message service (SMS) message sent from a sending device without a mobile station international subscriber directory number (MSISDN), and to decode the SMS message using a p-asserted-identity header to determine the identity of the sending device.

Another embodiment is directed to a computer program, embodied on a computer readable medium, wherein the computer program is configured to control a processor to perform a process. The process includes receiving from a gateway a session initiation protocol (SIP) message including a short message service (SMS) message sent from a sending device without a mobile station international subscriber directory number (MSISDN), and decoding the SMS message using a p-asserted-identity header to determine the identity of the sending device.

In view of the above, in a first aspect of the present invention, there is provided a method, comprising: storing, by a gateway, a session initiation protocol uniform resource identifier and/or international mobile subscriber identity of a device sending a short message; receiving the short message from the sending device; retrieving a session initiation protocol uniform resource identifier for a receiving device that is a recipient of the short message, wherein the session initiation protocol uniform resource identifier of the receiving device is retrieved from the "to header" of the short message; querying a home subscription server of the receiving device for the international mobile subscriber identity and routing information of the receiving device; and delivering the short message to the receiving device using the international mobile subscriber identity and the routing information, wherein at least one of the sending device or the receiving device do not have a mobile station international subscriber directory number.

In a second aspect of the present invention, there is provided an apparatus, comprising: at least one processor; and at least one memory comprising computer program code, the at least one memory and the computer program code configured, with the at least one processor, to cause the apparatus at least to store a session initiation protocol uniform resource identifier and/or international mobile subscriber identity of a device sending a short message; receive the short message from the sending device; retrieve a session initiation protocol uniform resource identifier for a receiving device that is a recipient of the short message, wherein the session initiation protocol uniform resource identifier of the receiving device is retrieved from the "to header" of the short message; query a home subscription server of the receiving device for the international mobile subscriber identity and routing information of the receiving device; and deliver the short message to the receiving device using the international mobile subscriber

identity and the routing information, wherein at least one of the sending device or the receiving device do not have a mobile station international subscriber directory number.

In a third aspect of the present invention, there is provided a method, comprising: constructing, by a user equipment, a short message, wherein the constructing comprises filling a transfer protocol destination address field of the short message with a value configured to indicate that a receiving device that is a recipient of the short message is addressed without a mobile station international subscriber directory number, setting the request uniform resource identifier to a public service identity, and setting a "to header" of the short message to a session initiation protocol uniform resource identifier of the receiving device; and sending the short message.

In a fourth aspect of the present invention, there is provided an apparatus, comprising: at least one processor; and at least one memory comprising computer program code, the at least one memory and the computer program code configured, with the at least one processor, to cause the apparatus at least to construct a short message, wherein the constructing comprises filling the a transfer protocol destination address field of the short message with a value configured to indicate that a receiving device that is a recipient of the short message is addressed without a mobile station international subscriber directory number, setting the request uniform resource identifier to public service identity, and setting a "to header" of the short message service to a session initiation protocol uniform resource identifier of the receiving device; and
send the short message service message.

In a fifth aspect of the present invention, there is provided a computer program, embodied on a computer readable medium, the computer program configured to control a processor to perform a process, comprising: storing a session initiation protocol uniform resource identifier and/or international mobile subscriber identity of a device sending a short message; receiving the short message from the sending device; retrieving a session initiation protocol uniform resource identifier for a receiving device that is a recipient of the short message, wherein the session initiation protocol uniform resource identifier of the receiving device is retrieved from the "to header" of the short message; querying a home subscription server of the receiving device for the international mobile subscriber identity and routing information of the receiving device; and delivering the short message to the receiving device using the international mobile subscriber identity and the routing information, wherein at least one of the sending device or

the receiving device do not have a mobile station international subscriber directory number.

In a sixth aspect of the present invention, there is provided a computer program, embodied on a computer readable medium, the computer program configured to control a processor to perform a process, comprising: constructing a short message, wherein the constructing comprises filling a transfer protocol destination address field of the short message with a value configured to indicate that a receiving device that is a recipient of the short message is addressed without a mobile station international subscriber directory number, setting the request uniform resource identifier to public service identity, and setting a "to header" of the short message service message to a session initiation protocol uniform resource identifier of the receiving device; and sending the short message service message to a gateway.

BRIEF DESCRIPTION OF THE DRAWINGS:

For proper understanding of the invention, reference should be made to the accompanying drawings, wherein:

Fig. 1a illustrates a signaling diagram according to an embodiment;

Fig. 1b illustrates a signaling diagram according to an embodiment;

Fig. 1c illustrates a signaling diagram according to an embodiment;

Fig. 2a illustrates a signaling diagram according to another embodiment;

Fig. 2b illustrates a signaling diagram according to another embodiment;

Fig. 2c illustrates a signaling diagram according to another embodiment;

Fig. 3 illustrates an apparatus according to an embodiment;

Fig. 4 illustrates a flow diagram of a method according to one embodiment;

Fig. 5 illustrates a flow diagram of a method according to another embodiment;

Fig. 6 illustrates a flow diagram of a method according to another embodiment; and

Fig. 7 illustrates a flow diagram of a method according to another embodiment.

We Claim:

1. A method, comprising:

storing, by a gateway, a session initiation protocol uniform resource identifier and/or international mobile subscriber identity of a device sending a short message ~~service message~~;

receiving the short message ~~service message~~ from the sending device;

retrieving a session initiation protocol uniform resource identifier for a receiving device that is a recipient of the short message ~~service message~~, wherein the session initiation protocol uniform resource identifier of the receiving device is retrieved from the "to header" of the short message ~~service message~~;

querying a home subscription server of the receiving device for the international mobile subscriber identity and routing information of the receiving device; and

delivering the short message ~~service message~~ to the receiving device using the international mobile subscriber identity and the routing information,

wherein at least one of the sending device or the receiving device do not have a mobile station international subscriber directory number.

2. The method according to claim 1, wherein the delivering comprises directly delivering the short message ~~service message~~ to the receiving device or delivering the short message ~~service message~~ to the receiving device via a short message service center.

3. The method according to claims 1 or 2, wherein the short message ~~service message~~ comprises a mobile originated short message service ~~(MO-SMS)~~ or a mobile terminated short message service ~~(MT-SMS)~~.

4. The method according to any of claims 1-3, wherein a transfer protocol destination address field of the short message ~~service message~~ is filled with a value configured to indicate the receiving device is addressed without the mobile station international subscriber directory number, the request uniform resource identifier is set to a public service identity, and the "to header" of the short message ~~service message~~ is set to the session initiation protocol uniform resource identifier of the receiving device.

5. The method according to any of claims 1-4, further comprising receiving a message from

the short message service center, wherein the message comprises a session initiation protocol uniform resource identifier and/or international mobile subscriber identity of the sending device.

6. The method according to any of claims 1-5, further comprising delivering a session initiation protocol message to the receiving device, wherein the delivering of the session initiation protocol message is performed using a session initiation protocol uniform resource identifier to international mobile subscriber identity binding stored during registration of the receiving device.

7. An apparatus, comprising:

at least one processor; and

at least one memory comprising computer program code,

the at least one memory and the computer program code configured, with the at least one processor, to cause the apparatus at least to

store a session initiation protocol uniform resource identifier and/or international mobile subscriber identity of a device sending a short message ~~service message~~;

receive the short message ~~service message~~ from the sending device;

retrieve a session initiation protocol uniform resource identifier for a receiving device that is a recipient of the short message ~~service message~~, wherein the session initiation protocol uniform resource identifier of the receiving device is retrieved from the "to header" of the short message ~~service message~~;

query a home subscription server of the receiving device for the international mobile subscriber identity and routing information of the receiving device; and

deliver the short message ~~service message~~ to the receiving device using the international mobile subscriber identity and the routing information,

wherein at least one of the sending device or the receiving device do not have a mobile station international subscriber directory number.

8. The apparatus according to claim 7, wherein the at least one memory and the computer program code are further configured, with the at least one processor, to cause the apparatus to directly deliver the short message ~~service message~~ to the receiving device or to deliver the short message ~~service message~~ to the receiving device via a short message service center.

9. The apparatus according to claims 7 or 8, wherein the short message ~~service message~~ comprises a mobile originated short message service ~~(MO SMS)~~ or a mobile terminated short message service ~~(MT SMS)~~.

10. The apparatus according to any of claims 7-9, wherein a transfer protocol destination address field of the short message ~~service message~~ is filled with a value configured to indicate the receiving device is addressed without the mobile station international subscriber directory number, the request uniform resource identifier is set to a public service identity, and the "to header" of the short message ~~service message~~ is set to the session initiation protocol uniform resource identifier of the receiving device.

11. The apparatus according to any of claims 7-10, wherein the at least one memory and the computer program code are further configured, with the at least one processor, to cause the apparatus to receive a message from the short message service center, wherein the message comprises a session initiation protocol uniform resource identifier and/or international mobile subscriber identity of the sending device.

12. The apparatus according to any of claims 7-11, wherein the at least one memory and the computer program code are further configured, with the at least one processor, to cause the apparatus to deliver a session initiation protocol message to the receiving device, wherein the delivering of the session initiation protocol message is performed using a session initiation protocol uniform resource identifier to international mobile subscriber identity binding stored during registration of the receiving device.

13. The apparatus according to any of claims 7-12, wherein the apparatus comprises an internet protocol short message gateway.

14. A method, comprising:

constructing, by a user equipment, a short message ~~service message~~,

wherein the constructing comprises filling a transfer protocol destination address field of the short message ~~service message~~ with a value configured to indicate that a receiving device that is a recipient of the short message ~~service message~~ is addressed without a mobile station international subscriber directory number, setting the request uniform resource

identifier to a public service identity, and setting a "to header" of the short message ~~service message~~ to a session initiation protocol uniform resource identifier of the receiving device; and

sending the short message ~~service message~~.

15. The method according to claim 14, wherein the user equipment does not have a mobile station international subscriber directory number.

16. The method according to claims 14 or 15, wherein the short message ~~service message~~ comprises a mobile originated short message service ~~(MO-SMS)~~ or a mobile terminated short message service ~~(MT-SMS)~~.

17. The method according to any of claims 14-16, wherein the gateway comprises an internet protocol short message gateway.

18. An apparatus, comprising:

at least one processor; and

at least one memory comprising computer program code,

the at least one memory and the computer program code configured, with the at least one processor, to cause the apparatus at least to

construct a short message ~~service message~~,

wherein the constructing comprises filling the a transfer protocol destination address field of the short message ~~service message~~ with a value configured to indicate that a receiving device that is a recipient of the short message ~~service message~~ is addressed without a mobile station international subscriber directory number, setting the request uniform resource identifier to public service identity, and setting a "to header" of the short message service to a session initiation protocol uniform resource identifier of the receiving device; and

send the short message service message.

19. The apparatus according to claim 18, wherein the apparatus comprises a user equipment, and wherein the user equipment does not have a mobile station international subscriber directory number.

20. The apparatus according to claims 18 or 19, wherein the short message ~~service message~~

comprises a mobile originated short message service ~~(MO-SMS)~~ or a mobile terminated short message service ~~(MT-SMS)~~.

21. The apparatus according to any of claims 18-20, wherein the gateway comprises an internet protocol short message gateway.

~~22. A method, comprising:~~

~~receiving from a gateway, by a user equipment, a session initiation protocol message including a short message service message sent from a sending device without a mobile station international subscriber directory number; and~~

~~decoding the short message service message using a p-asserted-identity header to determine the identity of the sending device.~~

~~23. An apparatus, comprising:~~

~~at least one processor; and~~

~~at least one memory comprising computer program code,~~

~~the at least one memory and the computer program code configured, with the at least one processor, to cause the apparatus at least to~~

~~receive from a gateway a session initiation protocol message including a short message service message sent from a sending device without a mobile station international subscriber directory number; and~~

~~decode the short message service message using a p-asserted-identity header to determine the identity of the sending device.~~

224. A computer program, embodied on a computer readable medium, the computer program configured to control a processor to perform a process, comprising:

storing a session initiation protocol uniform resource identifier and/or international mobile subscriber identity of a device sending a short message ~~service message~~;

receiving the short message ~~service message~~ from the sending device;

retrieving a session initiation protocol uniform resource identifier for a receiving device that is a recipient of the short message ~~service message~~, wherein the session initiation protocol uniform resource identifier of the receiving device is retrieved from the "to header" of the short message ~~service message~~;

querying a home subscription server of the receiving device for the international

mobile subscriber identity and routing information of the receiving device; and

delivering the short message ~~service message~~ to the receiving device using the international mobile subscriber identity and the routing information,

wherein at least one of the sending device or the receiving device do not have a mobile station international subscriber directory number.

~~25~~23. A computer program, embodied on a computer readable medium, the computer program configured to control a processor to perform a process, comprising:

constructing a short message ~~service message~~,

wherein the constructing comprises filling a transfer protocol destination address field of the short message ~~service message~~ with a value configured to indicate that a receiving device that is a recipient of the short message ~~service message~~ is addressed without a mobile station international subscriber directory number, setting the request uniform resource identifier to public service identity, and setting a "to header" of the short message service message to a session initiation protocol uniform resource identifier of the receiving device; and

sending the short message service message to a gateway.

~~26. A computer program, embodied on a computer readable medium, the computer program configured to control a processor to perform a process, comprising:~~

~~receiving from a gateway a session initiation protocol message including a short message service message sent from a sending device without a mobile station international subscriber directory number; and~~

~~decoding the short message service message using a p-asserted-identity header to determine the identity of the sending device.~~