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ETSI GR ISG-PDL 020 V0.0.1 (2022-06)

**Group REPORT**

PDL Services for Wireless Consensus Network

<

Reference

PDL-020

Keywords

PDL, Consensus, Wireless network

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# Foreword

This Group Report (GR) has been produced by ETSI Industry Specification Group <long ISGname> (<short ISGname>).

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# Executive summary

The Group Report presents the fundamentals and potential applications of decentarlized identification that can benefit various public and private services. Further the group report also discusses a set of PDL services that can together enable a PDL based Wireless Consensus Network framework.

# Introduction

The study introduces and analyses the overview of wireless consensus network approaches that can benefit different services involving various factors such as the requirements and architectures of wireless consensus network, consensus mechanisms, hardware, protocols, etc. Wireless consensus network is the key to ensure a consensus of data among nodes in a distributed system or reach an agreement on a proposal. It is fault tolerant, scalable, secure, democratic, and privacy-preserving to be served as an auditable tool when accidents happen. Furthermore, wireless consensus network can also be the backbone technique of distributed systems such as PDL. In addition, this study also demonstrates various use cases based on wireless consensus network.

# 1 Scope

The present document investigates wireless consensus network related to the following aspects:

* Wireless consensus network architecture
* Ways to construct wireless consensus networks
  + MAC and physical layers
  + Decentralised/Centralised communication
* Protocols to construct wireless consensus networks
* Performance metrics of consensus mechanisms
* Use cases of wireless consensus networks

# 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.

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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] <Standard Organization acronym> <document number><version number/date of publication>: "<Title>".

[i.2] etc.

# 3 Definition of terms, symbols and abbreviations

## 3.1 Terms

For the purposes of the present document, the [following] terms [given in ... and the following] apply:

## 3.2 Symbols

For the purposes of the present document, the [following] symbols [given in ... and the following] apply:

## 3.3 Abbreviations

For the purposes of the present document, the [following] abbreviations [given in ... and the following] apply:

WCN Wireless Consensus Network

CM Consensus Mechanism(s)

# 4 Overview of Wireless Consensus Network

## 4.1 Need for Wireless Consensus Network

### 4.1.1 General problem statement

Autonomous vehicles are currently at Level 2 but nearing Level 3 of a possible 5. Current autonomous vehicles detect other vehicles by identifying them as obstacles, which is not optimal in terms of safety and efficiency.

One step forward is that all driver-less vehicles are connected, communicate with each other, know each other’s intention in advance, and jointly reach optimal decisions.

Existing solutions are centralised, which have limitations on availability (of trustworthy), reliability, scalability, privacy/security concerns.

### 4.1.2 Consensus for distributed automation

It is an essential enabling technology to bring the autonomous driving to reality.

Solve technical issues: Connected autonomous vehicles needs solutions being fault-tolerant, scalable, ultra-reliable, flexible, democratic and privacy-preserving, DCN-based solution meet all requirements.

Reduce the costs: the solution has the potential to increase wireless network reliability and the local perception precision requirements by 2 to 3 orders of magnitude, significantly reducing the costs in deploying infrastructures

Break the non-technical barriers: it provides an auditable tool, with implications to ethical, legitimation, and regulation, insurance etc.

## 4.2 Motivations

# 5 Opportunities and Use Cases of Wireless Consensus Network

## 5.1 Opportunities

## 5.2 Use case 1: Autonomous vehicles

## 5.3 Use case 2: Industrial IoT

# 6 Architectural Functionalities and Considerations for Wireless Consensus Network Framework

# 7 Hardware Definition

## 7.1 Hardware requirement

## 7.2 Hardware security and threats

# 8 Consensus Mechanism

## 8.1 Proof based consensus

## 8.2 Voting based consensus

## 8.3 Performance metrics

# 9 Protocol for Wireless Consensus Network

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Change History

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*Latest changes made on 2022-07-06*