CLAIMS

WHAT IS CLAIMED IS:

1. A computer-implemented method comprising:
   a. connecting a wireless device to a cellular network by single-hopping or multi-hopping to a sink device in a non-cellular network; and
   b. establishing a security tunnel between the wireless device and a first gateway through the sink device.
2. The method of claim 1, wherein the first gateway comprises one or more of the following: an evolved packet data gateway, a packet data gateway, and an IPsec gateway.
3. The method of claim 1, wherein establishing the security tunnel is based on a key assigned to the wireless device by the cellular network.
4. The method of claim 1 further comprising:
   a. encrypting by the wireless device a first data packet, and generating an encrypted first data packet;
   b. sending by the wireless device the encrypted first data packet over the security tunnel to the first gateway;
   c. receiving by the first gateway the encrypted first data packet;
   d. decrypting by the first gateway the encrypted first data packet, and generating a decrypted first data packet; and
   e. updating a network connection table by the first gateway.
5. The method of claim 4, further comprising one or more of the following:
   a. modifying by the first gateway a source address of the decrypted first data packet,
   b. sending by the first gateway the decrypted first data packet to the Internet, and
   c. sending by the first gateway the decrypted first data packet to a second gateway.
6. The method of claim 5 further comprising one or more of the following:
   a. deleting by the first gateway a first billing record of the sink device,
   b. sending by the first gateway a request to the second gateway to delete a first billing record of the sink device,
   c. deep packet inspecting by the second gateway so that the second gateway does not create a first billing record of the sink device, and
   d. sending by the second gateway the decrypted first data packet to the Internet;

   wherein the second gateway comprises a packet data gateway
7. The method of claim 1, further comprising one or more of the following:
   a. receiving by the first gateway a second data packet from the Internet, and

b. receiving by the second gateway a second data packet from the Internet, and sending the second data packet to the first gateway.

8. The method of claim 7, further comprising modifying by the first gateway a destination address of the second data packet.

9. The method of claim 7, further comprising:

a. encrypting by the first gateway the second data packet, and generating an encrypted second data packet;

b. sending by the first gateway the encrypted second data packet over the security tunnel to the wireless device through the sink device;

c. receiving by the wireless device the encrypted second data packet; and

d. decrypting by the wireless device the encrypted second data packet and generating a decrypted second data packet.

10. The method of claim 9, further comprising one or more of the following:

a. deleting by the first gateway a second billing record of the sink device,

b. sending by the first gateway a request to the second gateway to delete the second billing record of the sink device, and

c. deep packet inspecting by the second gateway so that the second gateway does not create the second billing record of the sink device.

CLAIMS

WHAT IS CLAIMED IS:

1. A computer-implemented method comprising:
    a. connecting a wireless device to a cellular network by single-hopping or multi-hopping to a sink device in a non-cellular network;
    b. establishing a security tunnel between the wireless device and a first gateway through the sink device;
    c. encrypting, by the wireless device, a first data packet, and generating an encrypted first data packet;
    d. sending, by the wireless device, the encrypted first data packet over the security tunnel to the first gateway;
    e. receiving, by the first gateway, the encrypted first data packet;
    f. decrypting, by the first gateway, the encrypted first data packet, and generating a decrypted first data packet;
    g. updating, by the first gateway, a network connection table;
    h. sending, by the first gateway, the decrypted first data packet to a second gateway; and
    i. sending, by the second gateway, the decrypted first data packet to the Internet.
2. The method of claim 1 further comprising one or more of the following:
    a. sending, by the first gateway, a request to the second gateway to delete a billing record of the sink device; and
    b. performing deep packet inspection, by the second gateway, and not creating the billing record of the sink device.
3. The method of claim 1, wherein (a) the first gateway comprises one or more of the following: an evolved packet data gateway and a tunnel termination gateway; and (b) the second gateway comprises one or more of the following: a packet data network gateway and a gateway GPRS support node.
4. The method of claim 1, wherein the establishing the security tunnel is based on a key assigned to the wireless device by the cellular network.
5. A computer-implemented method comprising:
    a. connecting a wireless device to a cellular network by single-hopping or multi-hopping to a sink device in a non-cellular network;
    b. establishing a security tunnel between the wireless device and a first gateway through the sink device;
    c. receiving, by a second gateway, a second data packet from the Internet;

d. sending, by the second gateway, the second data packet to the first gateway;

e. encrypting, by the first gateway, the second data packet, and generating an encrypted second data packet;

f. sending, by the first gateway, the encrypted second data packet over the security tunnel to the wireless device through the sink device;

g. receiving, by the wireless device, the encrypted second data packet; and

h. decrypting, by the wireless device, the encrypted second data packet and generating a decrypted second data packet.

6. The method of claim 5, further comprising one or more of the following:

a. sending, by the first gateway, a request to the second gateway to delete a billing record of the sink device; and

b. performing deep packet inspection, by the second gateway, and not creating the billing record of the sink device.

7. The method of claim 5, wherein (a) the first gateway comprises one or more of the following: an evolved packet data gateway and a tunnel termination gateway; and (b) the second gateway comprises one or more of the following: a packet data network gateway and a gateway GPRS support node.

8. The method of claim 5, wherein the establishing the security tunnel is based on a key assigned to the wireless device by the cellular network.

9. A system comprising:

a. a wireless device comprising a processor and a memory and configured to connect to a cellular network by single-hopping or multi-hopping to a sink device in a non-cellular network;

b. a first gateway configured to establish a security tunnel between the wireless device and the first gateway through the sink device; and

c. a second gateway;

wherein

the wireless device is further configured to (1) encrypt a first data packet and generate an encrypted first data packet; and (2) send the encrypted first data packet over the security tunnel to the first gateway; and

the first gateway is further configured to (1) receive the encrypted first data packet; (2) decrypt the encrypted first data packet and generate a decrypted first data packet; (3) update a network connection table; and (4) send the decrypted first data packet to the second gateway; and

the second gateway is configured to send the decrypted first data packet to the Internet.

10. The system of claim 9 further comprising one or more of the following:
    a. the first gateway is configured to send a request to the second gateway to delete a billing record of the sink device; and
    b. the second gateway is configured to perform deep packet inspection and does not create the billing record of the sink device.
11. The system of claim 9 wherein (a) the first gateway comprises one or more of the following: an evolved packet data gateway and a tunnel termination gateway; and (b) the second gateway comprises one or more of the following: a packet data network gateway and a gateway GPRS support node.
12. The system of claim 9, wherein the establishing the security tunnel is based on a key assigned to the wireless device by the cellular network.
13. A system comprising:
    a. a wireless device comprising a processor and a memory and configured to connect to a cellular network by single-hopping or multi-hopping to a sink device in a non-cellular network;
    b. a first gateway configured to establish a security tunnel between the wireless device and the first gateway through the sink device; and
    c. a second gateway;

    wherein

    the second gateway is configured to (1) receive a second data packet from the Internet; and (2) send the second data packet to the first gateway;

    the first gateway is further configured to (1) encrypt the second data packet and generate an encrypted second data packet; and (2) send the encrypted second data packet over the security tunnel to the wireless device through the sink device;

    the wireless device is further configured to (1) receive the encrypted second data packet; and (2) decrypt the encrypted second data packet and generate a decrypted second data packet.
14. The system of claim 13 further comprising one or more of the following:
    a. the first gateway is configured to send a request to the second gateway to delete a billing record of the sink device; and
    b. the second gateway is configured to perform deep packet inspection and does not create the billing record of the sink device.
15. The system of claim 13, wherein (a) the first gateway comprises one or more of the following: an evolved packet data gateway and a tunnel termination gateway; (b) the second gateway comprises one or more of the following: a packet data network gateway

and a gateway GPRS support node; and (c) the establishing the security tunnel is based on a key assigned to the wireless device by the cellular network.