



# Byelaws of the Linked Data Benchmark Council (LDBC)

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## **Article 1 — Relationship of Byelaws to the Articles of Association**

These Byelaws are supplementary to the Articles of Association (the “Articles”) of the Linked Data Benchmark Council (the “Company”), and were adopted by the Directors of the Company at its meeting of [28 July 2020].

Terms whose interpretation is defined in Article 2 of the Articles are used in this document with the same meaning.

Nothing in these Byelaws may be interpreted as affecting or repealing any provision of the Articles.

## **Article 2 — ADDRESSES**

### **2.1 Official Web Addresses**

- (a) The Company shall maintain an internet website on the address:

<http://www.ldbcouncil.org>

- (b) Its official list of organisation members is reflected at:

<http://www.ldbcouncil.org/industry/members>

- (c) Its official list of membership dues is at:

<http://www.ldbcouncil.org/industry/organization>

- (d) The digital archive of the Board of Directors, including its meeting minutes, is kept on:

<http://wiki.ldbcouncil.org/display/LBD>

- (e) The list of Task Forces, including their member lists and meeting minutes, is kept on:

<http://wiki.ldbcouncil.org/display/LOTF>

(f) The official open-source repository for LDBC software components is on:

<https://www.github.com/ldbc>

## 2.2 Postal Address

The LDBC's postal address is its registered office address:

45 Church St  
Canary Wharf London Email: [pgoldwin@pkf-littlejohn.com](mailto:pgoldwin@pkf-littlejohn.com) Birmingham  
B3 2RT  
United Kingdom

## 2.3 Mailing List

The Company maintains an email distribution list

[bod@lists.ldbcouncil.org](mailto:bod@lists.ldbcouncil.org)

which reaches all Directors of the Company, and a second

[admin@lists.ldbcouncil.org](mailto:admin@lists.ldbcouncil.org)

which reaches the members of the Steering Committee.

# Article 3 — MEMBERSHIP

## 3.1 Membership Classes

The class of membership for non-profit organisations established in Article 8.1 of the Articles shall be reserved for any corporation or association whose purpose is other than the making of profit, and which is not an Affiliate of a commercial organization, nor under the control of, nor in control of, nor under common control with a commercial organization.

## 3.2 Admission to Membership

Membership applications, other than those for Associate Membership, should be sent to the Board of Directors, using the email address given in Article 1 of this document. A decision on the application will be made at the latest by the next meeting of the Board of Directors, or by a written or electronic resolution of the Directors in accordance with Article 21.4 of the Articles.

Applications for Associate Membership should be sent to the Steering Committee, using the email address given in Article 1.3 of this document. The power to admit individuals as Associate Members is delegated to the Steering Committee in accordance with Article 22 “Delegation” of the Articles.

Decisions to approve applications for Associate Membership must be made unanimously by the members of the Steering Committee. They must be reported promptly to the Board of Directors. The Steering Committee must refer any application which they cannot agree upon for determination by the Board of Directors.

### 3.3 Membership Registration

The Company will keep a public, freely accessible, list of organization members on its official website as defined in Article 1.1 (b), that must be updated at most 10 business days after a membership change occurs.

A record of the Company’s officers and Directors is available for public consultation at

<https://beta.companieshouse.gov.uk/company/o8716467/officers>

### 3.4 Sponsor Members

Members can be denominated Sponsor members if they pay higher membership dues, as set by the Board of Directors.

## Article 4 — DIRECTORS AND VOTING

### 4.1 Board of Directors

Any change, addition or deletion to the register of names and contact details of the Directors must be notified to all Directors by email and recorded in the archive of the Board of Directors referred to in Article 1.1 (d) within ten business days of the alteration.

### 4.2 Chair and Vice Chair of the Board

Any change in the names and contact details of the Chair and Vice Chair must be notified to all Directors by email and recorded in the archive of the Board of Directors referred to in Article 1.1 (d), within ten business days of the alteration.

### 4.3 Steering Committee

The Steering Committee consists of at least one Director in addition to the Chair and Vice Chair, who are members ex officio. Steering committee members other than the Chair and Vice Chair are appointed at the first Board Meeting of the year, and they can be replaced by a decision of the Board of Directors at any time.

The Steering Committee is responsible for the day-to-day management of the Company and should appoint from within its membership one person responsible for each of the following areas:

- (a) Financial Management: dues collection, payment of taxes, payment of expenses.
- (b) Secretarial Management: board meeting minutes, membership and task force list administration.
- (c) Communications Management: press releases, website, social media channels.

Any change in the names and contact details of the members of the Steering Committee or of the management roles given above must be notified to all Directors by email and recorded in the archive of the Board of Directors referred to in Article 1.1 (d), within ten business days of the alteration.

### 4.4 Board Meetings

- (a) The chair of a Board Meeting will appoint one of the Directors present to act as meeting secretary.
- (b) Decisions of the Directors, in meetings or by written or electronic resolution, shall be entered within one day of being made into the Minute Book of the Company and notified by email to the Directors. The contents of the Minute Book shall at all times be reflected in the archive of the Board of Directors referred to in Article 1.1(d).

### 4.5 Arbitration

In the event of a dispute among the members with respect to any provision of these Byelaws, or the application of these Byelaws to the business conducted by the Company, such dispute shall be settled shall be determined by the appointment of a single arbitrator to be agreed between the parties, or failing agreement within fourteen days, after either party has given to the other a written request to concur in the appointment of an arbitrator, by an arbitrator to be appointed by the President or a Deputy President of the Chartered Institute of Arbitrators. The arbitrator will apply English law to this arbitration and this arbitration will take place in London, or such

other place as the parties may agree. Written notice of any arbitration hearing will be given to all members at least 10 business days prior to commencement of arbitration.

## Article 5 — Task Forces and Working Groups

### 5.1 Task Force Scope

- (a) The Company undertakes to define high-quality benchmarks relevant to specific application scenarios. A Task Force coordinates technical development activities in a well-defined direction, typically having to do with
- (b) the development of a benchmark inclusive auditing rules, as well as to
- (c) training and qualification of auditors for a particular benchmark, as well as to perform
- (d) maintenance on an already existing benchmark, as well as to
- (e) arbitrate on disagreements over the validity of benchmark results and practices<sup>1</sup>

Further:

- (f) A Task Force may be working on multiple benchmarks at different stages of their lifecycles.
- (g) Each benchmark that has been adopted (and not retracted) by the Company shall have one Task Force responsible for it.

### 5.2 Task Force Organization

- (a) A proposal to create a Task Force, typically with a mission statement, introductory materials or proposals, shall be brought forward in a Board Meeting. The decision to start or disband a Task Force is made by the Board of Directors.
- (b) All members of a Task Force shall be individual members (that is, Directors or Associate Members) of LDBC, or employees or other agents of organization members.
- (c) All Directors have the right to appoint a person as member to a Task Force. These are called Appointed Members. Task Force members do not need to be Directors and do not need to be employees of Company member organizations or be affiliated with these.
- (d) At least annually, each Task Force elects a Task Force Leader by simple majority.
- (e) Task Forces may appoint or remove additional Task Force members beyond the Appointed Members. They may do so either by a decision of the Task Force Leader, or by a simple majority vote of the existing members, which shall supervene over a contrary decision by the Task Force Leader.

- (f) The actual member list of each Task Force (names and contact details) are kept up-to-date within ten business days after each change on a web page specified in Article 1.1 This list should include by which member (if any) they are appointed and also list the Task Force Leader.
- (g) Task Forces should meet at least once a quarter physically, or by electronic means (conference telephone call or by internet). For each of these (potentially virtual) meetings, the Task Force Leader ensures that on the web page named in Article 1.1 (e), within ten business days written meeting minutes are posted or linked that show (at least) which Task Force Members were present in the meeting as well as contain its minutes and action points.

### 5.3 Working Groups

A Working Group is created; its membership is composed; it conducts its business; and it is disbanded in the same way as a Task Force. The goals of a Working Group are not restricted to work on benchmark specifications or tools, but they must contribute to promoting the objects of the Company.

Article 6 — Benchmark Adoption, Retraction and Maintenance

### 6.1 Minimum Benchmark Adoption Requirements

A benchmark specification in the form of a single readable document shall satisfy the following criteria before it is eligible for adoption:

- (a) It defines a primary metric and a price-performance metric.
- (b) It defines a scaling rule that defines how results at different size are to be reported.
- (c) It defines a validation dataset that allows checking that an implementation produces correct results.
- (d) It defines an Executive Summary for result disclosure
- (e) It defines a Full Disclosure Report, including a set of files and run logs that must be disclosed along with a result.
- (f) It defines a set of auditing requirements that apply to a benchmark execution and can be validated by an auditor.

The software components of the benchmark (e.g. data generators, work load generators, and non-vendor specific drivers) have the following requirements:

- (g) have been reasonably tested.
- (h) their use is reasonably documented and this documentation is publicly available.
- (i) the source code is publicly available in a version control system.



- (j) the code is released an open-source license.
- (k) there is a public system for reporting and tracking software issues.

The benchmark has been successfully implemented:

- (l) the benchmark has been implemented, run, validated and audited on at least two different software systems.

## 6.2 Maintenance of Benchmarks

After a benchmark has first been adopted, the Task Force which has produced it will be initially responsible for its ongoing maintenance and for review of results and resolution of challenges relating to the benchmark.

Maintenance comprises:

- (a) Overseeing the auditing process and accepting new benchmark results, and posting these on the Company website.
- (b) Retracting outdated or challenged results from the Company website.
- (c) Defining and Changing auditing materials and guidelines.
- (d) Training and Qualifying Benchmark Auditors.
- (e) Developing extensions and changes to an existing benchmark specifications.
- (f) Developing and changing benchmark software.

## Article 7 — Benchmark Results

### 7.1 System Under Test

The totality of hardware and software used for obtaining a benchmark result is called the System Under Test (SUT). This is the set of items that is priced for obtaining a price/performance metric, with a single or otherwise reasonably uniform interface.

### 7.2 Price Metrics

The price/performance metric of LDBC benchmarks is based on the concept of Total Cost of Ownership during three years, covering both direct hardware and software as well as support on these, needed for reliable and continuous operation of the System Under Test of the benchmark workload.

In particular, the cost metric of official LDBC benchmark results must be computed using the TPC pricing specification version v2.0 as available via the Transaction Processing Council (<http://www.tpc.org/pricing/>).

### 7.3 Test Sponsor

Test Sponsor is the legal entity which submits a result. This will usually be a company but may also be an individual, especially in instances where a research organization submits a result.

### 7.4 Benchmark Result Generation

- (a) Any party may act as Test Sponsor, running an LDBC benchmark at any time of its choice.
- (b) For a result to be labeled as an LDBC result, this result must successfully pass auditing by an LDBC approved auditor. Once the auditor has approved a result, including all required supporting documentation, the Steering Committee and the Task Force responsible for the benchmark will be notified.

The Steering Committee will have the result added to the LDBC web site as follows:<sup>2</sup>

- (c) LDBC members will receive notification of the result via email to their designated contacts within five business days of LDBC receiving the notification.
- (d) Within five business days of this notice, the LDBC administrator will post the result on the LDBC web site unless the result is withdrawn by the test sponsor in the meantime.
- (e) A result may be challenged and subsequently be withdrawn by the LDBC following a review process as described in Article 6.6.
- (f) A result that is not challenged within 60 days of its publication will be automatically considered valid and may not be challenged after this time.

### 7.5 Third Party Result Generation

If the test sponsor is not the vendor or creator of one of the main parts of the SUT, an additional procedure will apply before a result is posted:

- (a) The vendor/creator of the tested software (the “Reviewing Party”) will be notified and asked to review the result.<sup>3</sup> It is up to the Task Force which is responsible for maintenance of the benchmark to decide, by simple majority in the Task Force, whether a result is a Third Party Result and which entity is the Reviewing Party.

- (b) The review by the Reviewing Party should be provided by it to the Task Force within 20 business days of the original request. This review may contain requests for changes to the configuration of the software and hardware.
- (c) The Task Force responsible for the benchmark examines this review within 10 business days and decides per simple majority in the Task Force whether it provides sufficient arguments for rejecting the benchmark result.
- (d) If the Task Force decides to accept the result, it is a right of the Reviewing Party to request that its review be added to the benchmark Full Disclosure Report as an appendix.

## 7.6 Challenging Benchmark Results

- (a) To initiate a Benchmark Result Challenge, the alleged policy violation must be submitted to the Task Force via email, copying the original Test Sponsor. The submission must include a precise description of the alleged violation.
- (b) Both parties, the original Test Sponsor and the Challenger, are encouraged to resolve the issue among themselves at this point. If the Challenger has not withdrawn the challenge after a waiting period of fifteen business days, the Task Force will put the issue on its agenda. The Test Sponsor is asked to write a rebuttal of the Benchmark Result Challenge to the Task Force, copying the Challenger.
- (c) The Task Force will review the issue, and determine by simple majority vote whether a violation has occurred and its severity. Besides technical issues, the Task Force will also take into account the degree of severity (insignificant, minor or major) in formulating its response, as well as any history or a recent pattern of violations by the same Test Sponsor. The Technical Area Committee will organize meetings until a decision is made.
- (d) The Challenge Response formulated by the Task Force is a binding decision within the LDBC for which no further appeal process exists.

The response measures outlined below are the expected outcome in most circumstances. However, the Task Force retains the right to take other response measures if necessary under extra-ordinary circumstances. In all cases the response measures will seek to be fair, reasonable, and appropriate.

- (e) For insignificant violations the Task Force will send a response to the involved parties and take no further action.
- (f) For minor violations, the Task Force will inform the Steering Committee that a minor violation has occurred. It is assumed that the Test Sponsor has already taken correction actions which are reflected in an updated result posting. If not, the Steering Committee sends the Test Sponsor a letter outlining the nature of the violation, asking for appropriate corrective actions that should lead to an updated re-audited result within fifteen business days. If the

corrective actions have not led to an updated result after that time period, the challenged result is removed by the Steering Committee from the LDBC website.

- (g) For major violations, the Task Force will inform the Steering Committee that a major violation has occurred. The Steering Committee then must remove the challenged result from the LDBC website and sends the Test Sponsor a letter outlining the nature of the violation. In addition, the Task Force may issue a fine (limited to maximally 3 years of Company Member Dues) or remove all other results from the Test Sponsor from the LDBC website. According to the seriousness of the issue, it may instruct the Steering Committee to issue a press release outlining the nature of the policy violation, and, in extreme cases, might initiate expulsion proceedings.

## Article 8 — Benchmark Auditing

### 8.1 Benchmark Auditors

An Auditor is an individual authorized by a Task Force to audit a benchmark for which that Task Force is responsible. The authorized Auditors must be listed on the Company website and when changes occur this must be reflected there within ten business days.

### 8.2 Auditor Compensation

A Test Sponsor will engage an Auditor to verify the compliance of a result before submitting said result. The compensation of the Auditor is agreed upon between the test sponsor and the auditor.

### 8.3 Auditor Qualification

An individual may apply with the Company to be approved as an auditor for one or more benchmarks maintained by it.

The Task Force will interview the auditor and based on the interview and hold an examination where the auditor answers questions relevant to the benchmark in question and general issues of system performance evaluation. Having reviewed these, the Task Force can approve the auditor by simple majority within the Task Force.

### 8.4 Auditing by the Task Force itself

As a special case, which applies for instance if there are no qualified Auditors yet for a particular benchmark, the Task Force may again by simple majority, as set forth above, decide that the Task Force collectively or a designated individual member of the Task Force will audit a result.

## 8.5 Auditor Independence

The auditor of a Benchmark Result may not be affiliated to the test sponsor and must otherwise be independent of the test sponsor. The conditions of payment between the Test Sponsor and Auditor

- (a) must be based on an hourly tariff and,
- (b) must be disclosed to the Steering Committee and
- (c) may not depend on the outcome of the benchmark audit.

## 8.6 Audit Requirements

- (a) For systems using dedicated hardware (such as physical servers, specialized machines, etc.), an audit should be possible via remote access to the SUT. The remote access must grant the auditor administrator privileges, preferably a remote console via IPMI<sup>4</sup> or equivalent. This makes it possible to simulate an instantaneous failure such as a power outage by remotely powering down a system. For systems running in a cloud-based environment, the auditor should set up the system based on the documentation, software components and other artifacts (licenses, configuration files, etc.) provided by the test sponsor. System failures such as a power outage shall be simulated using the administration console provided by the cloud environment.
- (b) The specific requirements for storage durability and other concerns are defined in the audit rules section of each benchmark.
- (c) The auditor shall perform the test execution via remote access. The auditor may communicate with the test sponsor via teleconference or other means.
- (d) A benchmark result is not a valid LDBC result unless the audit is completed and the required supporting material is made publicly available in electronic form.
- (e) An attestation letter by the auditor will be published as part of the full disclosure report. This is a signed document which specifies the date of the audit and states that the result is compliant to the best knowledge of the auditor after due review. The attestation letter can be linked to the executive summary by electronic signature to prevent later tampering.

## Article 9 — Communications

### 9.1 Confidentiality

All internal communication between LDBC members that the Board of Directors has marked confidential must be treated as LDBC confidential. LDBC confidential information must not be disclosed to any non-member without prior approval by the Steering Committee.

No Member may speak to the press or the public at large on behalf of the LDBC other than the Steering Committee and its designated representatives.

## 9.2 Fair Use

LDBC benchmark results are potentially important marketing assets. For these results to be publicly used, their use must satisfy the following criteria:

- (a) A result may not be designated as an LDBC benchmark result unless it is an official result listed on the LDBC website at the time of the communication.
- (b) A result may not be designated as an LDBC result if the result has been challenged and removed.
- (c) The LDBC name, logo, or LDBC metrics may not be used in reference to qualitative statements in reference to a product, unless this is a mention of a currently listed official result on the LDBC website.

## Article 10 — Intellectual Property Rights

### 10.1 IPR Assets

The IPR management for LDBC covers these asset types created by members of the LDBC or participants in any LDBC activities:

- (a) Software Components (for benchmark or other standards, and contributions to external standards);
- (b) Specification documents (for benchmark or other standards, and contributions to external standards);
- (c) Auditing Rules (for benchmarks);
- (d) Academic papers, articles, explanatory materials, analyses, reports and presentations, whether published by LDBC or elsewhere;
- (e) Documentation for processes and procedures;
- (f) Benchmark Results, both Executive Summaries and Full Disclosure Reports

LDBC IPR management also covers Brands, being names and/or logos related to benchmarking and standards-setting activities of the LDBC, such as its own name, its benchmarks and benchmark metrics.

## 10.2 Copyright

The copyright in the IPR Assets defined in Article 9.1 (a) to (f) are allowed to remain with their original copyright holder. The copyright in all contributions to materials as defined in Article 9.1 (a) to (f) shall be licensed to the LDBC on the basis set out in Article 9.3 below. Copyright in LDBC materials made available to third parties shall be licensed in accordance with Article 9.4 below.

## 10.3 Inbound Licenses

- (a) The LDBC requires that contributors of Code (including Members) do so on the basis of a modified Apache contributor license agreement, including Apache-style patent provisions, the terms of which shall be determined by the Board of Directors from time to time.
- (b) The LDBC requires that contributors of documentation and other non-Code content (including Members) do so on the basis of a modified Apache contributor license agreement without a patent license the terms of which shall be determined by the Board of Directors from time to time.

## 10.4 Outbound Licenses

Materials specifying Benchmarks, Benchmarking Practices, Benchmark results (together “Benchmark Materials”), adopted in accordance with Article 5.1, must be open to the public. For such Benchmark Materials, two licenses have been adopted:

- (c) For all Software Components of Benchmark Materials the Apache 2.0 License will be used, the text of which can be found at:  
<https://www.apache.org/licenses/LICENSE-2.0>

The LDBC will take adequate and specific measures to ensure that the software it releases in its public reposit(ies) as specified in Article 1 (f) properly complies with this intention while protecting the IPR rights of LDBC.

- (d) The Creative Commons Attribution-NoDerivatives 4.0 International (CC BY-ND 4.0) License (<https://creativecommons.org/licenses/by-nd/4.0/>) will be used for non-code publications which are part of Benchmark Materials..

The LDBC may license materials other than Benchmark Materials listed under Article 9.1(a) to (f) to any party on such terms as the Board of Directors sees fit provided that such terms are consistent with its mission to make such standards and materials as freely available as reasonably possible to the public.

## 10.5 Patents

Participants (including Members) in activities of LDBC are required to comply with the LDBC Patent Rules as determined by the Board of Directors from time to time. The LDBC shall not apply for patents on its own behalf, nor grant or seek to grant any patent license or sub-license to any third party (including any Member).

## 10.6 Trade marks

LDBC may establish, register and use trade mark names and logos related to its core mission, such as its own name, its benchmarks, and its benchmark metrics. It may license such trademarks on terms consistent with its objects as are determined by the Board of Directors from time to time. Nothing in these Byelaws or the Articles of Association of LDBC grants any Member a license in respect of any such trade marks.

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<sup>1</sup> The rationale for organizing arbitration of issues of interpretation and compliance under a Task Force is that the Task Force responsible for the benchmark in question is the most likely place where both competent and concerned parties may be found.

<sup>2</sup> The rationale for this procedure is that benchmark results may be important tools for marketing and may have to be timed to coincide with other activity. Hence the publication delay must be predictable and potential competitors must not be in a position to preempt a result publication. The challenge procedure may however bring to light non-compliance.

<sup>3</sup> The rationale is that a result may not be a bona fide attempt at obtaining the best performance possible, or the test may be carried out in a less than optimal manner, e.g. by erroneous configuration.

<sup>4</sup> [https://en.wikipedia.org/wiki/Intelligent\\_Platform\\_Management\\_Interface](https://en.wikipedia.org/wiki/Intelligent_Platform_Management_Interface)