

Terms of Reference (ToR) for ETSI ISG 'Permissioned Distributed Ledger' (ISG PDL)

Approved by the Director-General on **30 November 2018**, following ETSI Board consultation

Scope

The "Industry Specification Group Permissioned Distributed Ledgers" (ISG PDL) will analyze and provide the foundations for the operation of permissioned distributed ledgers, with the ultimate purpose of creating an open ecosystem of industrial solutions to be deployed by different sectors, fostering the application of these technologies, and therefore contributing to consolidate the trust and dependability on information technologies supported by global, open telecommunications networks.

Distributed ledgers constitute ones of the most disruptive applications of information technology that have appeared recently. Their ability to store any kind of data as a consensus of replicated, shared, and synchronized digital records distributed across multiple sites, without depending on any central administrator, together with their properties regarding immutability (and therefore non-repudiation) and multi-party verifiability opens a wide range of applications, and new interaction models among those entities willing to record the transactions associated to those interactions through these ledgers. While distributed ledgers are mostly known because of their use as cryptocurrencies, there are many other uses besides those, with examples such as the so-called *smart contracts*, support to digital identity attributes, object tracking, or the verification of service level agreements.

Distributed ledgers can be considered as permissioned or permissionless, regarding the requirements for a node to be approved to validate the transactions and record them on the ledger. While permissionless ledgers are the ones that have received most attention from the general public (with the paradigmatic example of Bitcoin), permissioned distributed ledgers are the ones best qualified to address most of the use cases of interest to the industry and governmental institutions. The main reasons for this are related to both technical (cost and delay of the recording of a transaction, cost of the consensus algorithm, fairness properties among participants...) and legal (support from external legal agreements, regulatory enforcement in critical sectors...). The ISG PDL will start from already available experiences in the field of permissioned distributed ledgers, seeking for the definition of open and well-known operational mechanisms to:

- Validate participant nodes.
- Scale up ledgers to accommodate more nodes at reasonable throughput.
- Decide consensus among the participant nodes.
- Publish and execute operations regarding the recorded transactions.
- Facilitate the automation of node management and operation.
- Improve security of ledgers during both their design and operation
- Communicate events relative to node operation.
- Establish trusted links among different ledgers using these mechanisms.

The ISG PDL intends to incorporate research and new development results in the field as they become available. The group will facilitate the coordination and cooperation between relevant standardization bodies and open source projects. Mechanisms and means to ensure an efficient and fruitful collaboration will be identified, evaluated and leveraged.

The ISG PDL will study and document use cases and analyze the related challenges. It will review and reuse any existing solutions wherever applicable and conduct feasibility studies. The industry initiative will also evaluate and consider deliveries from open source projects. Based on that, the ISG PDL will derive corresponding requirements and specify a permissioned distributed ledger operational reference architecture. It is proposed to complement the cooperation with other standardization bodies and open source projects with interoperability testing specifications, test platforms, acceptance tests and test results dissemination, to be considered in the specification activities. This work will be done in collaboration with the related organizations.

Planned deliverables and timeline

The ISG PDL will produce both informative documents (Group Reports) and normative documents (Group Specifications) and the work will initially focus on the following deliverables:

- Report(s) describing the challenges related to the operation of permissioned distributed ledgers.
- Specification(s) of the business use cases and related requirements.
- Specification(s) of the concepts, features and capabilities related to the operation of permissioned distributed ledgers.
- Specification(s) of the functional architecture and solutions for the operation of permissioned distributed ledgers, including interfaces/APIs/protocols and information/data models.
- Report(s) describing how application scenarios can be supported by the ISG PDL work.
- Report(s) providing gap analysis of the work done in existing standards and open source groups with relation to the agreed use cases and the recommended functional architecture.
- Report(s) providing a descriptive Proof-of-Concept (PoC) framework with minimum requirements, templates, and process description,
- Specification(s) on test methodologies used to validate interfaces and data models.

The detailed ISG work plan may be modified as the work and project priorities evolve and will be maintained and made available on the ETSI portal.

The ISG intends to re-use existing specification work wherever applicable.

Throughout the project, the ISG will provide recommendations to the existing standard groups when impacts on their specifications are foreseen.

The ISG PDL will encourage its members and other organizations to create Proof of Concepts (PoCs) and use the results from those PoCs to validate the recommendations. However, the ISG will not own the PoCs, but will seek to facilitate PoCs and test events by delivering technical (e.g. metrology, test plan) and procedural frameworks.

The PoCs will be demonstrated and advertised via the appropriate market channels and at key industry events.

Annex (informative): collaboration with other bodies

ISG PDL will set-up the appropriate communication channels to the following groups both within and outside of ETSI.

ETSI groups

- ETSI TC CYBER
- ETSI IPP 3GPP

and others as identified during the progression of the work.

External groups

- CEN/CENELEC
- Ethereum Foundation
- GSMA
- Hyperledger
- IETF
- ISO
- ITU-T
- W3C

and others as identified during the progression of the work.

