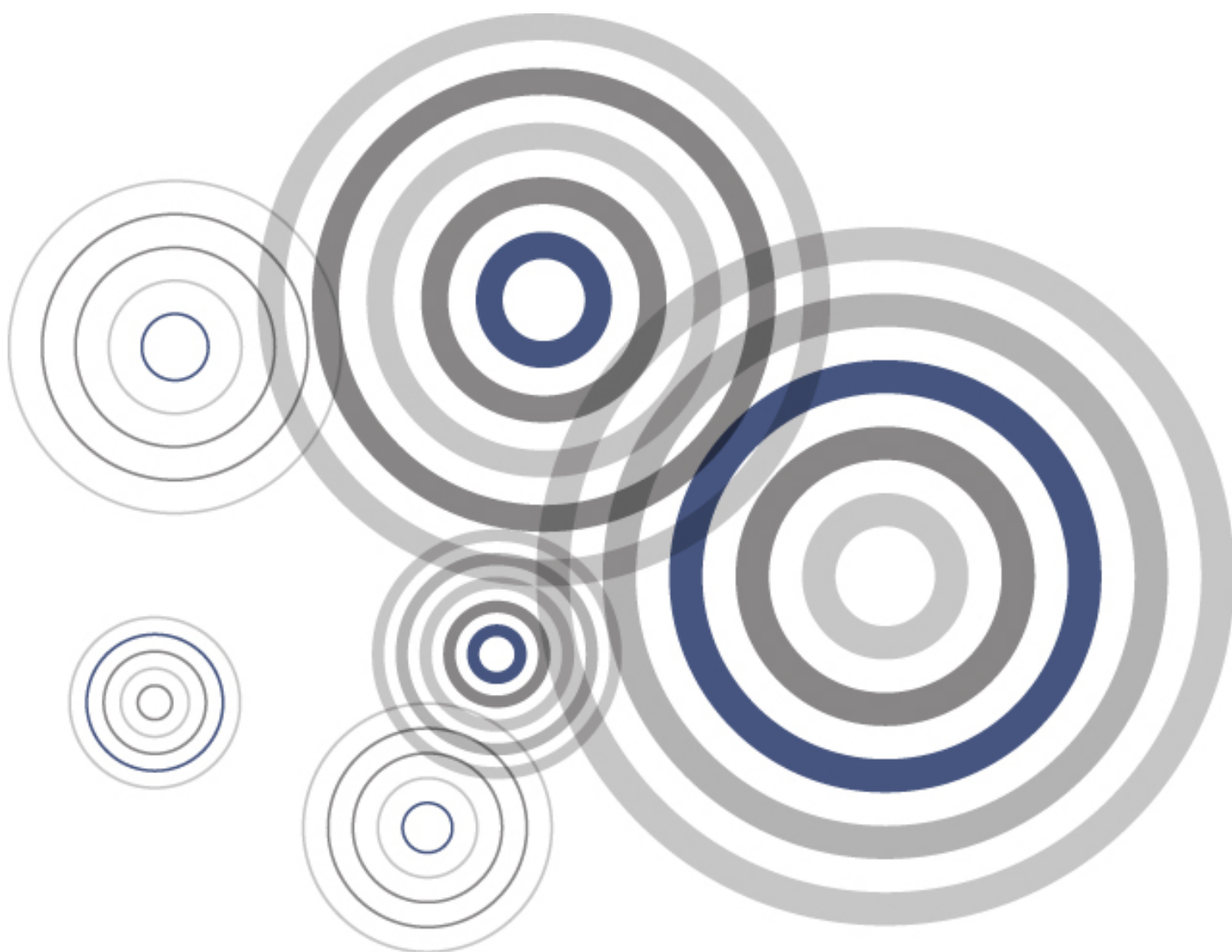


# GLEIF Global LEI Data Quality Report Dictionary



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## Data Quality Report Glossary

Term	Definition
Check	A Check is the execution of a data rule.
File Checks	'File Checks', also referred to in this document as 'Source Checks', are checks that affect the source file issued by an LEI Issuer.
GLEIS	A Global LEI System (a framework) for the issuance of unambiguous LEI records.
LEI	The Legal Entity Identifier (LEI) is a unique 20-character alphanumeric code based on the ISO 17442 standard developed by the International Organization for Standardization.
LEI Issuer	LEI Issuers are accredited (or in process of accreditation) institutions that issue LEIs. They are also known as Local Operating Units.
Record Checks	Quality Checks that apply per LEI record inside a particular file issued by a LEI Issuer.
Source Files	The XML data file provided by an LEI Issuer, containing LEIs and their reference data according to the Common Data File format.
Tachometer	For the purposes of this report, a visual representation of the LEI Total Data Quality Score, on a scale of 0 - 100 (in percentages) that resembles a traditional RPM gauge.

## 1. Chapter 1: Preface

This is a general description of how the Data Quality Reports are generated from the source files provided by the LEI Issuers. It is not seen as a complementary monthly document, as it is only concerned with the general calculations, and not the specific content of each Data Quality Report. This document structure is 'deductive' in its reasoning, working from the general structure of the formulas used in the Data Quality Report to particular examples and specifics. Each chapter, where needed or noted, will have a particular paragraph distinguished in bold of where to find the particular element or elements in the Data Quality Report. It is important to notice that the screenshots used in this document serve as companions to the examples provided, and might not be found with the values shown here in the Data Quality Report.

### 1.1. Purpose of the Data Quality Report

The Data Quality Report summarizes the results of GLEIF’s assessment of the level of data quality in the Global LEI System based on a set of clearly defined data quality criteria to achieve GLEIS’s quality objectives of LEIs and Legal Entity Reference Data (LE-RD) that are:

- Open.
- Reliable.
- Trusted.

Openness assures global access without barriers to anybody who decides to analyze the data and the information that it hosts.

A system that is up-to-date, where internationally recognized standards of quality are applied, and the information is renewed constantly and scored accordingly, ensures that the data is reliable.

The rule setting of data quality, constant monitoring and reporting as well as continuous improvement of the data quality itself is the basis for trusted data.

### 1.2. GLEIS’s Data Quality Criteria

To clarify the concept of data quality with regard to the LEI population, GLEIF has defined, in close dialog with the LEI Regulatory Oversight Committee and the LEI issuing organizations, a set of measurable quality criteria using standards developed by the International Organization for Standardization (ISO). Instituting a set of defined quality criteria establishes a transparent and objective benchmark to assess the level of data quality within the Global LEI System.

The Global LEI Data Quality Report contains the list of data quality criteria already implemented. The full defined 12 data quality criteria will be implemented over time.

Accuracy	The extent to which the data are free of identifiable errors; the degree of conformity of a data element or a data set to an authoritative source that is deemed to be correct; and the degree to which the data correctly represents the truth about real-world objects.
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Accessibility	Data items that are easily obtainable and legal to access with strong protections and controls built into the process.
Completeness	The degree to which all required occurrences of data are populated.
Comprehensiveness	All required data items are included - ensures that the entire scope of the data is collected with intentional limitations documented.
Consistency	The degree to which a unique piece of data holds the same value across multiple data sets.
Currency	The extent to which data are up-to-date; a datum value being up-to-date if it is current at a specific point in time, and outdated if it was previously current but then incorrect at a later time.
Integrity	The degree of conformity to defined data relationship rules (e.g., primary/foreign key referential integrity).
Provenance	History or pedigree of a property value.
Representation	The characteristic of data quality that addresses the format, pattern, legibility, and usefulness of data for its intended use.
Timeliness	The degree to which data is available when it is required.
Uniqueness	The extent to which all distinct values of data elements appear only once.
Validity	The measure of how a data value conforms to its domain value set (i.e., a set of allowable values or range of values).

### 1.3. GLEIS's Rule Setting

To measure the data quality criteria, Checks have been defined based on the Common Data File format. These LEI Checks are measured at different LEI data hierarchy levels:

Meta Checks are not measured in the data file itself. These checks focus on timeliness, currency and accessibility of the data. The harder it is for the general public to access the information, the lower the accessibility. The more up-to-date the files that contain the relevant information are, the more current it is. And the easier it is to access the information in a timely manner, regardless of timeframe, if it is available, the more 'timeliness' it has.

Format Checks are implemented on the file level, i.e. whether the files are compliant with the XML standard and Common Data File format. If a file is non-compliant to the standard, the information cannot be aggregated and therefore the data quality cannot be assessed.

Record Level Checks apply to mandatory and optional elements, format per element and plausibility checks like value ranges. These checks comprise the majority of the checks per file by the LEI Issuer.

Additionally, there are several Checks on relationships between elements of one record (Relation Checks between fields of one LEI record) but also between multiple records (Relation Checks between data in the upload file and data in the LEI repository). A prominent example of the latter is the check for duplicates. These checks ensure internal consistency in the ecosystem: they serve as a second level threshold of trust, firstly when the information gathered by the LEI Issuer is truthful and valid, and secondly, when the information is unique, and the relevant relationships from these records can verifiably be based on actual parameters.

The list of implemented data quality checks can be downloaded from GLEIF's website: LEI Data -> Data Quality -> Supporting Documents -> Data Quality Rule Setting.

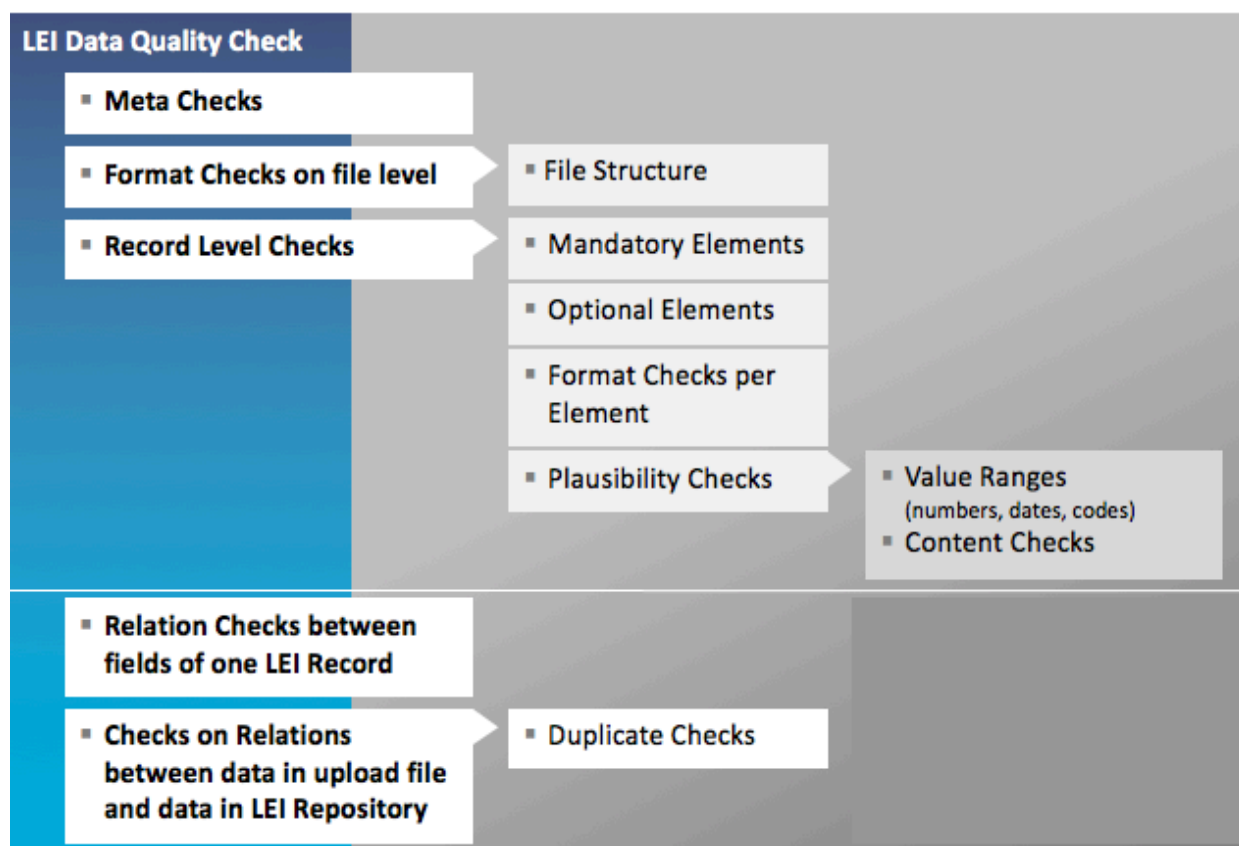


Figure 1 GLEIS's data quality rule setting.

## 1.4. GLEIS's Maturity Levels

Maturity levels define the evolution of improvements in processes associated with what is measured. Therefore, they are scored differently from data quality criteria: while the scoring rules apply in a similar way, higher maturity levels can only be scored if the previous maturity level is fully achieved.

The following maturity levels apply:

Level 1 – 'Required Quality' (must be 100 percent for all data records).

Level 2 – 'Expected Quality' (should be 100 percent).

Level 3 – 'Excellent Quality' (the higher the better).

## 2. Chapter 2: Data Quality Score

This chapter describes the Checks and their relationship with the scores they generate. First the 12 data quality criteria are introduced for which individual quality scores are calculated. The total data quality score is the average of these individual scores.

All files are based on the Common Data File format.

GLEIF obtains one of these files daily per LEI Issuer, and each file comprises one or more LEI records, each containing data fields relevant to the Legal Entity (i.e. Legal Name, Address, Country etc.). The omission, inclusion or intra- and inter-relationship of these fields is evaluated by Checks that yield either 'success'/'not applicable' (1) or 'failure' (0). These results are used to create the monthly data quality reports.

### 2.1. General Descriptors

The 12 defined data quality criteria are the measure points for the overall data quality:

Accuracy, Accessibility, Completeness, Comprehensiveness, Consistency, Currency, Integrity, Provenance, Representation, Timeliness, Uniqueness, Validity.

### 2.2. Conceptual Calculation

The score ( $Q_s$ ) for every data quality criterion is calculated as follows. Each Check only considers one data quality criterion, regardless of the possible overlap they might have, therefore each check can have only a maximum value of 1 and a minimum value of 0. The general formula for scoring the data quality criteria is the following. Note that this formula is applied either to each 'record' when concerned with the contents of a particular LEI record, or once per an LEI Issuer's source file, for all of the other checks.

$$Q_s = \frac{\sum_{i=1}^I q_i}{I}$$

Equation 1

Where:

- $Q_s$  is the quality score for the respective quality criterion.
- $q_i$  is the  $i^{th}$  check result for the respective quality criterion with:
 
$$q_i = \begin{cases} 1 & \text{if check is "success" or "not applicable"} \\ 0 & \text{if check is "failed"} \end{cases}$$
- $I$  is the number of total data quality checks performed for the respective quality criterion.

Quality criteria scores ( $Q_s$ ) are the percentages of "successful" and "not applicable" data quality checks for the respective quality criterion.

An added layer of complexity arises when considering that any particular source file might contain more than one LEI record. For this purpose the difference between a 'Record Check' and a 'File Check' is explained: A 'Record Check' is any particular Check that is applied to individual LEI records. To illustrate we assume 10 Record Checks and an LEI Issuer supplying a file with 100 LEI records. This would result in a total of 1,000 checks being performed:

$$(I = 10 \text{ records} * 100 \text{ LEI Records}).$$

Quality checks that apply only to the source file of the LEI Issuer are named 'File Checks'.

### Example 1:

In a scenario where only one LEI Issuer exists, which publishes only one LEI record ('record 1' in the table below), this source file is run through 10 'Validity' Checks. One Check applies to the source file (a 'File Check') and nine checks apply to the LEI record ('Record Check'). This LEI Issuer failed its 'File Check' and the last 'Record Check' (i.e.  $q_i = 0$ ) and had a 'not applicable' in its 3<sup>rd</sup> and 7<sup>th</sup> 'record check'. All other Checks were successful. Note that both non-applicable and successful checks are regarded as positive Checks (i.e.  $q_i = 1$ ). Therefore:

	LEI Issuer
'File Check' for Validity	$q_1 = 0$
1 <sup>st</sup> "Record Check" for Validity for LEI record 1	$q_2 = 1$
2 <sup>nd</sup> "Record Check" for Validity for LEI record 1	$q_3 = 1$
3 <sup>rd</sup> "Record Check" for Validity for LEI record 1	$q_4 = 1$
4 <sup>th</sup> "Record Check" for Validity for LEI record 1	$q_5 = 1$
5 <sup>th</sup> "Record Check" for Validity for LEI record 1	$q_6 = 1$
6 <sup>th</sup> "Record Check" for Validity for LEI record 1	$q_7 = 1$
7 <sup>th</sup> "Record Check" for Validity for LEI record 1	$q_8 = 1$
8 <sup>th</sup> "Record Check" for Validity for LEI record 1	$q_9 = 1$
9 <sup>th</sup> "Record Check" for Validity for LEI record 1	$q_{10} = 0$
Total performed Checks	$I = 10$

Table 1 Quality Checks for the first example.

In this scenario, the total number of Checks performed for 'Validity' would be 10 ( $I = 10$ ). In the following equation, the Checks for this LEI Issuer are listed as follows: the 'File Check' would be bolded, the rest of the Checks ('Record Checks' in all cases), would be in normal script. This example shows that - as noted earlier - when a Check is considered not applicable, it is counted as a success (to avoid penalizing the score).

According to Equation 1, the quality score for 'Validity' would be the following:



$$Q_s = \frac{\sum_{i=1}^{10} q_i}{10} = \frac{0 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 0}{10} = 0.8$$

Equation 2

### In the Data Quality Report

In the example referred in the previous formula, this means that in the Data Quality Report, the overall 'Validity' for that month would be 80%:

Data Quality Criteria	Dec	Nov	Oct	31-Dec-15
Accuracy	100.00 %	100.00 %	100.00 %	99.99 %
Completeness	91.37 %	91.35 %	91.33 %	85.23 %
Comprehensiveness	100.00 %	100.00 %	100.00 %	100.00 %
Integrity	99.90 %	99.90 %	99.90 %	99.71 %
Representation	99.99 %	99.99 %	99.99 %	99.97 %
Uniqueness	100.00 %	100.00 %	100.00 %	100.00 %
Validity	80.00 %	98.11 %	98.12 %	95.39 %

Figure 2 The Data Quality Criteria per month, and how it is to be found in the report.

In general, quality scores will be presented as percentages. So for example 0.8 will be represented as 80%. A full example of the calculation of the remaining quality criteria will be provided in section 2.4.

The quality scores in the previous formula can apply to a multitude of records with a simple extension. The following section will delve into that.

## 2.3. Multiple LEI Records

The quality score and total score can be calculated for one or many LEI records. With more than one record, this means that Checks which concern the LEI records need to take place multiple times (as many times as there are records). They are viewed as 'Record Checks', while the Checks that concern the quality of the file issued by the LEI Issuer are 'Source Checks' or 'File Checks', and are required to run only once per source file (as each LEI Issuer publishes one file that contains all of their relevant LEI records). In this case, the formula is an expansion of Equation 1, this one is more focused on the denominator, to account for the differences in 'File Checks' and 'Source Checks' when calculating  $I$ , the total number of Checks performed:

$$Q_s = \frac{\sum_{i=1}^I q_i}{(N_{LEI} * Record_{checks,qc}) + (N_{files} * File_{checks,qc})}$$

$$Q_s = \frac{\sum_{i=1}^I q_i}{I}$$

Equation 3

Where:

- $Q_s$  is the quality score for the respective quality criterion.
- $q_i$  is the  $i^{th}$  check result for the respective quality criterion with:
 
$$q_i = \begin{cases} 1 & \text{if check is "success" or "not applicable"} \\ 0 & \text{if check is "failed"} \end{cases}$$
- $N_{LEI}$  is the total number of LEI records.
- $Record_{checks,qc}$  is the total number of 'Record Checks' for the respective quality criterion.
- $N_{files}$  is the total number of source files (i.e. one file per LEI Issuer).
- $File_{checks,qc}$  is the total number of 'File Checks' for the respective quality criterion.
- $I$  is the number of total data quality checks performed for the respective quality criterion.

The previous equation shows the simplification of the denominator as:

$$(N_{LEI} * Record_{checks-qc}) + (N_{files} * File_{checks-qc}) = I$$

The following section shows the calculation of the LEI Total Data Quality score.

## 2.4. LEI Total Data Quality Score

The total data quality score of the data quality criteria takes the average of the individual quality criteria scores (as previously mentioned  $Q_s$ ). This average is **not** weighted by data quality criteria, meaning that each data quality criteria contributes equally to the total data quality score. The LEI Total Data Quality score ( $TQ_s$ ) is therefore:

$$TQ_s = \frac{\sum_{s=1}^N Q_s}{N}$$

Equation 4

Where:

- $TQ_s$  is the total data quality score.
- $s$  in the summation is an index representing individual quality criteria.
- $Q_s$  is the quality score for each respective quality criterion.
- $N$  is the number of quality criteria for which there are Checks implemented.

**Example 2:**

In the following example we assume 7 data quality criteria and 7,000 performed Checks (1,000 checks per criterion). The results of the checks are to be found in the following table:

Criteria	Success	Failure	Not Applicable	Total Checks Performed
Accuracy	1,000	0	0	1,000
Completeness	1,000	0	0	1,000
Comprehensiveness	1,000	0	0	1,000
Integrity	0	0	1,000	1,000
Representation	894	106	0	1,000
Uniqueness	0	0	1,000	1,000
Validity	0	0	1,000	1,000
Total	3,894	106	3,000	7,000

*Table 2 Quality Criteria Checks for the second example.*

In this example each quality score, according to Equation 1, is then the following (expressed in percentages):

Criteria	Scores (in percentages)
Accuracy	100.00%
Completeness	100.00%
Comprehensiveness	100.00%
Integrity	100.00%
Representation	89.40%
Uniqueness	100.00%
Validity	100.00%

*Table 3 Quality criteria and scores*

For details on calculating the individual quality criteria scores using Equation 1, please refer to Example 1 in Section 2.2.

The total data quality score for this example, according to Equation 4, would be then:

$$TQ_s = \frac{1 + 1 + 1 + 1 + .894 + 1 + 1}{7} = 0.9848$$

**In the Global LEI Data Quality Report**

In the Global LEI Data Quality Report the LEI Total Data Quality Score is shown both in the tachometer (current month, Figure 3, truncating to the first two decimal places) and the trend chart (current and previous months, Figure 4):

**LEI Total Data Quality Score**

The LEI Total Data Quality Score is calculated as the equal weighted average of the 7 'Data Quality Criteria' listed below.

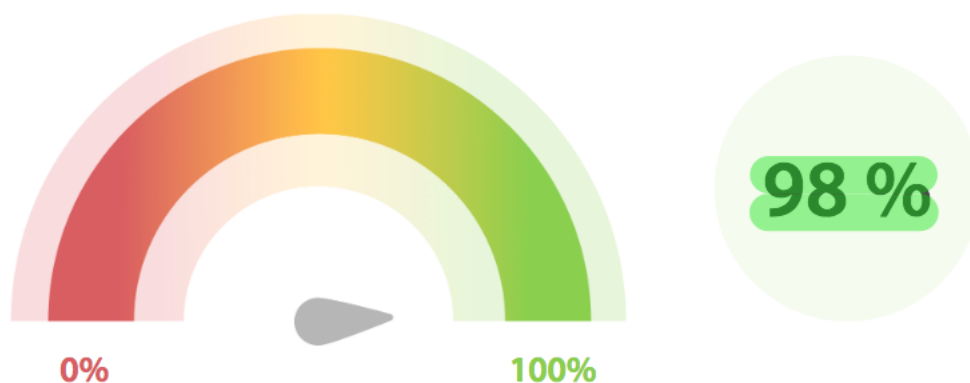


Figure 3 The LEI Total Data Quality Score displayed as a tachometer (for the month referred in the report).

**LEI Total Data Quality Score Trend**

Progress achieved with regard to the continuous optimization of the data quality based on the LEI Total Data Quality Score.

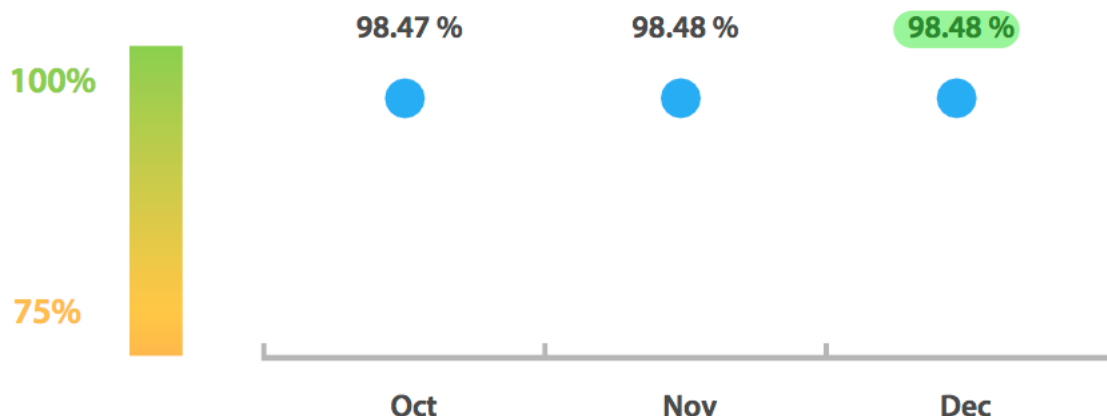


Figure 4 The LEI Total Data Quality Score Trend, where the most current value is also present in the tachometer.

### 3. Chapter 3: Quality Maturity Levels

Maturity levels define the evolution of improvements in processes associated with what is measured. Therefore, the total maturity level score is aggregated differently from the total data quality score: while the scoring rules for the individual maturity levels apply in the same fashion, the scores for higher maturity levels will only contribute to the total score if the previous maturity level is fully reached (i.e. 100% score).

The total maturity level score is reported as a two decimal number between 0 and 3. For this, the individual maturity level scores are aggregated, subject to the above rule that a maturity level is only considered if the previous maturity level was fully reached.

As an example, assuming the maturity level scores:

- Maturity level 1: 99%.
- Maturity level 2: 100%.
- Maturity level 3: 100%.

The aggregated score would be 0.99. Note that maturity level 3 and 2 do not affect the aggregated score, as maturity level 1 is not fully reached. The same example is illustrated in more detail in Example 3.

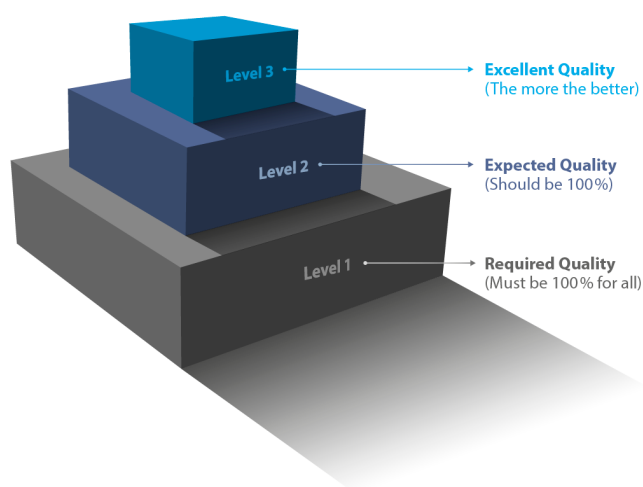


Figure 5 Pyramidal model of Maturity.

#### General Descriptors

There are 3 maturity levels:

- 1 - Required: This level reflects repeatable success and is achieved when the following data quality checks are attained:
  - daily XML compliant files exist.
  - all format checks on file level succeed.
  - all record level checks regarding mandatory elements and format checks per element

- succeed.
  - all relation checks between fields of one LEI record succeed.
- 2 - Expected: This level shows the managed success and is reached when the following data quality checks are passed:
  - all record level checks regarding optional elements and plausibility checks succeed.
  - all checks on relations between data in upload file and data in LEI repository succeed.
- 3 - Excellent: The third level is that of optimized success.

The maturity level scores are also calculated based on the source files received by GLEIF. The maturity levels are mutually exclusive and non-overlapping. This means that a particular Check can only count for one maturity level.

The general formula for maturity levels is conceptually identical to the one for the quality criteria scores (see Equation 1). The only difference is, that the “grouping” is now based on the maturity levels as opposed to the data quality criteria, as emphasized by the variable names:

$$ML_S = \frac{\sum_{i=1}^I ml_i}{I}$$

Equation 5

Where:

- $ML_S$  is the maturity level score for the particular maturity level.
- $ml_i$  is the  $i^{th}$  check result for the particular maturity level with:
 
$$ml_i = \begin{cases} 1 & \text{if check is "success" or "not applicable"} \\ 0 & \text{if check is "failed"} \end{cases}$$
- $I$  is the number of total checks performed for the respective maturity level.

The numerator in the above formula is essentially the number of successful and non-applicable Checks for the respective maturity level.

### In the Global LEI Data Quality Report

Like the total LEI data quality score, the quality maturity level pyramid shows the overall maturity of the Global LEI System. The pyramid shows the current maturity level achieved. The total number in the section 'LEI issuers achieving maturity level' shows how many LEI Issuers fulfilled that particular maturity level (i.e. reached 100% in this and the previous levels). The percentage number shows the percentage of all LEI Issuers that achieved the maturity level.

## Quality Maturity Level

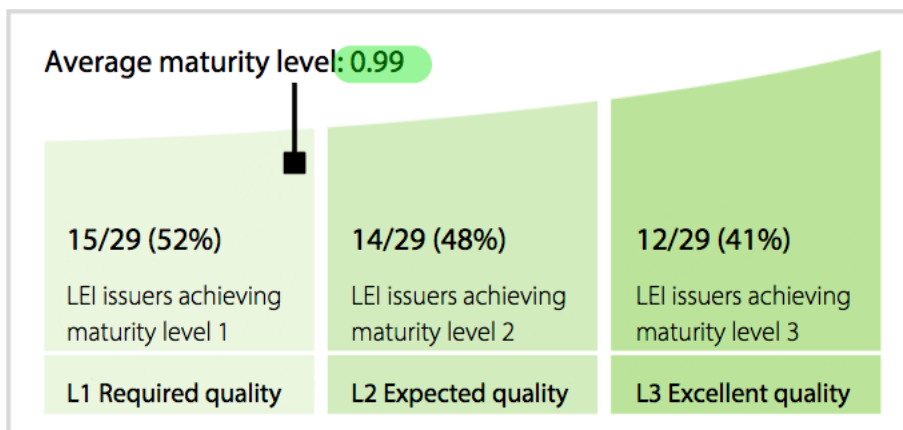


Figure 6 The aggregated Quality Maturity Level score and counts of LEI Issuers achieving the individual maturity levels

### Example 3:

This section elaborates on the example in section 3 assuming 300 performed Checks. The following table shows the three maturity levels and the hypothetical number of checks associated with the respective maturity level.

Maturity Level	Total Checks Performed
1	100
2	100
3	100
Total	300

Table 4 Example of maturity levels and number of associated checks

The following check results are assumed:

Maturity Level	Success	Failure	Not Applicable	Total Checks Performed
1	99	1	0	100
2	100	0	0	100
3	0	0	100	100
Total	199	1	100	300

Table 5 Extended maturity level scores

The scores for the maturity levels are calculated with Equation 5. In this example, the maturity level score for the 1<sup>st</sup> level is 99%, as 99 Checks are 'successful' and one is a failure, for the 2<sup>nd</sup> maturity level a 100% score is achieved. The score for the 3<sup>rd</sup> maturity level (although all checks are 'Non-applicable' and therefore successful, as the score is calculated as 1 – failed checks) is also 100%. These last two scores are not considered (as stated in section 3). The aggregated total maturity level score is thus 0.99.

## 4. Chapter 4: Filtered quality scores

The previous two chapters described the general concept of the quality scoring and quality maturity levels. This chapter is about the implementation of quality criteria scores on a per LEI Issuer and per country basis.

### 4.1. Top 5 best performing LEI Issuers

The section in the Global LEI Data Quality Report titled 'Top 5 Best Performing LEI Issuers' ranks the LEI Issuers by their total quality score achieved with their latest source file as of the the reporting period. For an LEI Issuer to be listed, they must manage at least 100 LEI records with a registration status of either 'ISSUED', 'PENDING\_TRANSFER' or 'LAPSED'.

The total data quality score for each LEI Issuer ( $TQ_{Issuer}$ ) is calculated as the total score in Section 2.2 using Equation 4, which is the average of the individual quality criteria scores  $Q_{s,Issuer}$  (see Equation 1) for a given LEI Issuer. For illustration, both equations are provided below with changed variable names to emphasize the focus on individual LEI Issuers:

$$TQ_{Issuer} = \frac{\sum_{s=1}^N Q_{s,Issuer}}{N}$$

Equation 6

Where:

- $TQ_{Issuer}$  is the total data quality score for a given LEI Issuer.
- $Q_{s,Issuer}$  are the individual quality criteria scores for a given LEI Issuer.
- $N$  is the number of quality criteria for which there are Checks implemented.

$$Q_{s,Issuer} = \frac{\sum_{i=1}^I q_{i,Issuer}}{I}$$

Equation 7

Where:

- $q_{i,Issuer}$  is the  $i^{th}$  check result associated with the given LEI Issuer for the respective quality criterion with:

$$q_{i,Issuer} = \begin{cases} 1 & \text{if check is "success" or "not applicable"} \\ 0 & \text{if check is "failed"} \end{cases}$$

- $I$  is the number of total data quality checks performed for the respective quality criterion and the given LEI Issuer.



Calculating an LEI Issuer’s quality score is essentially the same as calculating the total data quality score but on a subset of the LEI data (i.e. the individual LEI Issuer’s source file).

Two things should be noted: First, even when any particular check has two factors associated with it (quality criterion and a maturity level), for this filtering per LEI Issuer, only the data quality criteria are considered and second only the total data quality score for an LEI Issuer is reported in the Global LEI Data Quality Report, instead of also providing all individual data quality criteria scores.

### In the Global LEI Data Quality Report

The quality report shows the top five performing LEI Issuers managing at least 100 LEI records with a registration status of either ‘ISSUED’, ‘PENDING\_TRANSFER’ or ‘LAPSED’. The LEI Issuers will be ranked by score first and the number of managed LEI records second. The trend arrow (explained in Figure 8) indicates the LEI Issuer’s change in quality compared to the previous month.

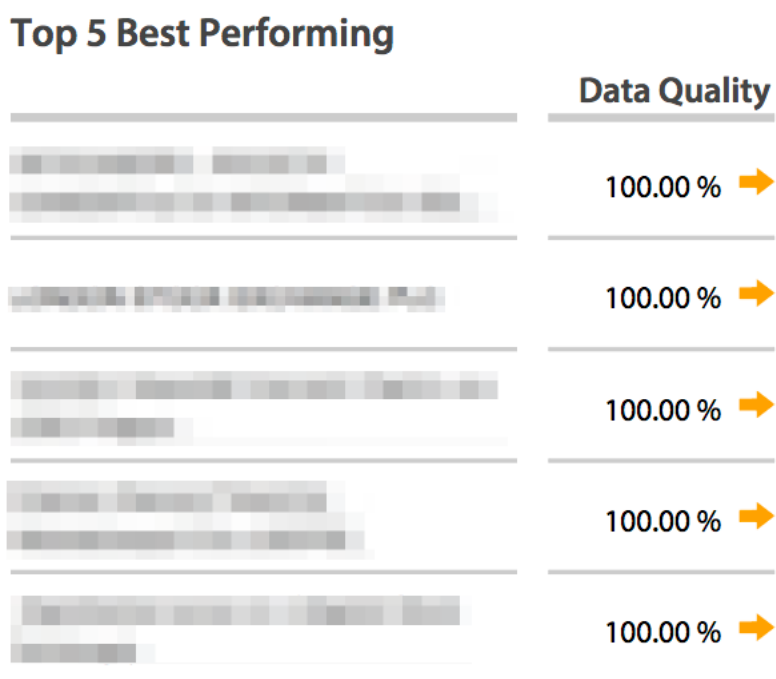


Figure 7 The Top 5 performing LEI Issuers.

when >	1%	↑	1.1%
when >	0%	↗	0.1%
when >=	0%	→	0.0%
when >=	-1%	↘	-0.1%
when <	-1%	↓	-1.1%

Figure 8 Explanation of trend arrow assignment.

## 4.2. Top 5 Countries

The quality scores per country follow the same logic of all the previous examples. However, the countries do not send files themselves to base the grouping of check results on. Instead the grouping is based on the Entity.LegalAddress.Country field of the individual LEI records. For a country to be listed in the Global LEI Data Quality Report, there must exist at least 30 LEI records associated to that country.

The actual formula for the calculation of the quality scores for individual countries is the same as for the total data quality score. Results from File Checks are not taken into account, as they are only concerned with the actual file that was published by an individual LEI Issuer. The formula below is based on Equation 1 (individual quality criteria scores) and Equation 4 (total data quality score), again with changed variable names for emphasis on the grouping. Also it is implied that  $I$  (the number of total Checks performed) only considers Record Checks:

$$TQ_{Country} = \frac{\sum_{s=1}^N Q_{s,Country}}{N}$$

Equation 8

Where:

- $TQ_{Country}$  is the total data quality score for a given country.
- $Q_{s,Country}$  are the individual quality criteria scores for a given country.
- $N$  is the number of quality criteria for which there are Checks implemented.

$$Q_{s,Country} = \frac{\sum_{i=1}^I q_{i,Country}}{I}$$

Equation 9

Where:

- $q_{i,Country}$  is the  $i^{th}$  check result associated with the given country for the respective quality criterion with:

$$q_{i,Country} = \begin{cases} 1 & \text{if check is "success" or "not applicable"} \\ 0 & \text{if check is "failed"} \end{cases}$$

- $I$  is the number of total data quality Record Checks performed for the respective quality criterion.

As the country is an inherent part of every LEI record and does not come from a separate source file the geographical location of the LEI Issuer is of no interest for the report. For that reason, File Checks are not considered in the calculation of the country scores.

### In the Global LEI Data Quality Report

The following map shows those five countries (having at least 30 LEI records associated with them) that had the best data quality in the reporting period, ranked from left to right by score:

## Top 5 Countries – Data Quality Score

Poland, Czech Republic, Slovakia, Russia, Germany



*Figure 9 The 5 countries in January 2016 whose Legal Entities provided the overall data with the highest quality.*