendering the LEI less flexible for ultimately replacing legacy systems identifiers, such an approach can be accommodated easily. Noting the ISO 17442 LEI standard is a construction of 18 characters plus two check digits (20 total characters) the LEI construction proposed here can be elongated (zero filled) with a two digit check digit added to fill out the ISO proposed code space. For example the RID could be reserved for expansion to accommodate more than just those business entities involved as financial market participants, to include sole proprietors and even individuals as the SEC's US Computer Assisted Audit Trail is proposing.

A longer RID and/or LEI component could also be constructed, if desired to fill out the elongated LEI code space to accommodate the four digit prefix and a two digit zero filler for expansion that has been proposed to this point. The design of the Registration Domain as the entity-specific code portion anticipates residing within the current prefix-prescribed design of the LEI.

## **Global LEI Data Requirements**

The G20's FSB has published the following set of reference data attributes as 'Recommendation 9' in their published and approved LEI requirements documents.<sup>50</sup> They are regarded as the minimum set of information that should be available at the launch of the LEI as specified in ISO LEI standard 17442:2012.

1. The official name of the legal entity;
2. The address of the headquarters of the legal entity;
3. The address of legal formation;
4. The date of the first LEI assignment;
5. The date of last update of the LEI;
6. The date of expiry, if applicable;
7. For entities with a date of expiry, the reason for the expiry should be recorded, and if applicable, the LEI of the entity that acquired the expired entity;

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<sup>50</sup> A Global Legal Entity Identifier for Financial Markets, June 8, 2012  
[http://www.financialstabilityboard.org/publications/r\\_120608.pdf](http://www.financialstabilityboard.org/publications/r_120608.pdf) at page 36

8. The official business registry where the foundation of the legal entity is mandated to be recorded on formation of the entity, where applicable; and
9. The reference in the official business registry to the registered entity, where applicable.

The first six items were previously announced by the FSB as items belonging in the set of minimum reference data at the launch of the LEI. The seventh item was included to provide information on the history of the entity, particularly if it is involved in a merger and acquisition and / or other form of corporate action.

The FSB included the final two items to provide a cross-reference to the official business registry entry which it is thought will provide the legal basis for the formation of the legal entity applying for the LEI. The FSB also believes that such a reference will help tie the global LEI system together as a registry of registries and provide a strong cross-referencing and supplementary data validation tool.

The notion of a registry of existing business registries has appeal as a way of organizing the global LEI registries. Some have suggested that by “simply” adding a high order “LEI domain” identifier (the “prefix”) as the first part of the ISO LEI code construction, one for each Local Operating Unit (LOU) at onboarding of each, then the remaining code could contain the business registry code as one approach to creating globally unique codes. In another instance it could contain a randomly generated code. This LEI domain has become the LEI prefix, a unique four digit code at the front end of the LEI code space that is now being assigned as requested by public authorities. Six such prefixes have been assigned to date. See section **Early Adapter Status of LEI-like Codes** for specific assignees.

This “prefix” approach to creating global uniqueness, however, has a potential weakness in that while the code must be persistent (unchangeable unless retired) it must also be portable. When a business entity changes its domicile this disrupts the first chosen LEI domain register as it is not then able to point to the correct LEI registry (LOU) any more. The correct registry (the LOU designation) must always be updated. Therefore, as a changeable feature in the LEI system, it must be kept in the reference data rendering the prefix code of no permanent relevance. It is also duplicative of the LOU designation kept in the reference data. More importantly, the LOU designation must be updated in the routing tables of the federated model in order that the LEI system locate the LEI as it moves to its new LEI registry.

Placing a front loaded code in the upper end of the LEI code space may have merit in encompassing and creating global uniqueness of a legacy code that a business registry may already use. This, however, would simply embed the standards of data quality (or perhaps lack thereof) that may currently exist in existing business registries, e.g. certainly uneven standards across the many registers that now exist, sometimes not updated on a timely basis, maybe not validated over time, etc.

We recommend that the FSB add four additional requirements to the ISO standard. The first is to provide for the native language name of the legal entity as the primary name and the Anglican (western alphabet name) as the globally communicated name, where they are different. Where there are two or more official languages the ISO standard should provide for a code that indicates other official language names, including carrying such names as reference data. The second is to provide the country code/province/state of the place of registration of the legal entity. This is to help resolve a name of a legal entity into its proper LEI code when the name of the identity is exactly the same in two different jurisdictions. The third is the LOU code to be placed in the reference data of the LEI registry the LOU oversees. The fourth is described below, the LEI designation of the top of the business hierarchy/control entity.

### **LEI Hierarchy Requirements**

A critical and most important recommendation is that the ISO 17442:2012 Standard include an Ultimate Parent (UP)/Ultimate Control Point LEI (UCPL) as a data point in the reference data at first assignment of any LEI. We deem this a critical component of an LEI system that has at its objective the ability to aggregate counterparty risk through knowing each counterparties' hierarchy of ownership. It is an early test of the resolve of regulators to begin to obtain such information. Without it no further insights into systemic risk across counterparties is possible and later attempts to gain such information will have no reference anchor to the ultimate control point of the hierarchy.

We recognize that significant control issues surface in describing ultimate controlling parentage as when, for example: a control hierarchy has multiple and equal partners; when contracts in default are transferred to obligors different than the previous ultimate control parent; and when guarantors step up in substitution under contracted terms when trigger conditions are met. In these circumstances the ultimate parent designation can be thought of as an ultimate control point legal entity or UCPL.

In standard accounting rules (FASB 166/167 in GAAP rules) this UCPL is known as an entity that “controls the activity of the structure”, not necessarily having majority or even a partial ownership interest in it. Such designation placed as reference data upon registering a LEI would trigger a responsibility at some later point to convey the relationship of liability, control and responsibility of the hierarchy of LEI's to be placed in the LEI's reference data. Thereafter, whether as a component of the LEI registry itself or external to it, a “network or hierarchical graph” of these relationships can be constructed while observing the confidentiality required in sovereign “privacy” jurisdictions.

To facilitate obtaining ultimate control point LEIs (throughout this document when UP LEI is designated it should be understood to be UP/UCPL LEIs) we suggest some approaches. Where

an ultimate parent does not come under the same financial regulatory authority as the applicant LEI; or that the UP exists in a sovereign “privacy” jurisdiction; or that the UP exists outside any financial regulatory authority; then the LEI applicant should register the UP LEI under a “redacted” status. This would enable the UP LEI to exist on the same registry as the applicant registry in redacted form, available for risk aggregation but unavailable in the public view.

The reverse redaction algorithm may be activated (information made available) by the regulatory authority overseeing the registered UP LEI, if available, and only to investigate risk exposures across the business hierarchy of the two if deemed material to investigate systemic risk. If there is no such financial regulator, as with an ultimate parent who is not a financial market participant, then the financial regulator of the registered LEI retains authority over the redacted algorithm.

If the legal entity of the ultimate parent is required to register its own LEI, then the sovereign jurisdiction in which it chooses to register it would have its own rules of public vs. redacted disclosure. Where the sovereign jurisdiction is a “privacy” jurisdiction each regulator will be responsible to honor reciprocal redaction rules of conduct, assumed to be part of the founding rules of conduct of the governing LEI charter. This is further described in this report in the section titled Confidentiality and Business Ownership Structures.

### **Early Adapter Status of LEI-like Codes**

Recently the FSB assigned a LOU code (referred to as a Prefix) to the CFTC for its CICI code and CICI Utility run on its behalf by DTCC/SWIFT, where DTCC operates a Swaps Data Repository giving it status in CFTC regulation to assign such codes. There are at least two (2) other SDR’s in the US that could lay claim to a unique LEI-like identifier that can meet the CFTC’s requirements for Swaps Data Reporting, the Chicago Mercantile Exchange (CME) and the Intercontinental Commodity Exchange (ICE) . In addition the National Futures Association (NFA) is qualified to apply for a LOU designation under the precedent now set as the “public authority criteria” by the FSB for designation as an LOU. The CME, ICE and the NFA have all been granted self-regulatory organization (SRO) status under US law. The NFA already assigns identity codes to all swaps market participants in the US as required by the CFTC.

Also five equity exchanges, three options exchanges, fifty state governments, and about fifteen federal agencies other than the CFTC are public authorities. They would, therefore, be entitled to LOU designation as per the 3rd Progress Report of the LEI Implementation Group (see [3rd LEI progress note.pdf](#)).

The transition to the LEI global system is qualified by meeting the global standard at the time of transition. The CFTC’s CICI and CICI Utility mandate is tentative and can be withdrawn on six months notification and expires at the two year anniversary. The CFTC has obligated itself to wait for the “the establishment of the Global LEI system” as stated in their Order before

finalizing the CICI as the LEI (see the order at [http://www.cftc.gov/ucm/groups/public/@newsroom/documents/file/cici\\_factsheet.pdf](http://www.cftc.gov/ucm/groups/public/@newsroom/documents/file/cici_factsheet.pdf) ).

The FSB has also issued a Prefix to BaFin (the German financial regulator) who assigned it to its designated LOU, WMDDataServern, a data vendor that is also the German National Numbering Agent for the instrument codes assigned to exchange traded instruments traded in Germany; to the Irish Stock Exchange, sponsored by the Central Bank of Ireland; the Palestine Securities Exchange sponsored by the Palestine Capital Market Authority; and Takasbank sponsored by the Capital Markets Board of Turkey.

We suggest that the ROC consider the LOU designation on a country by country basis, as is the National Numbering Agency designations for investment product code assignment. We also envision each national LOU being able to franchise and/or outsource its unique numbers to multiple regulatory agencies, within a country, even to custodians and others, all the while assigning numbers out of the same pool of unique numbers allocated to the national LOU. We even envision each LOU outsourcing its role to another country or a regional compact of countries. Premature activation of any designation of an LOU prior to the ROC and G20 approving the global LEI system and, specifically, its LEI code construction should be avoided as it will present mapping issues and preclude those early adopter financial market participants to forgo additional benefits of a more fit for purpose LEI code, especially those that would accrue to financial market participants regarding internal mappings and external synchronization for corporate events.

## **The General LEI Code Construction**

Our overriding objective for the LEI code construction is to assure data quality, business hierarchy creation and portability while leaving control of assignment at the local level. In carrying out this latter objective within the required federated model it is understood that multiple registration authorities may be assigning globally unique codes simultaneously. The fundamental LEI code construction we are proposing, in summary is set out as follows:

- The proposed LEI be non-intelligent and portable (persistent). It is to be constructed in two parts.
- The first six-characters (it may be longer) of the number / character string is globally unique. We refer to the entire set of such numbers as the Registration Domain that contains multiple Registration Identifiers (RIDs)
- The Registration Domain is created as a preset block of randomly chosen codes initially of six digits assigned at inception (with expansion possible to another three digits) by the operating authority (in the G20's language, the Central Operating Unit - COU). In this approach there is no possibility of a duplicate number being assigned.
- The individual unique numbers within each Registration Domain are themselves chosen randomly from a contiguous sequence; the required quantity of numbers is based upon

the registration authorities' census and projections of future growth. The number is selected at random not generated randomly.

- The local registration authority receives its set of six digit numbers through a secure update to the local LEI registry. The individual numbers are referred to as Registration Identifiers (RIDs).
- The registration authority assigns each six digit number to each financial market participant (FMP) that applies and is authenticated.
- Each FMP then is able to unilaterally self-assign and attach another five-digit code to identify each of its operating units or subsidiaries. This combination then becomes the self-registered LEI.
- In one instance of its implementation this first assignment to the financial market participant can be used to identify the ultimate parent or controlling entity. This is the legal entity at the top of the business ownership/control hierarchy. Such first assignment would facilitate future hierarchy construction, a necessary step toward achieving risk aggregation, the ultimate goal of the LEI initiative.
- There are other ways of assignment as when an organization is operated in a decentralized manner for example, and each local business entity assigns its own LEI. (See examples described in the sections of this report titled Quality of the LEI Reference Data, Hierarchies and Fees). However, we believe that at the time of registration that each LEI, at a minimum, must be overseen by and associated with its ultimate parent.
- There is no intelligence in the number, but there is a structure to it and a purpose to self-registration and, most importantly, self-assignment.
  - The two-part structure minimizes information leakage, allows control over financial market participants registered in local jurisdictions and facilitates persistence of the LEI through moves of headquarters to other domiciles or mergers with other entities.
  - The self-registration and self-assignment, along with certification at source by approved certification agents (described further in the section titled Self-registration, Certification and Data Quality), provide a quality assurance function for the data at the front end of the process and allows for the highest level of data quality and a definitive understanding of business ownership hierarchies.
- The accepted ISO 17442:2012 LEI code space contains an 18 character/digit code field and a 2 digit check sum. The ISO standard has been accommodated in this proposed LEI by making the front-filling code space available for the four (4) digit prefix and making three (3) zeros available to allow for expansion or for other purpose as when a temporary assignment of unique numbers are necessary for early adopter "LEI-like" codes.

- This expansion space can serve for expansion of the quantity of unique codes. This can be accommodated through either letter assignment after the digits are exhausted or through code length expansion if numbers rather than characters are preferred for efficiency in low latency systems.
- Filling in the code space with digits is the preferred method as it eases overhead burden on low latency needs such as the use of the LEI in order and trade management systems, in audit trails, and in real-time risk management. It also is the preferred method for designing data base key structures.

### **Self-registration, Certification and Data Quality**

Fostering the highest standard of data quality for the LEI is essential. This is most assuredly accomplished by preparing the data at-source and having the related source document available when the information is registered. Further, as a quality control check, we recommend that the registration process be overseen by an approved, trusted certifying agent. This is similar to procedures for a filing agent (accountant, lawyer) to place entries on business registries in some jurisdictions. (A more extensive discussion of data quality is to be found in a later section Quality of the LEI Data).

The LEI itself is to be assigned to a financial market participant (FMP). Such definition requires that the FMP be authorized to enter into, issue and/or create a financial market contract or financial transaction on a capital, contract or money market, whether private or public. Of necessity such status is bestowed by a regulator on a legal entity when the legal entity registers as a financial market participant. As the LEI is the entry key to the global financial system we must assume that first establishing that such a business entity is “registered”, whether before or concurrently with the appropriate government agency or market infrastructure operator is either a prerequisite or coincident with registering a LEI code.

The procedure for making a LEI entry to a local registry is summarized below and presented by example as a registry portal in Use Case 6:

#### **Certifying the LEI:**

- Review required valid bank registration, broker-dealer registration, futures commission merchant registration, investment advisor registration, hedge fund, swaps dealer registration, corporate status as an issuer of debt or equity, etc.

- Review articles of incorporation, trust agreement, memorandum establishing special purpose vehicle, etc. identifying the legal entity
- Confirm local business registry entry (if available) for existing legal entities or determine and fulfill requirements for coincident application for business registration
- Fill out a LEI Template containing standardized tags for direct LEI data input
- Verify against existing regulatory filings, i.e. Schedule 21.1 of 10k (US public SEC filers –see The Network Card and the Plug-in Architecture section of this report); Custom House (UK) business registry; etc. containing list of subsidiaries/affiliates of parent LEI

Certification agent ongoing role:

- Identify / confirm executive/agent of financial market participant as the responsible party
- Attest to the confirmation of documents and apply attestation/third party assurance certificate as proof of certification
- Responsible client executive to release “certified” LEI Template to the LEI registry
- Possible visit to appropriate regulator to confirm original documents; to addresses / sites needing to confirm physical presence of legal entity, etc.
- Receive automated challenge (simultaneously with legal entity and local registration agent) in case of suspected error in data, store for follow up and audit trail, and resolve amongst agents and financial market participant executive

## **Confidentiality and Business Ownership Jurisdictions**

A possible issue arises relating to the confidentiality of information in the Global LEI System when business relationships need to be defined between LEI’s of the same company or controlling entity. The issue relates to those sovereign “privacy” jurisdictions where the name of a legal entity is placed on the official business registry but its parent is known only to the agent (lawyer, accountant, local director, etc.) that maintains the ownership information.

There is no issue where a public company’s home country requires or can require it to divulge the tree of business relationships. The issue may arise when the company is private and the home country is in a sovereign privacy jurisdiction, or the chain of ownerships resides exclusively within separate sovereign privacy jurisdictions. This daisy chain registration, while potentially suspicious, has legitimate purposes i.e. asset protection, transfer pricing, currency repatriation, more lenient tax treatment, etc. in each jurisdiction.

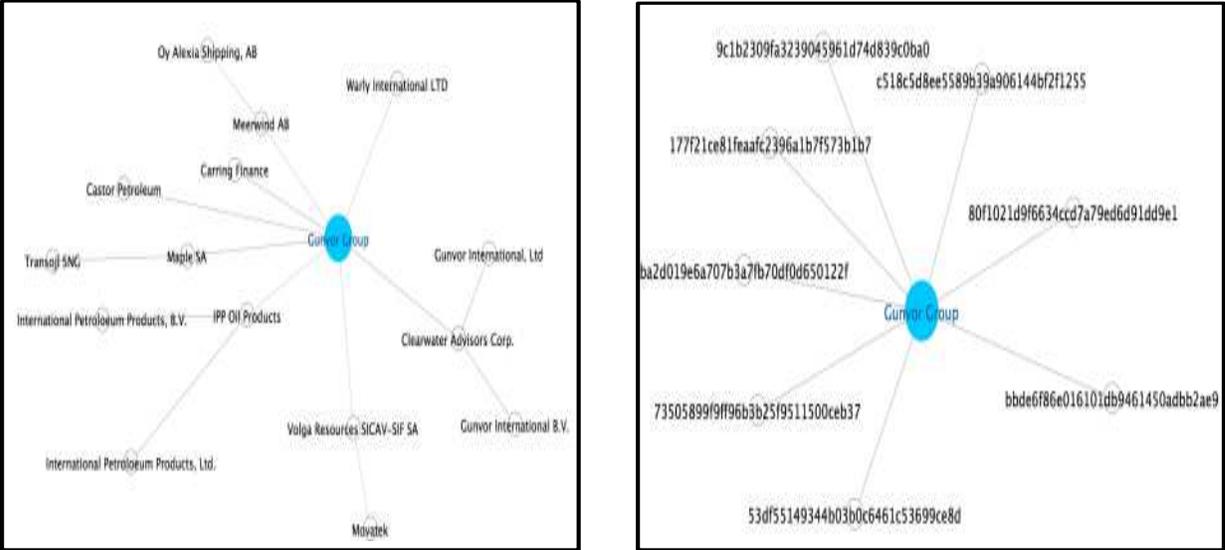
The laws of most sovereign privacy jurisdictions requires that the actual owner of the legal entity cannot be divulged unless another sovereign country goes through an appeal process to describe the reason for such disclosure and that a similar law obtains in each of the two countries. That law would have to compel the company domiciled in its territory to “fill out” the parent/child/ultimate parent relationship, basically requiring the rescinding of their privacy laws.

If we assume that each sovereign country has agreed to abide by the charter rules of the LEI initiative (the Regulator Oversight Council – ROC- charter) and has the companies registered in their domicile apply for its own LEI then software solutions can be applied. Software can aggregate hierarchical ownership structures without disclosing the identities of those legal entities that are to be kept confidential by practice of sovereign jurisdictional law.

This approach anticipates that each legal entity be housed in their own government’s LEI registry or one that is within its jurisdiction and / or authorization. Each legal entity is separately assigned a LEI code resolvable into its identity, but not as to its parentage in public view. The parent coding is done by the agent using a virtual portal (see Use Case 6) to register the LEI and will indicate such parent is protected under sovereign law and not to be publically disclosed. A hashing or redaction algorithm is then applied. The aggregation of data through reference to the tree structure is not impeded. (see graphical depiction of such a confidentiality mechanism on next page).

However, this does not imply that its parent/child/ultimate parent relationship is not in public view only that its identity is redacted or otherwise obfuscated in the hierarchy which is in public view. No other information about the legal entity is disclosed to any other sovereign jurisdiction. Sovereign government laws on confidentiality are to be upheld. The only way to see into the code through the aggregated form of the company’s hierarchy is for a regulator, perhaps the FSB itself retaining such authority, to compel the sovereign privacy jurisdiction to display the name to an appropriate regulator when systemic risk triggers are activated.

**Bringing privacy jurisdictions/non-reporting parent companies on board –  
LEI Names in public and redacted view**



## Random Numbers, Centralization and Alternative Coding Conventions

The ISO 17442:2012 standard was not designed to define what is contained in the code space. Some who have or are about to assign LEI-like codes declare their belief in a random number filling out the code space and or/ the entity-specific portion of the code; in a centralized LEI Utility for assigning codes globally; and in a global implementation of associated reference data, primarily as a means to assure data quality.

Is there a benefit of a random number filling out the entire LEI code space or just the entity-specific portion of it? Is there a code construction that benefits data quality, hierarchical business formations, uniqueness and persistence better than other models? Does one code construction method work better than another? What purpose is it of a central model used in distributing a code and registering its data vs. a federated model?

A number of methods could work with different levels of technology being applied to assure no duplicates, global uniqueness, persistence and a high degree of data quality. They are shown in the table on the next page and discussed further.

Randomly generated or other method for generating number by LEI Utility/COU	LD set by COU. COU distributes at approval and on-boarding of LOU. No LOU restriction on method of assigning lei	LD set by COU. Partitions chosen by LOU	COU chooses RD set (multiple RIDs) randomly from long sequence generated at COU. No restriction on lei chosen	Randomly generated or other method for generating number by LOU
LEI = An (18) centralized	LEI = LD (x) + lei (y)	LEI = LD(a) + Part (b) + Part (c)	LEI = Expansion(a) + RID (b) + lei (c)	LEI = An (18) localized

COU = Central Operating Unit

LEI = Legal Entity Identifier

LEI Utility (Central Database COU)

LOU = Local Operating Unit

LD = LOU Domain (prefix) - no rules as to meaning

RD = Registration Domain – no rules as to meaning

RID = Registration Domain Identifier

FMP = Financial market participant

lei = portion of LEI assigned by FMP and/or LOU

An = Alphanumeric characters

X, y; a, b, c - in combination not to exceed 18 An characters/digits

Firstly, random numbers invariably produce duplicates. One method of eliminating duplicates, especially when generating random numbers across many registration authorities (the federated model) is via a logically federated series of servers that check that the number generated has not duplicated an already existing number and, if a duplicate has been generated, automatically eliminating such duplicate prior to the new number being assigned. This same process is used to check web domain names for availability before they are registered.

Another random number method requires a central point for the issuance of all numbers which also represents a single point of failure for the whole system. It further requires some entity to be designated as a central controller of the system to provide access (act as a gate keeper) to all the world's regulators and financial market participants.

The federated model requires there be multiple registration authorities (and their appointed registrars), possibly one for each country or region, to issue LEI's. This is the G20's FSB model. If each registrar generates a random number for each LEI these too have to be checked with either a central system (in the case of a central controller model) or through a logically federated system to ensure that no duplicate numbers have been generated.

Are there alternative methods of ensuring that no duplicates have been generated whilst preserving the uniqueness in the number regardless of whether it is centrally or locally assigned?

One possibility is to assign a high order domain code within the LEI code space to a Local Operating Unit (LOU) with each domain being unique to a local registrar (LOU). If each potential separate LEI code within each local domain can be a randomly generated number or a randomly chosen number (code), even a sequential unique number then the whole of the number no matter what is added to it in the remaining low order space is unique, potentially obviating the need for validation of duplicates either at a central core or across a logically federated system. The FSB calls this "low order" portion of the code space the "entity-specific" identifier. However, the validation of duplicates at the local level would still be necessary, if a random number generator is used, as was previously discussed, as it will occasionally produce duplicates and transfers could potentially create duplicates if the transfer process is not automated and locked-in.

This addition of a LOU Domain Identity code (or prefix) would be acceptable if it weren't for the requirement that codes should not have any intelligence and must persist through all transfers of domicile where it may be reregistered or upon the occurrence of mergers, acquisitions, etc. This latter requirement has lead us to recommend including the registration authority identification code (LOU) as reference data in the updated ISO 17442:2012 LEI standard, noting that the registrar (LOU) might change while the LEI code remains constant.

The identity of the registrar (LOU) is also necessary for fee collection and the annual verification/certification of LEIs. However, knowing the identity of the LOU is necessary at the local level where invoicing of financial market participants will take place. Again, there is no need for a central utility function, only a central administration function, which is the intended role of the Central Operating Unit (COU).

The conclusion is clear that the Domain Identity (prefix) is duplicative of required reference data identifying the LOU. Further, it uses expansion space in one case and may overlay a portion of the code space in another that may have already been filled with a randomly generated number, as is the case of the CFTCs CICI code. In the latter, it should be noted that there are alphabetic characters in the code space that should either have zeros or numbers and thus leaves the entire set of these codes with intelligence, a prohibition of the ISO 17442:2012 standard (it conveys that this is a US counterparty in a swaps transaction that was issued a code for Swaps regulatory purposes prior to Nov. 9, 2012).

Another alternative is appending a LOU Prefix to an existing code already used as the local “LEI-like” proprietary code on exiting business registers or used by data vendors. That combination would then fill out the LEI code space. The problem with using an existing code is in the ambiguity of the identity of entities represented by local proprietary codes, perhaps even containing duplicates; the synchronization required of a local business registry or vendor code and the LEI registry; the timing considerations of registering the LEI vs. the timing of posting to another registry; the particular sovereign laws governing these local codes in their use externally; and the conflicting purpose of the same apparent entity.

This later point is important as business registries, tax registries, and other uses made of business identities may not be the same as the purpose of the LEI. That purpose is to define a financial market participant. The LEI is, in fact, the key to participate in the global financial system as a counterparty in financial transactions; as an issuer of securities; to originate a financial contract, etc. It should not be abrogated to an ancillary role within a sovereign country’s own internal business identification needs. This first ever global financial market business identifier should have a primary role as it represents an entry key to the globally interconnected financial system. What then is an optimal LEI code construction? We discuss one such code construction below.

## The Proposed Construction of the Recommended LEI 17442:2012 Compliant Standard<sup>51</sup>

We considered whether the LEI code could fulfill its promise of being the universal ID for all business entities that operate as financial market participants: securities issuers, traders, processors, financial intermediaries, exchanges, reference entities, collective trusts and funds, etc., whether used in a trading system or in an audit trail; for matching orders to trades to settlement instructions; for eliminating redundancies of reference data between business silos within firms; for aggregating position and cash flow data; for observing enterprise risk; for replacing legacy systems and vendor proprietary codes; and, finally, in the key role for aggregating risk exposures across firms so that the contagion of systemic risk can be observed and analyzed.

This has led us to consider whether a random number (as discussed previously) and/or a 20 character code is best for constructing the LEI code: for database storage and retrieval applications; for presentations on reports and screens; packaged in communications messages; in sorting and aggregating applications; in low latency networks?

Our proposed LEI standard is human readable and memory retainable. It contains no intelligence, is persistent and does not generate duplicates. The random number example shown by the FSB in its recommendations was borrowed from a test file used by others implementing a LEI-like identifier, “YUV8PRHOZSRFRC4J0269”. As an example this code is neither easy to read nor retain in memory. It is also not easy to find any specific LEI in a printout or on a screen.

CICI	Global LEI	Financial Market Participant
EZGFBZUBSZ4QWOL703-95	173670-11001-42	Argent Lowlev Convertible Arbitrage Fund LLC
OGHUSTPW44DZDNC7XV-23	190101-76543-76	J.P. Morgan Emerging Markets Debt Opportunity Fund
LLCXAGHJKBLRTJUVZXTMH-59	678335-12345-93	US State X Tax Rev Department
BGGKTFDDYCJKLFYCXAC-12	969594-00001-81	US State Y Tax Rev Water & Sewer Division

The construction of the proposed LEI code is depicted on the next page and described on this and the following page.

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<sup>51</sup>Grody, AD, Hughes, PJ, Reininger, D; [Global Identification Standards for Counterparties and Other Financial Market Participants ...](http://ssrn.com/abstract=2016874); *Journal of Risk Management in Financial Institutions Special Issue on Systemic Connectedness: Measuring and Managing Counterparty Risk*; Vol. 5, No. 2, April-June, 2012 at <http://ssrn.com/abstract=2016874>



9. While business entities can use multiple RIDs obtained from single or multiple LOUs it is desirable (and we believe should be mandated by the ROC) to use one RID across all the LOUs to affect corporate actions, especially for multi-national, multi-legal entity businesses
10. A single RID can be used to publish/subscribe to multiple LOUs using “RID channels” to populate the RID in multiple LEI registries and to update reference data for corporate actions efficiently and timely

Using a six-five RID + lei structure the total number of assignments using first the digits 0-9 and then the western alphabetic (excluding I, L, O, Q, V, and Z which are very easily confused with 1, 0, U and 2, a total of 30 digit/alphabet combinations is 729 million RIDs and, for each RID 24,300,000 lei’s. Using just digits, which is how we would suggest initiating the assignment process, would result in 1 million RIDs and 100,000 lei’s for each RID. Using just digits a seven – four code structure would result in 10 million RIDs and 10, 000 lei’s for each RID, an eight-five combination - 100 million RIDs and 100,000 lei’s. Until we take a census of each of the G20’s own LEI estimates we cannot be sure of the codes’ RID-lei balance. We urge such a census be done as soon as possible. Below are the numerals (10) and 20 western alphabet characters that are potentially to be used, eliminating potential conflicting number/letter pairs:

		0	1	2	3	4	6	6	7	8	9	
A	B	C	D	E	F	G	H	J	K	M	N	P
			R	S	T	U	W	X	Y			

## System Failure, the Federated vs. Central Model and the LEI Technology Platform

There are obvious concerns regarding system failures / vulnerabilities / security breaches in both a central and federated model. In a central controller model, a single point of failure may be resolved through multiple backups, a highly complex synchronization issue between fall-over synchronization of computers at the central core while multiple local registries compete to update a failed central core database.

However, while a customized engineered solution is possible it is already a feature of the proposed federated model where the LEI network will be overlaid as a virtual private network (VPN) “tunneled” through the Internet. The Internet itself has been built with inherent resilience with there being no single point of failure and thus useful as the network architecture at the application layer.

In a federated model a directory of LEIs can be replicated so there is no single point of failure as demonstrated in the ubiquitous World Wide Web’s Domain Name Server (DNS) network on the Internet. If we follow the DNS analogy there are many servers to choose from all of which can,

for example, resolve an LEI into an address to locate its LOU. Each server in the DNS network contains or can get access to the same directory.

If we place the locator directory at each LOU and need to search outside a local LOU the DNS service will “dial” the corresponding LOU. In this scenario the COU functions as an aggregator of the "who has what" data directory and pushes a copy to the LOUs. Again, this is the way DNS works. Most companies today have local DNS services that can resolve address lookups without going outside to higher order servers in the network. If you look at the federated solution in this way it is constructed as a peer-to-peer network of LOUs where the COU level is for building the "routing tables" that get distributed to the "routers" at the LOU.

Another implementation approach can be to interconnect the LOUs using publish/subscribe (pub/sub) channels for each Registration Domain (unique Registration Identifier – RID). The publishers produce the messages and the consumers (or subscribers) pick them up and process them. There can also be a mechanism for LOUs to query others LOUs by publishing their queries on a query channel (a control channel for LOUs). The query will state which channel the issuing LOU will “tune into” in order to receive responses from the responding LOUs.

The publish/subscribe approach based on RID channels and its sub (RID + lei) and supra (all country, region, market, regulator, exchange, etc.) structures is a method to keep all the LOUs in communication with each other without needing everything to go through the COU, a central controller or a central repository as in a wheel and spoke configuration. The COU could still be the holder of the golden copy of all LEI data by “listening” to all channels but not forcing each LOU to go through the COU.

In this scenario when one wishes to retrieve information about any one specific LEI, a query is published to the LOU on the corresponding “RID channel”. That query will be "routed" to the right LOU. The advantage of this implementation is that a LOU may want to publish information about a specific LEI as an update to those who need to be informed, whether of a merger, or a bankruptcy, or some other event that requires an update to the LOU’s registries. For example a corporate event that changes the capital structure of an existing company and could, therefore, affect the control of the company. That would require that the controlling entity LEI in use for a roll up to an aggregated view of multiple LEIs needs to be changed, actually to be substituted for the new LEI. Each old LEI in the reference data in each LOU associated with that roll up must be changed.

In our approach each LEI will be tied to an immediate parent and at some point to an ultimate parent/ultimate control group LEI. Many multi-LEI business structures, certainly the world’s largest and systemically important financial market participants would contain multiple references to its immediate parent/ultimate parent LEI that would have to change. The mechanism for making global changes would be through global commands across channels that communicate directly with LEIs. If the mechanism to make that change was already in the code

itself (our Registration Domain code configuration permits this), then simple pub/sub mechanisms could be commanded to make the change. One significant use of an RID channel is to affect a global change to an RID across multiple LOUs when, for example, one business entity merges with another, or one business entity acquires a component of another business entity, or one business entity spins off a component of its business (multiple LEIs). Assigning the same RID to multiple LOUs for carrying out this function is one approach using the COUs ability to populate each LOU from a central control. The same RID (not LEI) will not produce duplicate LEIs. This capability can also be affected by one LOU transferring the RID to another LOU.

Another benefit of this approach is to enable secure access control. For example when a user establishes a connection to a LOU, the publish/subscribe protocols specifies a virtual host within which it intends to operate. A first level of access control is enforced at this point, with the server checking whether the user has any “permissions” to access the virtual hosts, and rejecting the connection attempt otherwise. In this way an LOU can support virtual hosts for regulators, other country LOUs, same country LOUs, the public, etc.

A second level of access control is enforced when certain functions such as configuring, reading or writing operations are performed. A user is granted the respective permission for each or all operations. In order to perform an operation the user must have been granted the appropriate permissions. This allows a granularity of access control as, for example, when only redacted information on a RID is to be allowed through one RID channel for a “privacy jurisdiction” not allowing immediate or ultimate parent public disclosure. At the same time non-redacted ownership information can be published and made query-able on different channels (home country agent/regulatory access, for example) requiring different permissions. Results of such access control checks may be cached on a per-connection or per-channel basis. Hence changes to user permissions may only take effect when the user (a LOU, a regulator or the public) reconnects.

By designing the global LEI system using a pub/sub network of LEI “brokers” consisting of LOUs and a COU a more robust system can be provided beyond what a centralized or hub and spoke solution requires in passing large files from many-to-one. Here because we use a message passing paradigm with queues and virtual hosts at each server we allow for stateless asynchronous communications while the access control is state-full on a per-connection per-channel basis.

This later approach is ideal for machine-to-machine (M2M) design patterns as is used in today’s financial markets for market data and straight through processing (STP) applications, which do not require “humans-in-the-loop” to login and create a state-full session for both data transfer (potentially bulk data transfers) and access controls.

To those who design financial industry market data and trading systems these approaches will be familiar. We would also like to note that provisions have been made in the proposed design of the global LEI system to store, maintain and process Unique Product Identifiers (UPIs), a required identifier for the US's implementation of Swaps that has not yet been placed on anyone's global agenda and which we expect and hope that the FSB to do so at a later date. In the interim we have provided for a market symbol/market designation code in the server component of the plug-in network architecture we have designed for the Global LEI System.

In conjunction with setting up ownership/control hierarchies using RIDs such a capability would facilitate mass changes to control hierarchies, including the ultimate parent/control entity kept in the reference data. A fuller discussion of the use of RID's in this regard is available in this paper in the next section "Quality of the LEI Reference Data, Hierarchies".

Regardless of technical considerations, a central controller model or central utility model would not solve the geopolitical issue where some countries, perhaps the majority, will want to maintain their own registries, perhaps behind a firewall, which is generally the case for general business registries. Sovereign states will certainly wish to control information related to legal entities and related hierarchies of business ownership in circumstances where governing statutes do not permit public disclosure and/or exporting of such information outside their control.

### **Quality of the LEI Reference Data, Hierarchies and Fees**

Fostering the highest standard of data quality for the LEI is essential. The proposed LEI system in this paper relies on the at-source creator of the legal entity and its local certifying agent (an internationally recognized auditor, law firm, perhaps a local exchange or business registry owner or other trusted source) to ensure the accuracy of data. We believe this is precisely where the responsibility should be for recording both the LEI dataset and each LEIs placement in the business ownership hierarchy. This approach also solves information leakage issues as control over the timing of LEI registration remains with the respective financial market participant. This is important also to controlling both the updating of internal information and external LEIs when mergers are announced, when a new legal entity is formed, when a financial product is innovated within a new legal structure and for other competitive and control reasons.

The use of an audit firm as a certifying agent is consistent with other objects stated by the FSB related to auditors playing a more substantial role in stabilizing the financial system.<sup>52</sup> The international auditors, especially the Big 4 all have third party assurance practices that can perform this function. They themselves have organized their global partnership under a federated model. It would also serve auditors needs to understand the business hierarchies of the firms they

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<sup>52</sup>Enhancing the contribution of external audit to financial stability, Financial Stability Board Press Release March 15, 2012 at [http://www.financialstabilityboard.org/press/pr\\_120315.pdf](http://www.financialstabilityboard.org/press/pr_120315.pdf)

audit while acting as experts in applying the accounting standards for consolidation of entities in conforming to the LEI business ownership criteria.

It could well be that the LEI registry can serve as the ultimate reference source for performing auditors’ materiality attestation function in regard to exposure from subsidiaries and affiliates by adhering to accounting standards related to ownership criteria. The certifying agent function can be automated and regionalized for cost efficiency to better serve small financial market participants that do not generally have a full-audit requirement.

The parent LEI of a business hierarchy or the parent controlling the activity of a complex multi-entity structure is important to capture at inception of the LEI system so that any other LEI assigned will be able to be related to the parent/controlling entity, whether centrally controlled by the business entity or left to local subsidiaries and affiliates to register a LEI locally. This choice is to be left to the business practices of the parent of each business entity.

We believe there are few options on how a firm can register a LEI or a second LEI if there is no parent/controlling entity LEI and, therefore, few options of establishing business ownership hierarchies without it. In prescribing such a requirement for the LEI system the firm and their auditors and/or regulators always have an ability to know the legal structure of ownership of the company, something that is not easily available today.

It is possible that every legal entity within a business can get its own unique RID, but it still has to have a link back to the parent LEI. Complexity will increase when coding for subsidiary parent/child/ultimate parent relationships. It gets even more complicated when coding for percent ownerships and for cross business hierarchy dependences and control structures. It would, therefore, be best to do such coding centrally for each financial market participant. An example of various choices, each mutually exclusive, in selecting an approach to acquiring LEI’s is presented below. In the first table the first four columns allow access to all or some LEIs via use of a RID channel. The last column would require a one-for-one mapping.

**Example of An Ultimate Parent Choosing the Mechanism for Controlling Internal Business Hierarchies through Mappings to LEI Registration Domains**  
*-Example Using Multiple RIDs-*  
**[LOU assigned Registration ID (RID) + self-assigned lei = LEI]**

Centrally acquired RIDs LOU#1	Regionally LOU#2	or acquired LOU#3	RIDs LOU#4	or Decentralized – locally acquired RIDs
614141-00001	614141-00001	779234-00001	687993-00001	614141-00001-LOU#1
-00002	-00002	-00002	-00002	779234-00001-LOU#2
-00003	-00003			687993-00001-LOU#3
-00004				347621-00001-LOU#4
-00005				167832-00001-LOU#5
-00006				856045-00001-LOU#6
-00007				870653-00001-LOU#7

In this representation all LEIs would be accessible via the RID channel in a publication and subscription mode, negating a mapping exercise.

**Example of An Ultimate Parent Choosing the Mechanism for Controlling Internal Business Hierarchies through Mappings to LEI Registration Domains**  
*-Example Using Single RID-*  
**[LOU assigned Registration ID (RID) + self-assigned lei = LEI]**

Centrally controlled RIDs	-----	Regionally distributed RIDs	-----	Locally registered RIDs
614141-00001	614141-00001	614141-00004	614141-00006	614141-00001-LOU#1
-00002	-00002	-00005	-00007	614141-00002-LOU#2
-00003	-00003			614141-00003-LOU#3
-00004				614141-00004-LOU#4
-00005				614141-00005-LOU#5
-00006				614141-00006-LOU#6
-00007				614141-00007-LOU#7

To incent firms to do LEI coding centrally, the price to get an initial RID could be set by each local registration authority, but there should be no additional fees to set up every additional LEI using the same RID. Perhaps just a transfer fee would be required to initiate the RID at each local LOU when required by that jurisdiction to be locally registered. Should a firm want to do it in decentralized fashion, that is to receive a RID for each LEI they would have to pay the going rate for each local registry charge for an initial RID. This could prove rather expensive as many firms have thousands of legal entities.

The ongoing maintenance charge, an annual or an as-required update charge under each approach would still be the same, and should be charged in some relation to the cost of setting up the initial LEI. There are other fees that each legal entity will bear such as auditors’ and other certifying agents’ third party assurance service fees for example. However, this cost is in contrast to costs associated with a central controller function or central utility proposed by others which, in the federated model proposed here, is not required.

It would be expected that the certification fees would be considerably less if the certification function is carried out centrally, thus providing a further incentive for setting up LEI’s with a single RID, and giving auditors more insight into the firms business hierarchies.

It is clear to us that in order for hierarchies to work to achieve the ultimate objective of aggregating data for systemic risk analysis it is necessary to design the LEI system to accept such hierarchy codes. At a minimum a controlling parent, ultimate control point LEI should be placed into the LEI registry before starting to assign codes for any registered LEI. It is also clear that in order to control the mechanism to change these relationships for mergers and acquisitions,

bankruptcies, change of control, et al there must be a mechanism in place to do so throughout the federated network of LOUs.

Mandating that each legally created control entity obtain a singularly unique RID and then allowing its use without restriction in assigning the additional part of the code to any newly created and controlled affiliates, subsidiaries, etc. would be ideal. It would allow the system to reach out across the federated nodes to update all RID-lei combinations regardless of which LOU has registered the LEI.

See Use Case 6 where we describe the mechanism for accepting those codes into the LEI system and the section titled **The Network Card and the Plug-in Architecture** below where we describe how to store such data. Obviously it will be necessary to embed these procedures into the governance principle of the Regulatory Oversight Council that will govern the LEI system.

### **The Network Card and the Plug-in Architecture**

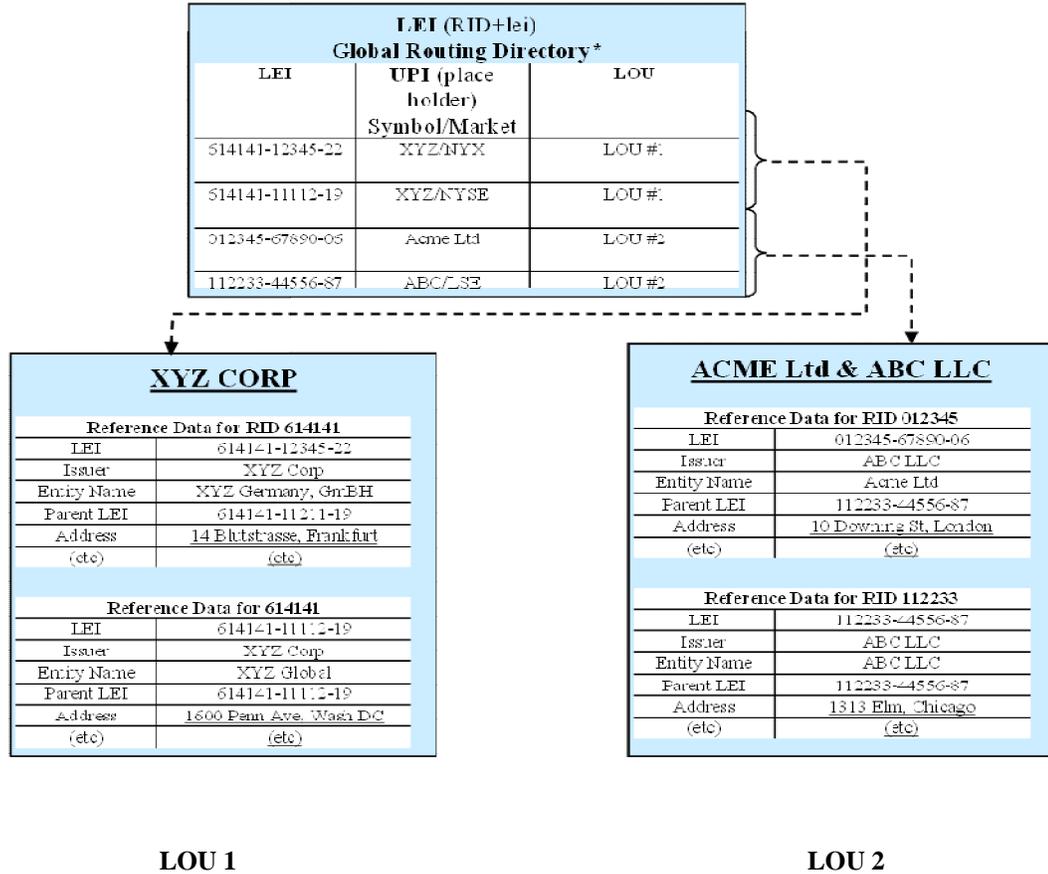
As required by the FSB the local federated LEI Registry has been designed around a “network card” or “plug-in” architecture at the LOU level that will federate up as the logical virtual database overseen by the Central Operating Unit (COU). This network card is described generally in the FSB recommendations for the LEI system<sup>53</sup> and interpreted and proposed by us as a high performance server. The server’s in-memory data bases anticipate extending its resolution and storage capabilities to the unique product identifier (UPI) when it becomes available and to reference data that operationalizes the identifiers for business application uses. Software will aggregate business hierarchies while redaction algorithms can obfuscate identification where called for by local law and for other reasons. Software anchors will be deployed in these servers to allow access via Automated Program Interfaces (APIs) or Service-Oriented Architectures (SOAs) to multiple vendor products, tools and services in keeping with the requested non-discriminatory and freely available use of LEIs. This technique permits any vendor to offer its services and plug their own hardware, software and other technology into the “network card” based upon the local registration authority’s preferences and bidding process.

This is the way we have translated FSB’s language of no single body being able to “capture” the system design to force a specific vendor’s technology solution. The LOU itself can design its own LEI registry using the specifications outlined in this section. See diagram on next page. (Note: the Issuer/Market/Symbol is a place holder for an eventual unique product identifier (UPI) which is to be stored and resolved in similar manner as the LEI.

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<sup>53</sup> [http://www.financialstabilityboard.org/publications/r\\_120608.pdf](http://www.financialstabilityboard.org/publications/r_120608.pdf) at page 45

## COU/LOU Routing Directory \*



\*Reference data obtained through direct peer to peer LOU-LOU searches or progressive LOU DNS searches- routing directories can be centralized in COU, distributed in LOUs or combinations of both

A second part of or a separate server can contain mapping tables for resolving multiple proprietary “LEIs” into the global LEI (see Tesco PLC example below). This service can be managed by commercial interests, by the LOU itself, or in some partnership with data vendors and regulators. It should be noted that the below mapping table would have to be expanded significantly if each LOU chose its own entity-specific data format for the LEI.

<b>Avid</b>	<b>3213705</b>
<b>Bloomberg</b>	<b>TESC:LN</b>
<b>D-U-N-S Number</b>	<b>216854067</b>
<b>Experian</b>	<b>00445790</b>
<b>Fitch-Research</b>	<b>80359969</b>
<b>Moody's</b>	<b>2714</b>
<b>BvD Zephyr</b>	<b>G800445790</b>
<b>GS1 Prefix</b>	<b>50000358</b>
<b>Edgar Online</b>	<b>0000885834</b>
<b>GSI Online</b>	<b>0000885834</b>
<b>ICC Document</b>	<b>00445790</b>
<b>Disclosure</b>	<b>S_0884709</b>
<b>LSE Ticker</b>	<b>TSCO</b>
<b>CUSIP Issuer</b>	<b>881575</b>
<b>CIN</b>	<b>G87621101</b>
<b>CIK</b>	<b>0000885834</b>
<b>ISIN</b>	<b>GB0008847096</b>
<b>SEDOL</b>	<b>0884709</b>

<b>Hoover's</b>	<b>90426</b>
<b>Ipreo Co. Insights</b>	<b>622</b>
<b>Mergent Financials</b>	<b>00000019052</b>
<b>Onesource</b>	<b>90171</b>
<b>Perfect Information</b>	<b>1113</b>
<b>Revere research</b>	<b>218152</b>
<b>Extel</b>	<b>S_0884709</b>
<b>UK Registration</b>	<b>00445790</b>
<b>Factiva</b>	<b>TSCO</b>
<b>First call</b>	<b>C:1182700</b>
<b>ISS</b>	<b>151655</b>
<b>Revere Research</b>	<b>218152</b>
<b>Investext</b>	<b>TESCO PLC</b>
<b>Street Events</b>	<b>TSCDY</b>
<b>Citywatch</b>	<b>GB00008847096</b>
<b>ExtelFinancials</b>	<b>157</b>
<b>Thomson M&amp;A</b>	<b>881575</b>
<b>Thomson NI</b>	<b>881575</b>

A third component of the server can contain hierarchy tables that can be aggregated in many ways depending upon their use i.e. counterparty exposure, accounting consolidations, credit limits, etc. This service too can be managed by commercial interests, by the LOU itself, or in some partnership with data vendors and regulators. It should be noted that hierarchical relationships must be flexible in regard to control issues, guarantors, triggers in defaults of contracts and in bankruptcies that substitute responsible entities, credit guarantors, etc. Notwithstanding the multitude of variations and cross business entity hierarchies that must be accommodated, we agree and recommend that the first set of hierarchies should be account consolidations under GAAP and IFRS standards.

Below is an example of a reporting structure that is public in the US.

### **Sec. 10k Form 21.1**

#### **Subsidiaries of MSCI Inc.**

<b>NAME</b>	<b>Jurisdiction of Incorporation/Organization</b>
Barra, Inc.	Delaware
MSCI Limited	United Kingdom
MSCI Australia Pty Limited	Australia
MSCI Barra Financial Information Consultancy (Shanghai) Limited	Shanghai
MSCI Barra SA	Switzerland
MSCI Services Private Limited	India
MSCI Services Private Limited	Hungary
MSCI Holdings LLC	Delaware
MSCI s. de RL de CV (Mexico)	Mexico

#### **Subsidiaries of Barra, Inc.**

<b>NAME</b>	<b>Jurisdiction of Incorporation/Organization</b>
Barra International, Ltd.	Delaware
Barra Japan Co., Ltd.	Japan
Financial Engineering Associates, Inc.	California

#### **Subsidiaries of Barra International, Ltd.**

<b>NAME</b>	<b>Jurisdiction of Incorporation/Organization</b>
Investment Performance Objects Pty Limited	Australia
BarraConsult, Ltda.	Brazil

Below and on the next page are a few examples of how such a business hierarchy may be presented for assignment by a financial market participant, the example of MSCI Inc. This mechanism allows financial market participants to control the relationship between its internal business hierarchies and its external representations in the LEI system. The first three columns accesses LEIs via a RID channel; the last column requires a one-for-one mapping to each LEI.

**Example of An Ultimate Parent Choosing the Mechanism for Controlling Internal Business Hierarchies through Mappings to LEI Registration Domains**  
*-Example Using Multiple RIDs- Multiple LOUs*  
**[LOU assigned Registration ID (RID) + self-assigned lei = LEI]**

<b>Centrally acquired RIDs LOU#1</b>	<b>----- Regionally LOU#2</b>	<b>----or---- acquired LOU#3</b>	<b>----- RIDs LOU#4</b>	<b>-----or----- Decentralized – locally acquired RIDs</b>
614141-00001 MSCI Inc.	614141-00001 MSCI Inc.	779234-00001 Barra, Inc.	687993-00001 Barra International, Ltd	614141-00001-LOU#1 MSCI Inc.
-00002 Barra, Inc.	-00002 MSCI Limited	-00002 Barra Japan Co., Ltd.	-00002 Investment Performance Objects Pty Limited	779234-00001-LOU#2 Barra, Inc.
-00003 Barra International, Ltd	-00003 MSCI Australia Pty Limited			687993-00001-LOU#3 Barra International, Ltd
-00004 MSCI Limited				347621-00001-LOU#4 MSCI Limited
-00005 MSCI Australia Pty Limited				167832-00001-LOU#5 MSCI Australia Pty Limited
-00006 MSCI Barra SA				856045-00001-LOU#6 MSCI Barra SA
-00007 MSCI Services Private Limited- India /Hungary*				870653-00001-LOU#7 MSCI Services Private Limited-India /Hungary*

The example below also depicts access to all LEIs via a single RID channel

**Example of An Ultimate Parent Choosing the Mechanism for Controlling Internal Business Hierarchies through Mappings to LEI Registration Domains**  
*-Example Using Single RID- Single LOU*  
**[LOU assigned Registration ID (RID) + self-assigned lei = LEI]**

<b>Centrally controlled RIDs/Single LOU</b>	<b>Ultimate parent</b>	<b>Immediate parent</b>	<b>Immediate parent</b>	<b>% Ownership</b>
614141-00001 MSCI Inc.	614141-00001 MSCI Inc.	614141-00002 Barra, Inc.	614141-00003 Barra International, Ltd	N/A
-00002 Barra, Inc.	-00002 Barra, Inc.	-00003 Barra International, Ltd	-00010 Investment Performance Objects Pty Limited	N/A
-00003 Barra International, Ltd	-00003 Barra International, Ltd	-00008 Barra Japan Co., Ltd.	-00011 Barra Consult, Ltda.	N/A
-00004 MSCI Limited	-00004 MSCI Limited	-00009 Financial Engineering Associates, Inc.		N/A
-00005 MSCI Australia Pty Limited	-00005 MSCI Australia Pty Limited			N/A
-00006 MSCI Barra SA	-00006 MSCI Barra SA			N/A
-00007 MSCI Services Private Limited-India /Hungary*	-00007 MSCI Services Private Limited-India/Hungary*			N/A

\*Note: The name of this legal entity is the same in both jurisdictions and can only be to be resolved into its LEI code through the country code/name (India vs. Hungary) in the reference data

## Use Cases

The Use Cases for the LEI on the following pages can be extended to demonstrate other Use Cases for the UPI (Unique Product Identifier) and FEI (Financial or Corporate Event Identifier). Both are applications of the same Global Identification System for the LEI but to be used for financial instruments and financial contracts (the UPI) and for corporate events and financial lifecycle events (the FEI). The reference to RDRAs (Reference Data Registration Authorities) and the CCDM (Central Counterparty for Distributed Data Management) are intended to demonstrate the potential for commercial interests to be certified to offer services, for example, around accessing hierarchies; in providing proprietary code resolution; and in the extension of the federated network to accommodate operational data that complement the regulatory reporting data in future enhancements to the system.<sup>54</sup> In this later regard, a partial example of such data categories for a financial institution is listed on the next page.

### Sample Extended Reference Data Sets for the LEI

Regulatory Agencies	Financial Reporting Agencies
Credit Agencies	Industry Classifications
Place of Domicile	Web addresses
Taxing Jurisdictions	Reporting Jurisdictions
Transfer Agent	Contract market
Broker-Dealer	Proxy agent
Bank	Credit Union
Inter-dealer	Custody Agent
Futures Commission Merchant	Floor Agent
Financial Market Utility	Securities Industry Processor
Introducing Broker	Hedge Fund
Trading Desk	Give-up Agent
Investment Manager	Clearing Agent
Trading Adviser	Settling Agent
Pool Operator	Escrow agent
Fund Operator	Redemption Agent
Prime Broker	Place of Trading
Settlement Account	Counterparty
Collateral Account	Reference Entity
Locations of Settlement	Guarantor
Delivery Location	Affiliate
Standing Settlement Instruction	Subsidiary
Swaps Dealer	Swaps Data Repository
Major Swaps Participant	Swaps Execution Facility
Business Registration Entity	Child/Parent Percent Ownership

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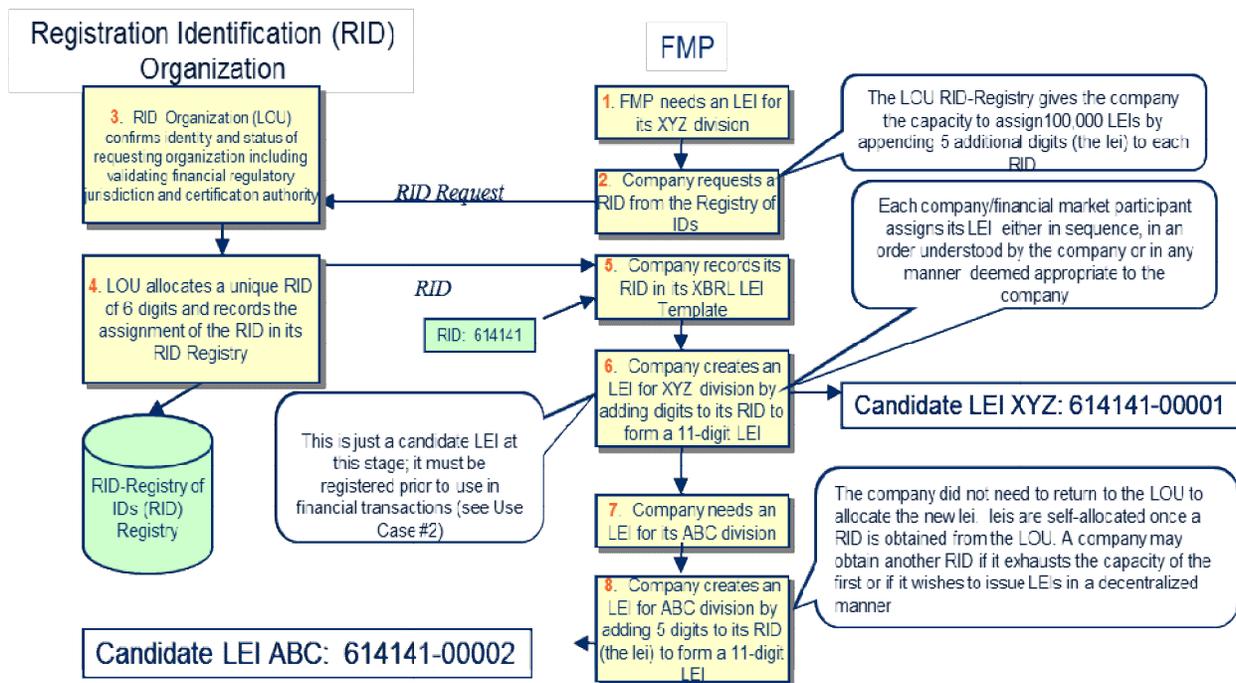
<sup>54</sup> These concepts and Use Cases were first presented in academic papers going back to 2005. They were also presented in responses to consultative requests of the CPSS in 2006 and in response to the IOSCO and CPSS consultative papers in 2011. Further, these concepts were explained in responses to the solicitations of interest of the US Treasury's Office of Financial Research, the SEC and the CFTC in January and February of 2011.

Specific Use cases (see following pages):

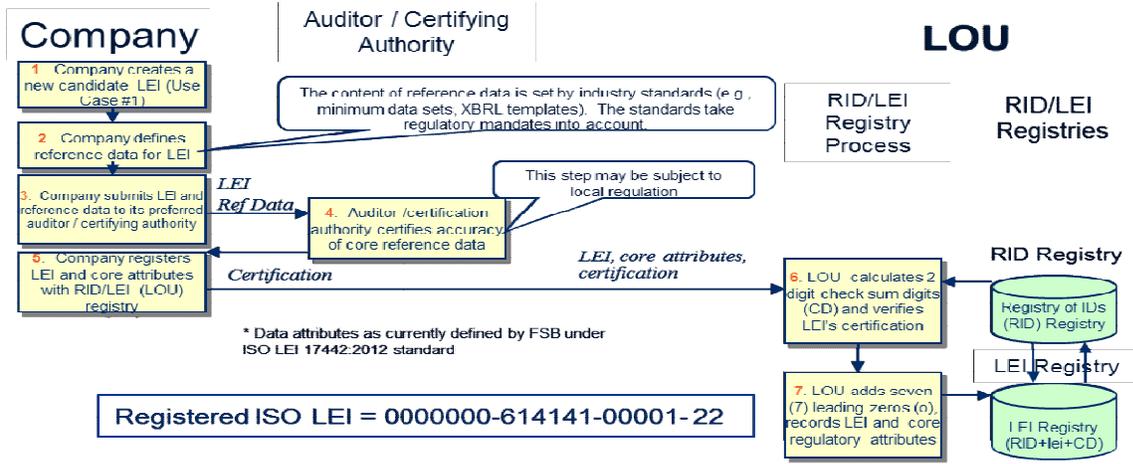
1. Financial Market Participant (FMP) creates new LEIs for two subsidiaries
2. FMP registers a LEI's core regulatory data attributes
3. FMP/Financial Intermediary registers a LEI's extended data attributes
4. FMP obtains reference data about an LEI
5. Regulator/other requestor obtains financial institution's LEI data
6. Registering, validating and certifying a LEI online

## Use Case #1: Financial Market Participant (FMP) creates new LEIs for two subsidiaries

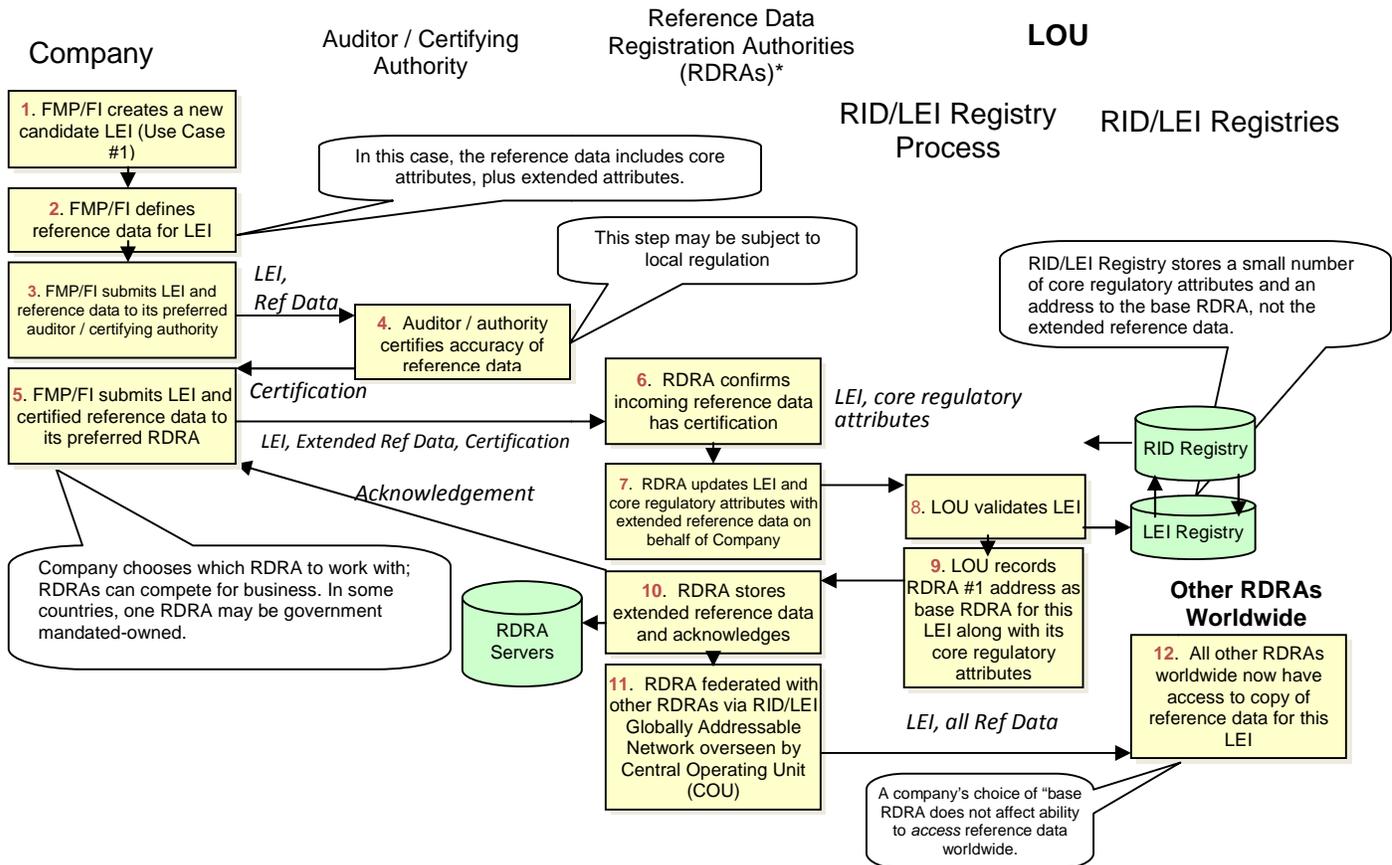
### LOU – Local Operating Unit



## Use case #2: FMP registers a LEI and its core regulatory attributes\*

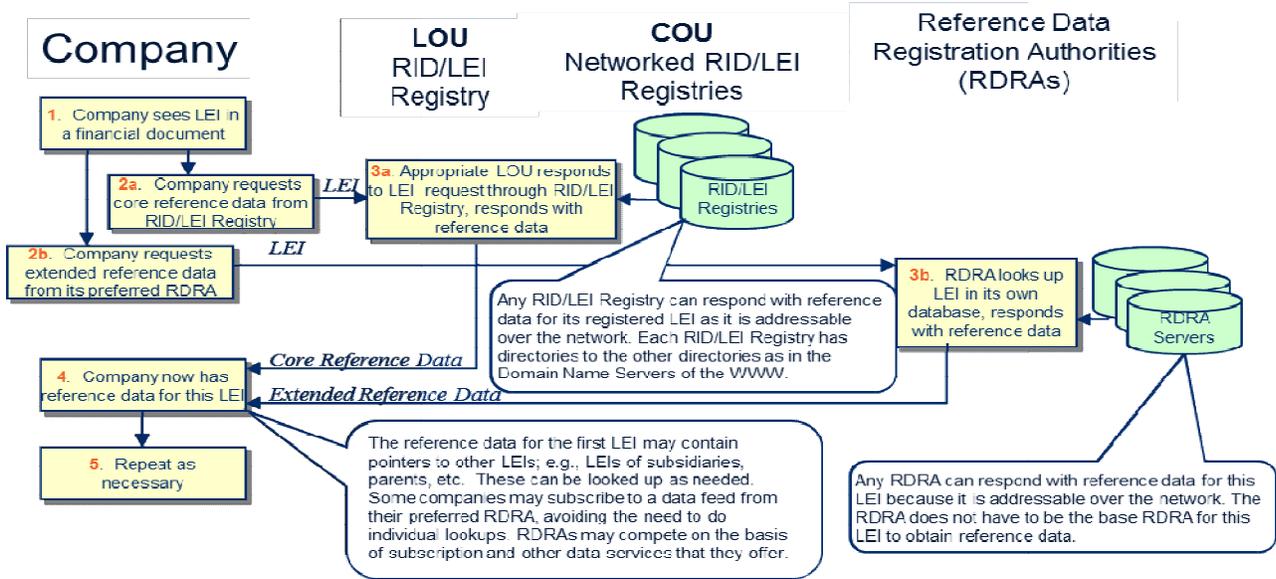


## Use case #3: FMP/Financial Intermediary (FI) registering an LEI with extended attributes using a Reference Data Registration Authority (RDRA)\*

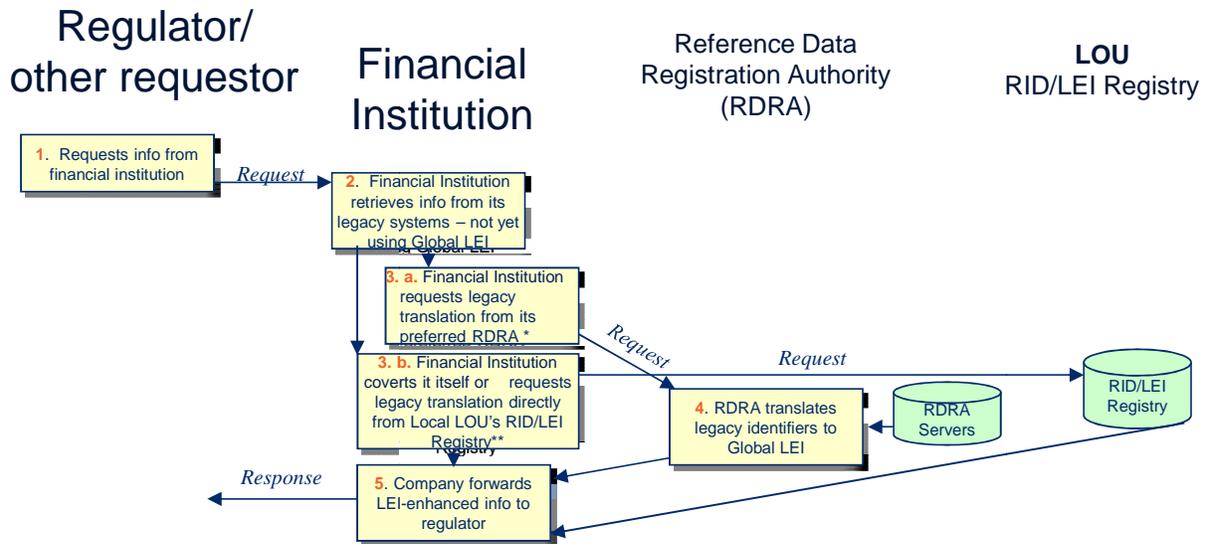


\* RDRAs could support a central counterparty for distributed data management (CCDM) across the federated network. These extended data sets would consist of stores of reference data from: the ISDA Derivatives Product Registry, copies of permissioned data vendors' data, business registries data, listed capital and contract market data, swaps repository data, and other standard reference data sets.

## Use case #4: Obtaining reference data for an LEI



## Use case #5: A data provider (RDRA) enhances a financial institution's legacy data with LEIs



\* In the short term, individual financial institutions avoid having to migrate legacy systems to standard LEIs; the short term need is met by data specialists (RDRA's).

\*\* Over the longer term financial institution can do this internally themselves, or go to direct use of LEIs assisted by mapping software that resolves proprietary LEIs into Global LEIs whether in-house or stored in LOU servers

# Use case #6: Registering, validating and certifying a LEI online

Part 1 of 3 ...

LEI Registration [Home](#) [About](#) [Contact](#)



### LEI Registration

**\* Required**

**Legal Name \***  
Entity's name as it appears on legal documentation

**Country of Formation**

**Registrar ID \***  
Local/regional registrar which registered/transferred LEI

**Address 1 \***  
Street address

**Address 2**  
Office number or floor

**Address 3**

**Address 4**

**City \***  
City domicile of entity

**State/Ward/Province \***  
State/Province/Ward where entity is located

Continued.....Part 2 of 3 ....



**Postal Code \***  
Postal code where entity is located

**Country of Residence \***  
Country domicile of entity

**HQ Indicator \***  
Indicates if entity is also a headquarter

Yes  
 No

**Local Firm \***  
Entity's legal type

**Ultimate Parent LEI \***  
Identifier for ultimate parent

**Ultimate Parent Indicator \***  
Indicates if entity is the ultimate parent

Yes  
 No

**Immediate Parent LEI \***  
Identifier for immediate parent

**Authorized Point of Contact \***  
First Name, Last Name

**Point of Contact Title \***  
Title/Roles of Authorized person

**Authorized Point of Contact eMail Address \***  
Contact email of authorized person at entity

**Authorized Point of Contact Phone Number \***

**Certifying Agent Code \***

**Certifying Agent Pass Phrase \***

**Certifying Agent Token Code**

Continued..... Part 3 of 3 .... **More field level data for LEI input**

# Field Name	Field Description	Sample Value(s)
1 LEI	Unique identification registered by LEI/RID issuer	864380-01000
2 Anglican Legal Name	Entity's name as it appears on legal documentation	Newco Ltd.
3 Street 1	Street address	100 Maple St
4 Street 2	Office number or floor	Suite 300
5 City	City - domicile of entity	Anytown
6 State /Province/Ward	State/Province/Ward where entity is located	NY/NSW
7 Postal Code	Postal code where entity is located	20001-1234
8 Country	Country - domicile of entity	Australia
9 HQ Indicator	Indicates if entity is also a headquarter	Y/ N
10 Legal Form	Entity's legal type	Ltd.
11 Control Entity LEI	LEI for ultimate parent/controlling entity	864380-11000
12 Ultimate Parent Code	Indicates if control entity is the ultimate parent	Y/N
13 Immediate Parent LEI	Identifier for immediate parent	864380-11000
14 Country of Formation	Country where entity was formed	Australia
15 Request For Review	Indicates if the entity has been requested for review	Y/N
16 LEI Certified Status	Indicates registration and certification status of a LEI	Y/N
17 Reason Code	Indicates why an LEI has been disabled (Error/Dup. etc.)	A, B, C, ...
18 Successor ID	Indicates which LEI is used due to corporate actions	864380-01000
19 Other Metadata	Date LEI Issued; Last Updated; Date Disabled	21-Jan-2012
20 Native language code	Original document language (Arabic, Chinese, etc.)	A, B, C...
21 Native Language Name	Entity's name as it appears on source document	Newco Ltd.
22 Street 1	Street address	100 Maple St
23 Street 2	Office number or floor	Suite 300
24 City	City - domicile of entity	Anytown
25 State /Province/Ward	State/Province/Ward where entity is	NY/NSW
26 Country	Country - domicile of entity	Australia
27 Current LOU ID	Local/regional registrar which registers LEI	0001
28 Prior LOU ID	Local/regional registrar which transferred LEI	0002
29 UP/UCPL LOU ID	LOU for ultimate parent/controlling entity	0003
30 GPS Coordinates	Address/location coordinates:	37 23.516 -122.02.625

## Implementation of the LEI and its Reference Data

We look to how XBRL is used now in financial statement reporting to inform the LEI implementation. XBRL is a data markup language intended to provide metadata (descriptive information) about the data itself. Markup languages are annotations added to textual material usually to indicate structural detail or presentation specifications. The standard generalized markup language is an ISO standard defining generalized markup languages for documents.

XBRL<sup>55</sup> is now used by many of the world's regulators and many exchanges to transform reports of the statement of financial condition into computer searchable data. These same regulators and the key financial personnel at submitting entities can be seen as having a role in the LEI, especially as the basics of this information is already reported in annual reports to the SEC in the US<sup>56</sup>.

The source institution would supply this information and after certification can be imported directly into the Legal Entity Identifier (LEI) Registry. Reference data beyond the minimum regulatory data required can be included to provide a more robust data set, i.e. tax-identification numbers, delivery location, web address, corporate executives, links to financial statements, etc.

Exchanges, coincidentally, are requiring XBRL financial accounts reporting and they are the one category of financial intermediary most often at the front end of the financial transaction supply chain. They are in an excellent position across the globe to interact with sovereign local regulators in overseeing the RID portion of the registration of LEI's.

Following the XBRL example we can translate the LEI and its data attributes into a standardized XBRL template. For the LEI Registry a set of data attributes currently defined by regulators and industry participants would be prescribed within the initial instance of the XBRL taxonomy and accommodated in an XBRL template. Below is an example of content of a LEI XBRL Taxonomy.

```
<LEGALENTITYIDENTIFIER>
  <PUBLIC>
  <LEI>
  <NAME>
  <ADDRESSLINE1>
  <ADDRESSLINE2>
  <ADDRESSLINE3>
  <ADDRESSLINE4>
  <CITY>
  <PROVINCESTATE>
  <POSTALCODE>
  <GPSCOORDINATES>
  <COUNTRYCODE>
  <DATEUPDATED>
  <ACTIVE/INACTIVE/PENDINGCODE>
  <PRIVATEINFOAVAILABLECODE>
  <REGISTRARIDCODE>
  <PUBLIC>
  <PRIVATE>
  <PARENTLEI>[1]
  <CHILDEI>[2]
  <LASTFEI>[3]
  <PRIVATE>
</LEGALENTITYIDENTIFIER>
```

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<sup>55</sup> See footnote 14

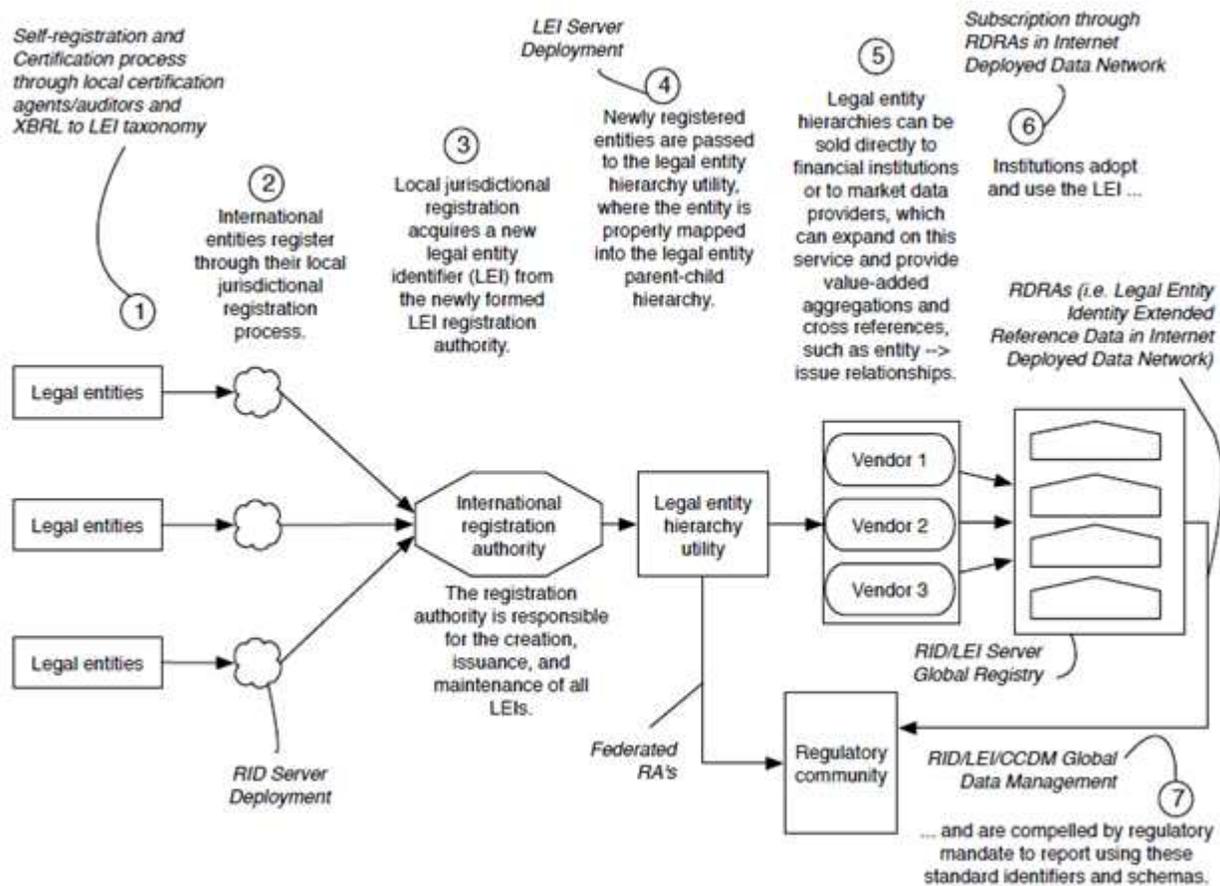
<sup>56</sup> See Rule 601 of SEC form 10k Exhibit 21

<sup>[1]</sup> Parent Legal Entity Identifier

<sup>[2]</sup> Child Legal Entity Identifier (defined by the SEC and CFTC as 25% or greater ownership)

<sup>[3]</sup> Last Financial Event Identifier

Such direct input could well spur the industry's financial institutions to think of establishing a broad utility, not just a Registry of Identifiers (RID) or LEI Registry, but more complete in respect of all the data attributes necessary to perform the myriad of operational processes necessary to make an identification system useful in business specific application processing systems. As more prospectuses, offering memoranda, financial event announcements, etc. are translated through XBRL templates into direct input as reference data, the facility emerges over time as a complete reference data repository, a "central counterparty" of distributed data management (the CCDM) to minimize the risk of using multiple versions of non-standard data.<sup>57</sup> An example of such a system, using the Registration Domain system and the CCDM architecture, is presented below overlaid on a system diagram described by a group of US agency staff to provide more detail to the OFR's solicitation of Interest on the LEI.<sup>58</sup>



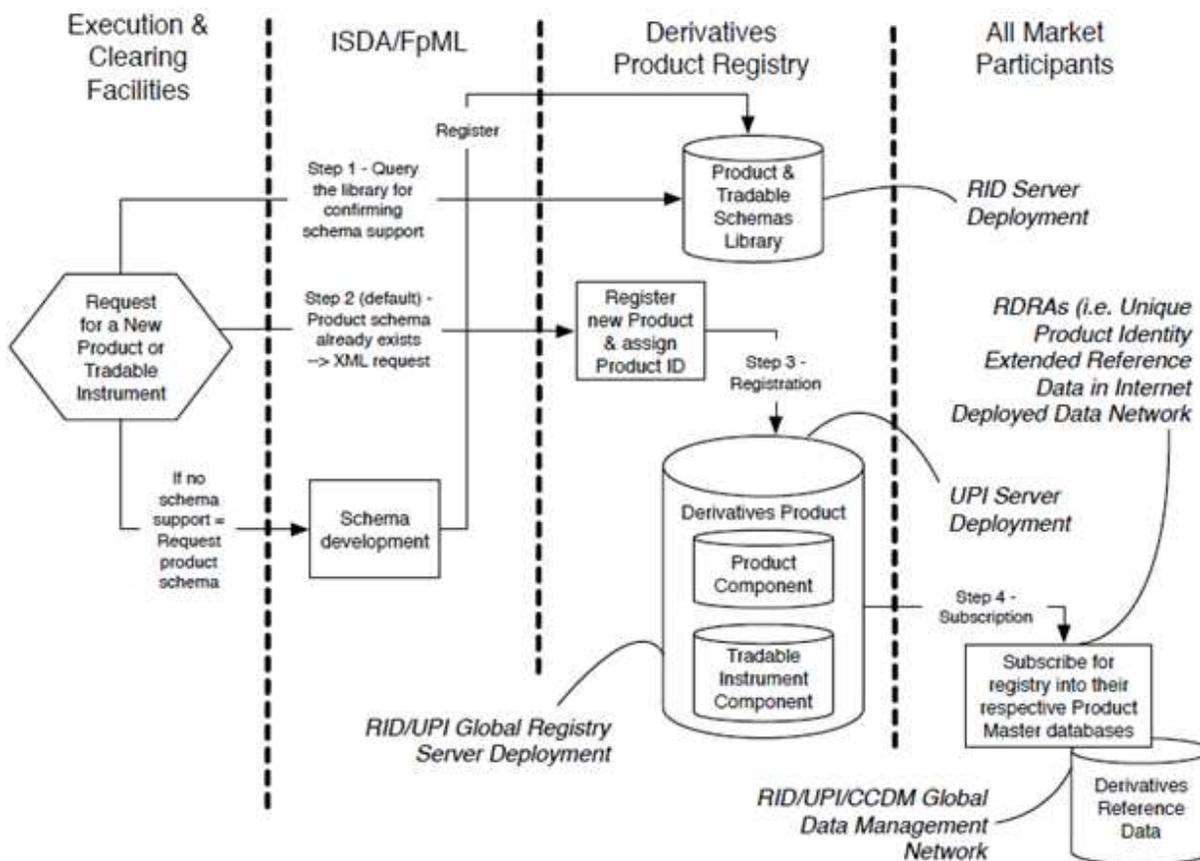
The actual LEIs hierarchical ownership structure could, where required by regulation, be redacted into a common form as is done in other industries where competitive data is to be aggregated and publically disseminated.<sup>59</sup> A private-public security key can be associated with the redacted identities and used for public distribution. Approved regulators, observing early triggers of undue risk exposure can obtain the redaction generator key to discover the source of the exposure and do more detailed analysis directly with the financial institution or counterparty.

<sup>57</sup> Central Counterparty for Data Management and U3 Identification System, US Patent no. 8,055,575 issued Nov. 8, 2011 and pending patents

<sup>58</sup> See reference 46 at page 15

<sup>59</sup> MITRE, Fusing Aviation Data: A New Approach to Keeping Skies Safer, April, 2009 at [http://www.mitre.org/news/digest/pdf/MITRE\\_Digest\\_09\\_1357.pdf](http://www.mitre.org/news/digest/pdf/MITRE_Digest_09_1357.pdf)

This same two part construct and system to support the LEI had been identified early in 2011 in the regulatory process in response solicitations of interest by the OFR, CFTC and the SEC. In these submissions it was shown how the system could, for example, be extended to be used for product, financial event and transaction identification.<sup>60 61 62</sup> One such example is shown below, using the Registration Domain Identification system for the UPI (Unique Product Identifier) within the FpML product registry proposed by the International Swaps and Derivatives Association.



## Risk and Performance Management Systems

The LEI system will assuredly need a risk management system and protocol. The LEI governance body will primarily be focused on managing Operational Risk, only to a limited extent financial risk. The key operational risk components and their interconnectedness for the LEI system can be simply described as people interacting through systems with data. The LEI

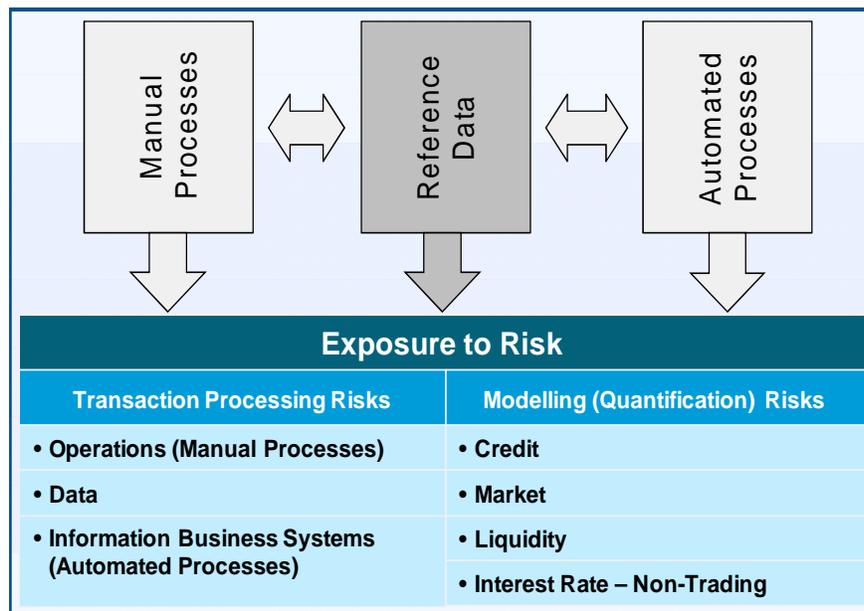
<sup>60</sup> US Treasury filing at <http://www.regulations.gov/#!documentDetail:D=TREAS-DO-2010-0008-0024>, Jan 31 2011

<sup>61</sup> CFTC filing at <http://comments.cftc.gov/PublicComments/ViewComment.aspx?id=27632&SearchText=>, February 7 2011

<sup>62</sup> SEC filing at <http://www.sec.gov/comments/s7-34-10/s73410-57.pdf>, February 14 2011

System and its facilities will be required to hold reserve capital for predictable operational losses, unexpected losses and losses or potential losses due to its systemically important role.

The LEI enterprise would most probably be classified as a global systemically important institution, not a financial one but certainly a systemic one involved in the financial system. Perhaps as the FSB defines the interconnectedness criteria for the G-SIFI's (Global Systemically Important Financial Institutions), a classification given out by the FSB to 29 global organizations already, they will also define a globally important financial system, a G-SIFS – Systemically Important Financial System. In the US, DTCC and CME Clearing are already classified as SIFI's by the FSOC. They are called Financial Market Utilities in the Dodd Frank legislation. The criteria for selection of the LEI system as a G-SIFS would not be by assets but by the interconnectedness criteria, certainly a significant aspect of the LEI system. As the LEI initiative extends itself to the Unique Product Identifier (UPI) and more extensive reference data sets it will need some form of capitalization based primarily on an Op Risk model as shown below.<sup>63</sup>



The uniqueness of the LEI system is that its primary fabric, aside from its charters and governance structures, is an information system receiving, transmitting and matching/resolving data. As the secretariat for the FSB the BIS has as its mission global economic stability. They administer a global capital standard, as will the FSB administer an equally important LEI standard. There are risk management systems that deal with both capital calculations for BIS type risks and evaluating risk in the context of risk mitigation. The model shown earlier is now under consideration for pilot operation and may satisfy uniquely the needs of the LEI system. We

<sup>63</sup> Kiran J. Fernandes, Allan D. Grody, Peter J. Hughes, Oliver Phillips, J. Steven Toms; Risk Accounting: An Accounting Based Approach to Measuring Enterprise Risk and Risk Appetite at <http://ssrn.com/abstract=2165034>, page 14.

would urge the governance body of the LEI to consider participating with us and others in this pilot.

The balance of the management systems needed by the governance body of the LEI system is traditional; accounting, billing, general ledger and balance sheet reporting; performance metrics, P&L reporting, annual statement of accounts, etc.

In addition a system to administer and manage a sophisticated Service Level Agreement (SLA) process between the ROC/COU/LOU should be planned in the very early stages as it, along with the risk management system will govern day to day operations. A final thought as there may be multiple agents acting on behalf of a local or regional LOU, unique SLAs would be required – for outsourcers (technical service, facilities management, et al) and “franchises” (custodian banks, clearing houses, National Numbering Agencies, GS1 Member Organizations, capital and contract market exchanges, et al) that are authorized to assign RIDs and confirm LEI registrations using each national LOU’s infrastructure and pool of Registration Domain RIDs.

### **Industry-wide Risk Mitigation, Cost Efficiencies and STP**

One of the most undervalued justifications for the Global LEI initiative is the great benefit that not just regulators will realize, but financial firms and their stakeholders as well. Starting with a global identification system for financial market participants (the LEI) and, eventually, the same for financial contracts and instruments (the Unique Product Identifier – UPI), the same efficiencies and innovations that accrued to the trade supply chain and the communications industries will be available to the global financial industry and its customers.

What became clear during and after the Lehman collapse and the many government led bailouts of financial institutions is that regulators had no way to assess overall financial system or counterparty risk. There was no universal identification system for the financial services industry and hence no overall visibility of financial participants and products.

This results inevitably in multiple versions of what needs to be identical information. The results are predictable - transactions that need to match for payment and settlement, and transactions conducted by the same counterparty in the same products that need to be aggregated into positions for risk assessment do not match nor do they get aggregated properly

This is quite amazing when you consider the information age we are in, the vast sums of money on the table and the fact that other global industries like retail, food, healthcare, telephone and communications, media and manufacturing have been using unique and global identifiers for years. These segments of the global economy have achieved their version of straight through processing (STP); the financial industry still has not.

It is not surprising then that the early proponents of the Dodd-Frank legislation advocated for this overall benefit of global efficiencies through a global identification system as justification for

embarking on the LEI and UPI journey - to first “fix the plumbing” in order to risk adjust the financial system. Without consistent quality data the risk triggers and risk calculations will be suspect at best and wrong in the main.

Below is the work that we and others have done in placing some tangible recurring value on the large financial institutions’ support of the Global LEI initiative. While it is sufficient to embark on this journey to allow regulators the ability to see that which they are mandated to oversee, it also has significant bottom line benefits to global financial institutions as shown below:

**Annual Recurring Data Management Costs of the Largest Financial Organizations<sup>64</sup>**

(\$ in millions)

**Direct Costs**

People and Facilities	\$ 50 - \$ 200
Data and Information	19 - 704
Software and Systems	2 - 57

**Losses**

Fails - DTCC	108
Fails – Federal Reserve	25
Corporate Actions	29 - 103

**Capital (preliminary)\***

Internal Operational Risk Capital Costs	5 - 45
External Operational Risk Capital Costs	.4

**Capital Efficiencies \*\***

1,080<sup>65</sup>

**Total** \$ 1,318 - \$ 2,322

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<sup>64</sup> Grody, Allan D., Harmantzis, Fotios and Kaple, Gregory J., Operational Risk and Reference Data: Exploring Costs, Capital Requirements and Risk Mitigation. *Journal of Operational Risk*, Vol. 1, No. 3, 2006, available at <http://ssrn.com/abstract=849224>

<sup>65</sup> Deloitte, SWIFT, Growth, risk and compliance: *The case for a strategic approach to managing reference data*, April 2012 available at <http://www.deloitte.com/assets/Dcom-UnitedKingdom/Local%20Assets/Documents/Services/Audit/uk-audit-swift-growth-risk-compliance.pdf>

\* Included is a very preliminary calculation for operational risk capital associated with faulty data under the Basel guidelines for the then 15 US based financial enterprises coming under its mandate that was never implemented. These guidelines have never been finalized. The estimate is based on Basel II guidelines as written for expected 2008 US implementation.

\*\* Typical Risk Weighted Asset (RWA) efficiencies from improvements to underlying data range from 1-6% depending on the organization. Based on an assumption of 2%, RWA efficiencies across the largest international banks could total £130b (\$227b) equating to approximately £17b (\$27b) in Tier 1 capital based on the weighted average of 2011 Tier 1 Capital Ratios for the largest international US/EU based organizations within the Top 25 (by total assets) financial services organizations. Source: Deloitte, Mint Global

## Concluding Commentary

The FSB on August 22, 2012 published a request for demonstrations of approaches to accommodate the LEI system. That activity took place on Oct. 15, 2102. In its request it specifically identified an important subset of the High Level Principles of its recommendations for the LEI system.<sup>66</sup> They are quoted below, all of which we believe we have fastidiously adhered to in our recommended approach and our interest in implementing it.

- “Flexibility must be built into the global LEI system to provide the capability for the system to expand, evolve, and adapt to accommodate innovations in financial markets.”
- “The LEI system should not be “locked-in” with a particular service provider for any key system functions or processes. The principles of competition should be ensured on both global and local levels where appropriate.”
- “The global LEI system should support a high degree of federation and local implementation under agreed and implemented common standards.”
- “The LEI system should meet evolving requirements of both the regulatory community and industry participants in terms of information content, scope of coverage, timeliness and availability.”
- “The LEI system should promote the provision of accurate LEI reference data at the local level from LEI registrants and ensure global uniqueness of the registrants.”

A global identification system is the pillar of future risk management systems, offering a means of risk aggregation. Given such a system, regulators will finally be able to have the transparency they require to see into financial transactions and understand risk exposures as they accumulate within and amongst counterparties. It is hoped that triggers of early warnings of the types of systemic risks encountered in the past, and recited earlier in this paper can be observed and future crisis mitigated if not prevented entirely. However, the technical requirements of such a system are dwarfed by the need for the political will of industry executives and regulators to pursue such a system of financial transparency and to overcome skepticism and past failures.

With global identifiers and minimum data sets for regulatory purposes as a starting point industry members may be next moved to support industry utilities with common reference datasets for operational

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<sup>66</sup> Financial Stability Board, Global Legal Entity Identifier (LEI) System Operational Solution Demonstration Day Invitation, Aug. 22, 2012 at [http://www.financialstabilityboard.org/publications/r\\_120822.pdf](http://www.financialstabilityboard.org/publications/r_120822.pdf)

purposes for each identifier. This can then provide the potential for fundamentally restructuring the largest financial institutions by removing the duplicative, costly and risk prone reference data infrastructures that each financial institution supports for no strategic value. This would be useful to limit systemic risk, a key objective promoted in the Wall Street Reform and Consumer Protection Act (Dodd Frank Act).<sup>67</sup>

The original requirements for the LEI were developed from a US-centric global perspective. That approach and subsequent requirements developed by private interests had taken a global view for sure, but without defining global regulators' requirements nor appreciating approaches taken in other industries. The countries and financial institutions now opining on the LEI issue are voicing interest in maintaining confidentiality and reflecting on the role their own business registries play in accommodating local business entity identification. These new inputs are now being considered.

Now that the Financial Stability Board is focused on the LEI, their member financial ministers and central bankers will surely have their own views on next steps as they form the governance mechanism for the enterprise, the Regulatory Oversight Council (ROC). Through the ROC, and in further partnership with financial market participants, regulatory requirements need to be further defined and already identified issues resolved. The list of issues and requirements include entity-specific standards construction and its relation to local assignment and control, confidentiality, hierarchical identification, local and global governance, operational and technical considerations, and security and fraud issues. Most probably the finalization of these requirements can be accomplished quickly, in time perhaps for the final approval at the next G20 Summit in March, 2013.

However designating an approach and selecting solutions providers will require both the formalization of a Request for Proposal as is the case with any significant systems projects, especially one as grand in its vision and scope as the LEI initiative. Nonetheless, what is exciting about the LEI initiative is that the components are all available and relatively easy to organize, perhaps as we have suggested in a joint undertaking. Precedents already exist for success with minimal risk. The path from the LEI initiative to observing the contagion of systemic risk is clear to us. However, that very first step has to be the right one.

Without implementing the building blocks of unique, unalterable and global LEIs, regulators and financial institutions will not be able to aggregate and observe risk exposures accumulating across our interconnected financial system. The G20 appears to have risen to the occasion so that all proclamations to come on how to risk adjust the financial system will be built atop a solid foundation. The authors hope that this paper and the proposals contained herein have contributed to the furtherance of that goal.

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<sup>67</sup> Wall Street Reform and Consumer Protection Act, Sec. 123 (H) at <http://www.gpo.gov/fdsys/pkg/PLAW-111publ203/pdf/PLAW-111publ203.pdf>

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