COMMUNICATION NETWORK NODE, USER EQUIPMENT, COMMUNICATION NETWORK, METHOD

TECHNICAL FIELD

The present disclosure generally pertains to communication network nodes, user equipments, communication networks, and methods.

TECHNICAL BACKGROUND

Generally, it is known to distribute a ledger over multiple nodes such as entities, e.g. electronic devices, servers or the like, which record digital transactions. Distributed ledgers can be based on the known blockchain technology, on which, for example, the known cryptocurrency bitcoin is based, but also the well-known Ethereum project, etc. Generally, a distributed ledger may also be implemented on other technologies than the blockchain technology and examples of distributed ledger projects which are not based on blockchain are BigchainDB and IOTA or the like. For instance, IOTA is a crypto currency which uses linked lists.

Moreover, mobility as a service (MaaS) is known, where a user or passenger uses mobility as a service without owing, for example, a car or the like. Mobility as a service may combine public (e.g. train, bus, etc.) and private (e.g. car sharing, bicycle sharing, etc.) transportation services from associated operators or providers.

Known MaaS solutions typically involve a central and unified gateway through which a trip or journey is planned and booked, wherein a user may pay with a single account.

Although there exist techniques for providing a distributed ledger and mobility as a service, it is generally desirable to provide a communication network node, a user equipment, a communication network and a method for providing mobility as a service.

SUMMARY

According to a first aspect of the present disclosure, there is provided a communication network node including: circuitry configured to: send a request to a home transportation service provider that is a transportation organization in which a passenger has a predefined relationship, wherein the request is a request to allow a roaming transportation service for the passenger which is located in a transportation service area of a roaming transportation service provider that is a transportation organization in which the passenger does not have the predefined relationship, the allowing of the roaming transportation service is based on an identifier, and the identifier is a decentralized identifier.

According to a second aspect of the present disclosure, there is provided a method for controlling a communication network node including: sending a request to a home transportation service provider that is a transportation organization in which a passenger has a predefined relationship, wherein the request is a request to allow a roaming transportation service for the passenger which is located in a transportation service area of a roaming transportation service provider that is a transportation organization in which the passenger does not have the predefined relationship, the allowing of the roaming transportation service is based on an identifier, and the identifier is a decentralized identifier.

According to a third aspect of the present disclosure, there is provided a communication network node comprising: circuitry configured to: request a decentralized database to provide a credential of a passenger, wherein the credential is generated based on a decentralized identifier of the passenger, the decentralized identifier of the passenger being an identifier that is globally unique and does not depend on a centralized authority, and wherein the decentralized identifier is generated based on a request of a user equipment sent to the decentralized database, and the request of the user equipment is a request for allowing the passenger to use a transportation service of a roaming transportation service provider that is a transportation organization in which the passenger does not have a predefined relationship.

According to a fourth aspect of the present disclosure, there is provided a user equipment comprising circuitry configured to: issue a generation of a decentralized identifier of a passenger, the decentralized identifier of the passenger being an identifier that is globally unique and does not depend on a centralized authority; and receive a credential of the passenger for allowing the passenger to use a transportation service of a roaming transportation service provider that is a transportation organization in which the passenger does not have a predefined relationship, wherein the credential is generated based on a request of a home transportation service provider that is a transportation organization in which the passenger has the predefined relationship sent to a decentralized database and based on the decentralized identifier.

Disclosed herein is a communication network for providing a distributed ledger comprising a plurality of network nodes for authenticating a passenger to a roaming mobility service provider comprising circuitry configured to: provide a decentralized identifier of the passenger in a decentralized database based on a request of a user equipment; provide a credential of the passenger in the decentralized database based on a request of a home mobility service provider and based on the decentralized identifier; and transmit the credential to the user equipment for allowing the passenger to use a mobility service of a roaming mobility service provider.

According to a fifth aspect of the present disclosure, there is provided a method for controlling a communication network for providing a distributed ledger comprising a plurality of network nodes for authenticating a passenger to a roaming transportation service provider, the method including: providing a decentralized identifier of the passenger in a decentralized database based on a request of a user equipment, the decentralized identifier of the passenger being an identifier that is globally unique and does not depend on a centralized authority; providing a credential of the passenger in the decentralized database based on a request of a home transportation service provider that is a transportation organization in which the passenger has a predefined relationship and based on the decentralized identifier; and transmitting the credential to the user equipment for allowing the passenger to use a transportation service of the roaming transportation service provider that is a transportation organization in which the passenger does not have the predefined relationship.

According to a sixth aspect of the present disclosure, there is provided a communication network node including circuitry configured to: receive a credential of a passenger, wherein the credential is generated based on a request of a home transportation service provider that is a transportation organization in which the passenger has a predefined relationship sent to a decentralized database and based on a decentralized identifier of the passenger, the decentralized identifier of the passenger being an identifier that is globally unique and does not depend on a centralized authority; receive the decentralized identifier in response to transmitting the credential to a database; and verify the passenger based on the decentralized identifier for allowing the passenger to use a transportation service of a roaming transportation service provider that is a transportation organization in which the passenger does not have the predefined relationship.

Disclosed herein is a user equipment comprising circuitry configured to: transmit a credential of a passenger, wherein the credential is generated based on a request of a home mobility service provider to a decentralized database and based on a decentralized identifier of the passenger; receive a token, wherein the token is based on an encryption of the decentralized identifier; and decrypt the token for verifying the passenger to a roaming mobility service provider for allowing the passenger to use a mobility service of the roaming mobility service provider.

Disclosed herein is a communication network for providing a distributed ledger comprising a plurality of network nodes for authenticating a passenger to a roaming mobility service provider comprising circuitry configured to: provide a token, wherein the token is based on an encryption of a decentralized identifier of the passenger; and decrypt the token for verifying the passenger to a roaming mobility service provider for allowing the passenger to use a mobility service of the roaming mobility service provider.

Disclosed herein is a communication network node comprising circuitry configured to: allow a passenger to use a mobility service of a roaming mobility service provider based on a credential of the passenger and based on a mutual agreement of the roaming mobility service provider and a home mobility service provider, wherein the credential is generated based on a request of the home mobility service provider to a decentralized database and based on a decentralized identifier of the passenger.

Disclosed herein is a communication network node comprising circuitry configured to: store a plurality of credentials of a passenger, wherein the plurality of credentials is generated based on a request of a home mobility service provider to a decentralized database and based on a decentralized identifier of the passenger; and transmit at least one credential of the plurality of credentials to a user equipment for allowing the passenger to use a mobility service of a roaming mobility service provider.

Disclosed herein is a method for controlling a communication network node comprising: storing a plurality of credentials of a passenger, wherein the plurality of credentials is generated based on a request of a home mobility service provider to a decentralized database and based on a decentralized identifier of the passenger; and transmitting at least one credential of the plurality of credentials to a user equipment for allowing the passenger to use a mobility service of a roaming mobility service provider.

Further aspects are set forth in the dependent claims, the following description and the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Embodiments are explained by way of example with respect to the accompanying drawings, in which:

Fig. 1 depicts an OAuth protocol as it is generally known;

Fig. 2 depicts a roaming mobility service method according to the present disclosure;

Fig. 3 depicts a method for authenticating a passenger to use a mobility service of a roaming mobility service provider;

Fig. 4 depicts a further embodiment of a method for authenticating a passenger;

Fig. 5 depicts a method for authorizing a passenger with a single mobility service credential and mutual agreements;

CLAIMS

1. A communication network node comprising:
circuitry configured to:
send a request to a home transportation service provider that is a transportation organization in which a passenger has a predefined relationship, wherein
the request is a request to allow a roaming transportation service for the passenger which is located in a transportation service area of a roaming transportation service provider that is a transportation organization in which the passenger does not have the predefined relationship,
the allowing of the roaming transportation service is based on an identifier, and
the identifier is a decentralized identifier.

2. The communication network node of claim 1, wherein the request is based on a detection of the passenger in the transportation service area of the roaming transportation service provider.

3. The communication network node of claim 2, wherein the detection is based on at least one of a mobile country code, geo-fencing, an external trigger, and a booking history.

4. The communication network node of claim 1, the circuitry being further configured to:
perform a social login to the roaming transportation service provider.

5. The communication network node of claim 1, wherein the decentralized identifier is a self-sovereign identity.

6. A method for controlling a communication network node comprising:
sending a request to a home transportation service provider that is a transportation organization in which a passenger has a predefined relationship, wherein
the request is a request to allow a roaming transportation service for the passenger which is located in a transportation service area of a roaming transportation service provider that is a transportation organization in which the passenger does not have the predefined relationship,
the allowing of the roaming transportation service is based on an identifier, and
the identifier is a decentralized identifier.

7. The method of claim 6, further comprising:
performing a social login to the roaming transportation service provider.

8. A communication network node comprising:

circuitry configured to:

request a decentralized database to provide a credential of a passenger,

wherein the credential is generated based on a decentralized identifier of the passenger, the decentralized identifier of the passenger being an identifier that is globally unique and does not depend on a centralized authority, and wherein

the decentralized identifier is generated based on a request of a user equipment sent to the decentralized database, and

the request of the user equipment is a request for allowing the passenger to use a transportation service of a roaming transportation service provider that is a transportation organization in which the passenger does not have a predefined relationship.

9. The communication network node of claim 8, wherein the decentralized database is based on a distributed ledger.

10. The communication network node of claim 9, wherein the distributed ledger is a blockchain.

11. A user equipment comprising circuitry configured to:

issue a generation of a decentralized identifier of a passenger, the decentralized identifier of the passenger being an identifier that is globally unique and does not depend on a centralized authority; and

receive a credential of the passenger for allowing the passenger to use a transportation service of a roaming transportation service provider that is a transportation organization in which the passenger does not have a predefined relationship,

wherein the credential is generated based on a request of a home transportation service provider that is a transportation organization in which the passenger has the predefined relationship sent to a decentralized database and based on the decentralized identifier.

12. The user equipment of claim 11, wherein the decentralized database is based on a distributed ledger.

13. A method for controlling a communication network for providing a distributed ledger comprising a plurality of network nodes for authenticating a passenger to a roaming transportation service provider, the method comprising:

providing a decentralized identifier of the passenger in a decentralized database based on a request of a user equipment, the decentralized identifier of the passenger being an identifier that is globally unique and does not depend on a centralized authority;

providing a credential of the passenger in the decentralized database based on a request of a home transportation service provider that is a transportation organization in which the passenger has a predefined relationship and based on the decentralized identifier; and

transmitting the credential to the user equipment for allowing the passenger to use a transportation service of the roaming transportation service provider that is a transportation organization in which the passenger does not have the predefined relationship.

14. A communication network node comprising circuitry configured to:

receive a credential of a passenger, wherein the credential is generated based on a request of a home transportation service provider that is a transportation organization in which the passenger has a predefined relationship sent to a decentralized database and based on a decentralized identifier of the passenger, the decentralized identifier of the passenger being an identifier that is globally unique and does not depend on a centralized authority;

receive the decentralized identifier in response to transmitting the credential to a database; and

verify the passenger based on the decentralized identifier for allowing the passenger to use a transportation service of a roaming transportation service provider that is a transportation organization in which the passenger does not have the predefined relationship.

15. The communication network node of claim 14, wherein the verifying is based on a token.

16. The communication network node of claim 15, wherein the token is based on a public key encryption of the decentralized identifier.