ETSI GR PDL 030 V0.0.2 (2024-04)

Permissioned Distributed Ledger; Trust in Telecom System

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**Group Report**

Reference

DGR/PDL-030\_Trust\_in\_Telecom\_System

Keywords

PDL, trust, telecom

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# Foreword

This Group Report (GR) has been produced by ETSI Industry Specification Group (ISG) Permissioned Distributed Ledger (PDL).

# Modal verbs terminology

In the present document "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](https://portal.etsi.org/Services/editHelp!/Howtostart/ETSIDraftingRules.aspx) (Verbal forms for the expression of provisions).

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# 1 Scope

This document describes scenarios and use cases in telecom system that need trustworthiness among different entities such as users, devices, networks, and applications. Technologies for providing such trustworthiness will be reviewed. Using PDL for realizing trust in telecom system will be discussed and demonstrated. This document also discusses the key issues or topics realed to how to enable PDL-enabled trust in telecom system, such as user trust, distributed trust, trust management, etc. The potential standardization recomenndations on those key issues or topics may also be investigated.

# 2 References

## 2.1 Normative references

Normative references are not applicable in the present document.

## 2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non‑specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] PDL-015.

[i.2] PDL-021.

# 3 Definition of terms, symbols and abbreviations

## 3.1 Terms

For the purposes of the present document, the following terms apply:

**Trust:** tbd

**Distributed Trust:** Trust relationship built without fully relying on a centralized party (but such a centralized party may be used to facilitate to build distributed trust relationship). Distributed trust can be established among devices, between devices and networks, or between networks

**User Trust:** Trust relationship relying on user credentials instead of fully relying on or in addition to SIM-based primary authentication in current 5G system. User trust also can be established among devices, and between devices and networks. User trust can enable user-centric trustworthiness expanding or beyond existing SIM-based authentication and trust

**User Credential Management**: tbd

**User Identifier Management**: tbd

**Trust Evaluation:** tbd

**Trust Management:** tbd

**Trust Indicator:** tbd

**Trust Index:** tbd

## 3.2 Symbols

Void.

## 3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

ETSI European Telecommunications Standards Institute

EU European Union

PDL Permissioned Distributed Ledger

# 4 Trust-Related Definitions

**TBD:** This clause defines key trust-related such as trust, trust evaluation, root of trust, mutual authentication, etc.

Trust is a measurable belief about an entity that represents: 1) an accumulated value from history; and 2) the expected value for the future. The accumulated value may be related to the quality, behavior, performance, and/or characteristic of a logical/physical entity. In the context of telecom system, the entity could refer to, but not limited to, a network node (e.g., a 3GPP base station), a user equipment (UE), a device, a network service, or a human user.

* Trust can be both objective and subjective. The objective trust often leverages the security mechanisms, such as authentication, to validate an entity’s identity. However, trust covers more than security. For example, an Entity A passing the authentication by another Entity B only means the Entity A has successfully proved its identity to the Entity B, but Entity A still may not be fully trusted since Entity B may subjectively expect Entity A has other desired characteristics or behaviors.
* Trust is an essential input for various decision making in telecom system and it is usually measured or calculated in a quantitative or a qualitative manner. For example, a Trust Index reflects a trust level of an entity (e.g. an UE in the telecom system).
  + Trust index is an overall metric, which is often calculated based on the aggregation of one or more Trust Indicators (depending on specific trust evaluation criteria).
  + Trust indicators may cover various aspects, such as security, privacy, resilience, performance, robustness, scalability, availability, accuracy, reliability, consistency, etc. In particular, for the same Entity A, Entity B and Entity C may have varied and subjective criteria regarding how Entity A’s trust should be measured. For example, Entity B may care more about Entity A’s reliability and availability while Entity C may care more about Entity A’s scalability and privacy.
  + Trust index is often measured and generated via trust evaluation. During the process, various data about an entity can be collected and those data could be used as inputs to calculate various trust indicators, which in turn are aggregated into an overall metric, i.e. the current trust index of the entity.
* Trust is also dynamic, meaning that a given trust index may be applicable for a limited time period and may change as time goes on.
* Trust is also context-dependent, which means that the trust can have a significant change if the context gets changed.
* In addition, trust is an asymmetric relationship, meaning that a fact that Entity A trusts Entity B cannot deduce another fact that Entity B trusts Entity A.

# 5 Introduction to Trust in Telecom System

## 5.1 3GPP Telecom Networks

## 5.2 Existing Trust Mechanisms in 3GPP Networks

# 6 Existing Standards and Trust Mechanisms

## 6.1 Trust Computing Group

**TBD:** Describe TPM (Trust Platform Module) 2.0, etc.

## 6.2 ITU-T

**TBD:** Describe “Trust in ICT” white paper

## 6.3 NIST

**TBD:** Describe “Zero-Trust Archtiecture (ZTA)” white paper

## 6.4 IETF

**TBD:** Describe RFC9397 on “Trusted Execution Environment Provisioning (TEEP) Architecture”, RFC9334 on “Remote ATtestation procedureS (RATS)”

## 6.5 3GPP

**TBD:** Describe TR33.894 on ZTA Study

## 6.6 ETSI

**TBD:** Describe some relevant ETSI work such as PDL & ESI: 1) PDL-015 on Reputation Management; 2) PDL-021 on Use Cases in 3GPP Network and Impact Analysis on Architecture Integration; 3) PDL-023 on DID Framework.

## 6.7 eIDAS (910-2014)

Third-party trust services

# 7 Use Cases for Trust in Telecom System

## 7.1 Introduction

## 7.2 Use Case 1 - TBD

## 7.3 Use Case X - TBD

# 8 Key Issues

## 8.1 Introduction

## 8.2 Key Issue 1 - TBD

## 8.3 Key Issue X - TBD

# 9 Potential Solutions

## 9.1 Introduction

## 9.2 Solution 1 - TBD

## 9.3 Solution X - TBD

# 10 Conclusions and Next Steps

# History

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| **Document history** | | |
| v0.0.1 | 18 Mar 2024 | Creation of document, TOC and high-level content |
| V0.0.2 | 18 Apr 2024 | PDL(24)000\_048: trust-related definitions for Clause 4 |
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