CLAIMS

1. A communication entity, comprising:

means for notifying another communication entity that a wireless device intends to use a single Internet Protocol (IP) address for connections to multiple access gateways; and

means for sending information that is related to at least one of the wireless device's IP flows to the other communication entity.

2. The communication entity of claim 1, wherein the communication entity is a policy charging rule function, wherein the other communication entity is a packet data network gateway, wherein the means for sending comprises means for sending a response to an IP connectivity access network message to the packet data network gateway, and wherein the response comprises information about a distribution of the wireless device's IP flows among the multiple access gateways.

3. The communication entity of claim 1, wherein the communication entity is a packet data network gateway, wherein the other communication entity is an access gateway, wherein the means for sending comprises means for sending a proxy binding acknowledgement message to the access gateway, and wherein the proxy binding acknowledgement message comprises identification information for an IP flow that is being moved to the access gateway.

4. The communication entity of claim 1, wherein the communication entity is an access gateway, wherein the other communication entity is the wireless device, wherein the means for sending comprises means for sending at least one of a router advertisement message, a neighbor advertisement message, and a dynamic host configuration protocol message to the wireless device, and wherein the router advertisement/neighbor advertisement/dynamic host configuration protocol message comprises identification information for an IP flow that is being moved to the access gateway.

5. The communication entity of claim 1, wherein the communication entity is an access gateway, wherein the other communication entity is the wireless device, wherein

the means for sending comprises means for sending a bearer modification message to the wireless device, and wherein the bearer modification message comprises identification information for an IP flow that is being moved from the access gateway.

6. The communication entity of claim 1, wherein the communication entity is a policy charging rule function, wherein the other communication entity is an access gateway in which a policy control and charging function is deployed, wherein the means for sending comprises means for sending quality of service rules to the access gateway, and wherein the quality of service rules are associated with an IP flow that is being moved to the access gateway.

7. The communication entity of claim 1, wherein the communication entity is the wireless device, wherein the other communication entity is an access gateway, wherein the means for sending comprises means for sending at least one of a router solicitation message, a neighbor solicitation message and a dynamic host configuration protocol message to the access gateway, and wherein the router solicitation/neighbor solicitation/dynamic host configuration protocol message comprises identification information for an IP flow that is being added by the wireless device and assigned to the access gateway.

8. The communication entity of claim 1, wherein the communication entity is an access gateway, wherein the other communication entity is a packet data network gateway, wherein the means for sending comprises means for sending a proxy binding update message to the packet data network gateway, and wherein the proxy binding update message comprises identification information for an IP flow that is being added by the wireless device and assigned to the access gateway.

9. The communication entity of claim 1, wherein the communication entity is a packet data network gateway, wherein the other communication entity is a policy charging rule function, wherein the means for sending comprises means for sending an IP connectivity access network message to the policy charging rule function, wherein the IP connectivity access network message comprises identification information for an IP flow that is being added by the wireless device.

10. The communication entity of claim 1, wherein the communication entity is an access gateway, wherein the other communication entity is the wireless device, wherein the means for sending comprises means for sending at least one of a router advertisement message, a neighbor advertisement message and a dynamic host configuration protocol message to the wireless device, and wherein the router advertisement/neighbor advertisement/dynamic host configuration protocol message comprises information for an IP flow that is being added by the wireless device.

11. The communication entity of claim 1, wherein the communication entity is the wireless device, wherein the other communication entity is an access gateway, wherein the means for notifying comprises means for sending an extensible authentication protocol message to the access gateway, and wherein the extensible authentication protocol message indicates that the wireless device intends to use the single IP address for the connections to the multiple access gateways.

12. The communication entity of claim 1, wherein the communication entity is the wireless device, wherein the other communication entity is an access gateway, wherein the means for notifying comprises means for sending at least one of a router solicitation message, a neighbor solicitation message, and a dynamic host configuration protocol message to the access gateway, and wherein the router solicitation/neighbor solicitation/dynamic host configuration protocol message indicates that the wireless device intends to use the single IP address for the connections to the multiple access gateways.

13. The communication entity of claim 1, wherein the communication entity is an access gateway, wherein the other communication entity is a packet data network gateway, wherein the means for notifying comprises means for sending a proxy binding update message to the packet data network gateway, and wherein the proxy binding update message indicates that the wireless device intends to use the single IP address for the connections to the multiple access gateways.

14. The communication entity of claim 1, wherein the communication entity is a packet data network gateway, wherein the means for notifying comprises means for sending an IP connectivity access network message to a policy charging rule function,

wherein the IP connectivity access network message indicates that the wireless device intends to use the single IP address for the connections to the multiple access gateways.

15. A communication entity, comprising:

circuitry configured to notify another communication entity that a wireless device intends to use a single Internet Protocol (IP) address for connections to multiple access gateways, and to send information that is related to at least one of the wireless device's IP flows to the other communication entity.

16. The communication entity of claim 15, wherein the communication entity is a policy charging rule function, wherein the other communication entity is a packet data network gateway, wherein the sending comprises sending a response to an IP connectivity access network message to the packet data network gateway, and wherein the response comprises information about a distribution of the wireless device's IP flows among the multiple access gateways.

17. The communication entity of claim 15, wherein the communication entity is a packet data network gateway, wherein the other communication entity is an access gateway, wherein the sending comprises sending a proxy binding acknowledgement message to the access gateway, and wherein the proxy binding acknowledgement message comprises identification information for an IP flow that is being moved to the access gateway.

18. The communication entity of claim 15, wherein the communication entity is an access gateway, wherein the other communication entity is the wireless device, wherein the sending comprises sending at least one of a router advertisement message, a neighbor advertisement message, and a dynamic host configuration protocol message to the wireless device, and wherein the router advertisement/neighbor advertisement/dynamic host configuration protocol message comprises identification information for an IP flow that is being moved to the access gateway.

19. The communication entity of claim 15, wherein the communication entity is an access gateway, wherein the other communication entity is the wireless device, wherein

the sending comprises sending a bearer modification message to the wireless device, and wherein the bearer modification message comprises identification information for an IP flow that is being moved from the access gateway.

20. The communication entity of claim 15, wherein the communication entity is a policy charging rule function, wherein the other communication entity is an access gateway in which a policy control and charging function is deployed, wherein the sending comprises sending quality of service rules to the access gateway, and wherein the quality of service rules are associated with an IP flow that is being moved to the access gateway.

21. The communication entity of claim 15, wherein the communication entity is the wireless device, wherein the other communication entity is an access gateway, wherein the sending comprises sending at least one of a router solicitation message, a neighbor solicitation message and a dynamic host configuration protocol message to the access gateway, and wherein the router solicitation/neighbor solicitation/dynamic host configuration protocol message comprises identification information for an IP flow that is being added by the wireless device and assigned to the access gateway.

22. The communication entity of claim 15, wherein the communication entity is an access gateway, wherein the other communication entity is a packet data network gateway, wherein the sending comprises sending a proxy binding update message to the packet data network gateway, and wherein the proxy binding update message comprises identification information for an IP flow that is being added by the wireless device and assigned to the access gateway.

23. The communication entity of claim 15, wherein the communication entity is a packet data network gateway, wherein the other communication entity is a policy charging rule function, wherein the sending comprises sending an IP connectivity access network message to the policy charging rule function, and wherein the IP connectivity access network message comprises identification information for an IP flow that is being added by the wireless device.

24. The communication entity of claim 15, wherein the communication entity is an access gateway, wherein the other communication entity is the wireless device, wherein the sending comprises sending at least one of a router advertisement message, a neighbor advertisement message and a dynamic host configuration protocol message to the wireless device, and wherein the router advertisement/neighbor advertisement/dynamic host configuration protocol message comprises information for an IP flow that is being added by the wireless device.

25. The communication entity of claim 15, wherein the communication entity is the wireless device, wherein the other communication entity is an access gateway, wherein the notifying comprises sending an extensible authentication protocol message to the access gateway, and wherein the extensible authentication protocol message indicates that the wireless device intends to use the single IP address for the connections to the multiple access gateways.

26. The communication entity of claim 15, wherein the communication entity is the wireless device, wherein the other communication entity is an access gateway, wherein the notifying comprises sending at least one of a router solicitation message, a neighbor solicitation message, and a dynamic host configuration protocol message to the access gateway, and wherein the router solicitation/neighbor solicitation/dynamic host configuration protocol message indicates that the wireless device intends to use the single IP address for the connections to the multiple access gateways.

27. The communication entity of claim 15, wherein the communication entity is an access gateway, wherein the other communication entity is a packet data network gateway, wherein the notifying comprises sending a proxy binding update message to the packet data network gateway, and wherein the proxy binding update message indicates that the wireless device intends to use the single IP address for the connections to the multiple access gateways.

28. The communication entity of claim 15, wherein the communication entity is a packet data network gateway, wherein the notifying comprises sending an IP connectivity access network message to a policy charging rule function, wherein the IP

connectivity access network message indicates that the wireless device intends to use the single IP address for the connections to the multiple access gateways.

29. A method for IP flow mobility, the method being implemented by a communication entity in a multi-interface communication environment, the method comprising:

notifying another communication entity that a wireless device intends to use a single Internet Protocol (IP) address for connections to multiple access gateways; and

sending information that is related to at least one of the wireless device's IP flows to the other communication entity.

30. The method of claim 29, wherein the communication entity is a policy charging rule function, wherein the other communication entity is packet data network gateway, wherein the sending comprises sending a response to an IP connectivity access network message to the packet data network gateway, and wherein the response comprises information about a distribution of the wireless device's IP flows among the multiple access gateways.

31. The method of claim 29, wherein the communication entity is a packet data network gateway, wherein the other communication entity is an access gateway, wherein the sending comprises sending a proxy binding acknowledgement message to the access gateway, and wherein the proxy binding acknowledgement message comprises identification information for an IP flow that is being moved to the access gateway.

32. The method of claim 29, wherein the communication entity is an access gateway, wherein the other communication entity is the wireless device, wherein the sending comprises sending at least one of a router advertisement message, a neighbor advertisement message, and a dynamic host configuration protocol message to the wireless device, and wherein the router advertisement/neighbor advertisement/dynamic host configuration protocol message comprises identification information for an IP flow that is being moved to the access gateway.

33. The method of claim 29, wherein the communication entity is an access gateway, wherein the other communication entity is the wireless device, wherein the sending comprises sending a bearer modification message to the wireless device, and wherein the bearer modification message comprises identification information for an IP flow that is being moved from the access gateway.

34. The method of claim 29, wherein the communication entity is a policy charging rule function, wherein the other communication entity is an access gateway in which a policy charging function is deployed, wherein the sending comprises sending quality of service rules to the access gateway, and wherein the quality of service rules are associated with an IP flow that is being moved to the access gateway.

35. The method of claim 29, wherein the communication entity is the wireless device, wherein the other communication entity is an access gateway, wherein the sending comprises sending at least one of a router solicitation message, a neighbor solicitation message and a dynamic host configuration protocol message to the access gateway, and wherein the router solicitation/neighbor solicitation/dynamic host configuration protocol message comprises identification information for an IP flow that is being added by the wireless device and assigned to the access gateway.

36. The method of claim 29, wherein the communication entity is an access gateway, wherein the other communication entity is a packet data network gateway, wherein the sending comprises sending a proxy binding update message to the packet data network gateway, and wherein the proxy binding update message comprises identification information for an IP flow that is being added by the wireless device and assigned to the access gateway.

37. The method of claim 29, wherein the communication entity is a packet data network gateway, wherein the other communication entity is a policy charging rule function, wherein the sending comprises sending an IP connectivity access network message to the policy charging rule function, wherein the IP connectivity access network message comprises identification information for an IP flow that is being added by the wireless device.

38. The method of claim 29, wherein the communication entity is an access gateway, wherein the other communication entity is the wireless device, wherein the sending comprises sending at least one of a router advertisement message, a neighbor advertisement message and a dynamic host configuration protocol message to the wireless device, and wherein the router advertisement/neighbor advertisement/dynamic host configuration protocol message comprises information for an IP flow that is being added by the wireless device.

39. The method of claim 29, wherein the communication entity is the wireless device, wherein the other communication entity is an access gateway, wherein the notifying comprises sending an extensible authentication protocol message to the access gateway, and wherein the extensible authentication protocol message indicates that the wireless device intends to use the single IP address for the connections to the multiple access gateways.

40. The method of claim 29, wherein the communication entity is the wireless device, wherein the other communication entity is an access gateway, wherein the notifying comprises sending at least one of a router solicitation message, a neighbor solicitation message, and a dynamic host configuration protocol message to the access gateway, and wherein the router solicitation/neighbor solicitation/dynamic host configuration protocol message indicates that the wireless device intends to use the single IP address for the connections to the multiple access gateways.

41. The method of claim 29, wherein the communication entity is an access gateway, wherein the other communication entity is a packet data network gateway, wherein the notifying comprises sending a proxy binding update message to the packet data network gateway, and wherein the proxy binding update message indicates that the wireless device intends to use the single IP address for the connections to the multiple access gateways.

42. The method of claim 29, wherein the communication entity is a packet data network gateway, wherein the notifying comprises sending an IP connectivity access network message to a policy charging rule function, wherein the IP connectivity access

network message indicates that the wireless device intends to use the single IP address for the connections to the multiple access gateways.

43. A computer-program product for a communication entity in a multi-interface communication environment, the computer-program product comprising a computer-readable medium having instructions thereon, the instructions comprising:

code for notifying another communication entity that a wireless device intends to use a single Internet Protocol (IP) address for connections to multiple access gateways; and

code for sending information that is related to at least one of the wireless device's IP flows to the other communication entity.

44. The computer-program product of claim 43, wherein the communication entity is a policy charging rule function, wherein the other communication entity is a packet data network gateway, wherein the code for sending comprises code for sending a response to an IP connectivity access network message to the packet data network gateway, and wherein the response comprises information about a distribution of the wireless device's IP flows among the multiple access gateways.

45. The computer-program product of claim 43, wherein the communication entity is a packet data network gateway, wherein the other communication entity is an access gateway, wherein the code for sending comprises code for sending a proxy binding acknowledgement message to the access gateway, and wherein the proxy binding acknowledgement message comprises identification information for an IP flow that is being moved to the access gateway.

46. The computer-program product of claim 43, wherein the communication entity is an access gateway, wherein the other communication entity is the wireless device, wherein the code for sending comprises code for sending at least one of a router advertisement message, a neighbor advertisement message, and a dynamic host configuration protocol message to the wireless device, and wherein the router advertisement/neighbor advertisement/dynamic host configuration protocol message comprises identification information for an IP flow that is being moved to the access gateway.

47. The computer-program product of claim 43, wherein the communication entity is an access gateway, wherein the other communication entity is the wireless device, wherein the code for sending comprises code for sending a bearer modification message to the wireless device, and wherein the bearer modification message comprises identification information for an IP flow that is being moved from the access gateway.

48. The computer-program product of claim 43, wherein the communication entity is a policy charging rule function, wherein the other communication entity is an access gateway in which a policy control and charging function is deployed, wherein the code for sending comprises code for sending quality of service rules to the access gateway, and wherein the quality of service rules are associated with an IP flow that is being moved to the access gateway.

49. The computer-program product of claim 43, wherein the communication entity is the wireless device, wherein the other communication entity is an access gateway , wherein the code for sending comprises code for sending at least one of a router solicitation message, a neighbor solicitation message and a dynamic host configuration protocol message to the access gateway, and wherein the router solicitation/neighbor solicitation/dynamic host configuration protocol message comprises identification information for an IP flow that is being added by the wireless device and assigned to the access gateway.

50. The computer-program product of claim 43, wherein the communication entity is an access gateway, wherein the other communication entity is a packet data network gateway, wherein the code for sending comprises code for sending a proxy binding update message to the packet data network gateway, and wherein the proxy binding update message comprises identification information for an IP flow that is being added by the wireless device and assigned to the access gateway.

CLAIMS

1. A communication entity in a Proxy Mobile IP communication environment, comprising:

means for notifying another communication entity that a wireless device intends to use a single Internet Protocol (IP) address for connections to multiple access gateways, wherein the wireless device has a plurality of IP sessions connected through a first access gateway;

means for sending information that is related to at least one of the wireless device's IP flows to the other communication entity, wherein at least one of the plurality of IP sessions is moved to a connection with a second access gateway while at least one other of the plurality of IP sessions remains connected through the first access gateway: and

means for performing a quality of service (QoS) negotiation between the wireless device and the second access gateway, wherein the means for performing a QoS negotiation comprises:

means for mapping QoS rules and a corresponding traffic flow template to the connection between the wireless device and the second access gateway; and

means for providing information instructing the wireless device to move data packets of the at least one of the plurality of IP sessions to the connection with the second access gateway while maintaining data packets of the at least one other of the plurality of IP sessions through the first access gateway.

2. The communication entity of claim 1, wherein the communication entity is a policy charging rule function, wherein the other communication entity is a packet data network gateway, wherein the means for sending comprises means for sending a response to an IP connectivity access network message to the packet data network gateway, and wherein the response comprises information about a distribution of the wireless device's IP flows among the multiple access gateways.

3. The communication entity of claim 1, wherein the communication entity is a packet data network gateway, wherein the other communication entity is the second access gateway, wherein the means for sending comprises means for sending a proxy binding acknowledgement message to the second access gateway, and wherein the proxy binding acknowledgement message comprises identification information for an IP flow of the at least one IP session that is being moved to the second access gateway.

4. The communication entity of claim 1, wherein the communication entity is the second access gateway, wherein the other communication entity is the wireless device, wherein the means for sending comprises means for sending at least one of a router advertisement message, a neighbor advertisement message, and a dynamic host configuration protocol message to the wireless device, and wherein the router advertisement/neighbor advertisement/dynamic host configuration protocol message comprises identification information for an IP flow of the at least one IP session that is being moved to the second access gateway.

5. The communication entity of claim **1**, wherein the communication entity is the first access gateway, wherein the other communication entity is the wireless device, wherein the means for sending comprises means for sending a bearer modification message to the wireless device, and wherein the bearer modification message comprises identification information for an IP flow of the at least one IP session that is being moved from the first access gateway.

6. The communication entity of claim **1**, wherein the communication entity is a policy charging rule function, wherein the other communication entity is the second access gateway in which a policy control and charging function is deployed, wherein the means for sending comprises means for sending quality of service rules to the second access gateway, and wherein the quality of service rules are associated with an IP flow of the at least one IP session that is being moved to the second access gateway.

7. The communication entity of claim **1**, wherein:

the communication entity is the wireless device;

the other communication entity is the second access gateway;

the means for sending information that is related to at least one of the wireless device's IP flows comprises means for sending at least one of a router solicitation message, a neighbor solicitation message and a dynamic host configuration protocol message to the second access gateway; and

the router solicitation/neighbor solicitation/dynamic host configuration protocol message includes identification

information for a new IP flow that is being added by the wireless device and assigned to the second access gateway.

8. The communication entity of claim **1**, wherein:

the communication entity is the second access gateway;

the other communication entity is a packet data network gateway;

the means for sending information that is related to at least one of the wireless device's IP flows comprises means for sending a proxy binding update message to the packet data network gateway; and

the proxy binding update message includes identification information for a new IP flow that is being added by the wireless device and assigned to the second access gateway.

9. The communication entity of claim **1**, wherein:

the communication entity is a packet data network gateway;

the other communication entity is a policy charging rule function;

the means for sending information that is related to at least one of the wireless device's IP flows comprises means for sending an IP connectivity access network message to the policy charging rule function; and

the IP connectivity access network message includes identification information for a new IP flow that is being added by the wireless device.

10. The communication entity of claim **1**, wherein:

the communication entity is the second access gateway;

the other communication entity is the wireless device;

the means for sending information that is related to at least one of the wireless device's IP flows comprises means for sending at least one of a router advertisement message, a neighbor advertisement message and a dynamic

host configuration protocol message to the wireless device; and

the router advertisement/neighbor advertisement/dynamic host configuration protocol message includes information for a new IP flow that is being added by the wireless device.

11. The communication entity of claim **1**, wherein:

the communication entity is the wireless device;

the other communication entity is the second access gateway;

the means for notifying comprises means for sending an extensible authentication protocol message to the second access gateway; and

the extensible authentication protocol message indicates that the wireless device intends to use the single IP address for the connections to the multiple access gateways.

12. The communication entity of claim **1**, wherein:

the communication entity is the wireless device;

the other communication entity is the second access gateway;

the means for notifying comprises means for sending at least one of a router solicitation message, a neighbor solicitation message, and a dynamic host configuration protocol message to the second access gateway; and

the router solicitation/neighbor solicitation/dynamic host configuration protocol message indicates that the wireless device intends to use the single IP address for the connections to the multiple access gateways.

13. The communication entity of claim **1**, wherein:

the communication entity is the second access gateway, wherein the other communication entity is a packet data network gateway;

the means for notifying comprises means for sending a proxy binding update message to the packet data network gateway; and

the proxy binding update message indicates that the wireless device intends to use the single IP address for the connections to the multiple access gateways.

14. The communication entity of claim **1**, wherein:

the communication entity is a packet data network gateway; and

the means for notifying comprises means for sending an IP connectivity access network message to a policy charging rule function, wherein the IP connectivity access network message indicates that the wireless device intends to use the single IP address for the connections to the multiple access gateways.

15. A communication entity in a Proxy Mobile IP communication environment, comprising:

circuitry configured to:

notify another communication entity that a wireless device intends to use a single Internet Protocol (IP) address for connections to multiple access gateways, wherein the wireless device has a plurality of IP sessions connected through a first access gateway;

send information that is related to at least one of the wireless device's IP flows to the other communication entity, wherein at least one of the plurality of IP sessions is moved to a connection with a second access gateway while at least one other of the plurality of IP sessions remains connected through the first access gateway; and

perform a quality of service (QoS) negotiation between the wireless device and the second access gateway, wherein the QoS negotiation comprises:

mapping QoS rules and a corresponding traffic flow

template to the connection between the wireless device and the second access gateway, and

providing information instructing the wireless device to move data packets of the at least one of the plurality of IP sessions to the connection with the second access gateway while maintaining data packets of the at least one other of the plurality of IP sessions through the first access gateway.

16. The communication entity of claim **15**, wherein the communication entity is a policy charging rule function, wherein the other communication entity is a packet data network gateway, wherein the sending comprises sending a response to an IP connectivity access network message to the packet data network gateway, and wherein the response comprises information about a distribution of the wireless device's IP flows among the multiple access gateways.

17. The communication entity of claim **15**, wherein the communication entity is a packet data network gateway, wherein the other communication entity is the second access gateway, wherein the sending comprises sending a proxy binding acknowledgement message to the second access gateway, and wherein the proxy binding acknowledgement message comprises identification information for an IP flow of the at least one IP session that is being moved to the second access gateway.

18. The communication entity of claim **15**, wherein the communication entity is the second access gateway, wherein the other communication entity is the wireless device, wherein the sending comprises sending at least one of a router advertisement message, a neighbor advertisement message, and a dynamic host configuration protocol message to the wireless device, and wherein the router advertisement/neighbor advertisement/dynamic host configuration protocol mes-

sage comprises identification information for an IP flow of the at least one IP session that is being moved to the second access gateway.

19. The communication entity of claim **15**, wherein the communication entity is the first access gateway, wherein the other communication entity is the wireless device, wherein the sending comprises sending a bearer modification message to the wireless device, and wherein the bearer modification message comprises identification information for an IP flow of the at least one IP session that is being moved from the first access gateway.

20. The communication entity of claim **15**, wherein the communication entity is a policy charging rule function, wherein the other communication entity is the second access gateway, wherein a policy control and charging function is deployed in the second access gateway, wherein the sending comprises sending quality of service rules to the access gateway, and wherein the quality of service rules are associated with an IP flow of the at least one IP session that is being moved to the second access gateway.

21. The communication entity of claim **15**, wherein:

the communication entity is the wireless device;

the other communication entity is the second access gateway;

the sending information that is related to at least one of the wireless device's IP flows comprises sending at least one of a router solicitation message, a neighbor solicitation message and a dynamic host configuration protocol message to the second access gateway; and

the router solicitation/neighbor solicitation/dynamic host configuration protocol message includes identification information for a new IP flow that is being added by the wireless device and assigned to the second access gateway.

22. The communication entity of claim **15**, wherein:
the communication entity is the second access gateway;
the other communication entity is a packet data network gateway;
the sending information that is related to at least one of the wireless device's IP flows comprises sending a proxy binding update message to the packet data network gateway; and
the proxy binding update message includes identification information for a new IP flow that is being added by the wireless device and assigned to the second access gateway.

23. The communication entity of claim **15**, wherein:
the communication entity is a packet data network gateway;
the other communication entity is a policy charging rule function;
the sending information that is related to at least one of the wireless device's IP flows comprises sending an IP connectivity access network message to the policy charging rule function; and
the IP connectivity access network message includes identification information for a new IP flow that is being added by the wireless device.

24. The communication entity of claim **15**, wherein:
the communication entity is the second access gateway;
the other communication entity is the wireless device;
the sending information that is related to at least one of the wireless device's IP flows comprises sending at least one of a router advertisement message, a neighbor advertisement message and a dynamic host configuration protocol message to the wireless device; and

the router advertisement/neighbor advertisement/dynamic host configuration protocol message includes information for a new IP flow that is being added by the wireless device.

25. The communication entity of claim **15**, wherein the communication entity is the wireless device, wherein the other communication entity is the second access gateway, wherein the notifying comprises sending an extensible authentication protocol message to the second access gateway, and wherein the extensible authentication protocol message indicates that the wireless device intends to use the single IP address for the connections to the multiple access gateways.

26. The communication entity of claim **15**, wherein the communication entity is the wireless device, wherein the other communication entity is the second access gateway, wherein the notifying comprises sending at least one of a router solicitation message, a neighbor solicitation message, and a dynamic host configuration protocol message to the second access gateway, and wherein the router solicitation/neighbor solicitation/dynamic host configuration protocol message indicates that the wireless device intends to use the single IP address for the connections to the multiple access gateways.

27. The communication entity of claim **15**, wherein the communication entity is the second access gateway, wherein the other communication entity is a packet data network gateway, wherein the notifying comprises sending a proxy binding update message to the packet data network gateway, and wherein the proxy binding update message indicates that the wireless device intends to use the single IP address for the connections to the multiple access gateways.

28. The communication entity of claim **15**, wherein the communication entity is a packet data network gateway, wherein the notifying comprises sending an IP connectivity access network message to a policy charging rule function, wherein the IP connectivity access network message indicates that the wireless device intends to use the single IP address for the connections to the multiple access gateways.

29. A method for IP flow mobility, the method being implemented by a communication entity in a multi-interface communication environment using Proxy Mobile IP, the method comprising:

notifying another communication entity that a wireless device intends to use a single Internet Protocol (IP) address for connections to multiple access gateways, wherein the wireless device has a plurality of IP sessions connected through a first access gateway;

sending information that is related to at least one of the wireless device's IP flows to the other communication entity, wherein at least one of the plurality of IP sessions is moved to a connection with a second access gateway while at least one other of the plurality of IP sessions remains connected through the first access gate; and

performing a quality of service (QoS) negotiation between the wireless device and the second access gateway, wherein the QoS negotiation comprises:

mapping QoS rules and a corresponding traffic flow template to the connection between the wireless device and the second access gateway, and

providing information instructing the wireless device to move data packets of the at least one of the plurality of IP sessions to the connection with the second access gateway while maintaining data packets of the at least one other of the plurality of IP sessions through the first access gateway.

30. The method of claim **29**, wherein the communication entity is a policy charging rule function, wherein the other communication entity is packet data network gateway, wherein the sending comprises sending a response to an IP connectivity access network message to the packet data network gateway, and wherein the response comprises information about a distribution of the wireless device's IP flows among the multiple access gateways.

31. The method of claim **29**, wherein the communication entity is a packet data network gateway, wherein the other communication entity is the second access gateway, wherein the sending comprises sending a proxy binding acknowledgement message to the second access gateway, and wherein the proxy binding acknowledgement message comprises identification information for an IP flow of the at least one IP session that is being moved to the second access gateway.

32. The method of claim **29**, wherein the communication entity is the second access gateway, wherein the other communication entity is the wireless device, wherein the sending comprises sending at least one of a router advertisement message, a neighbor advertisement message, and a dynamic host configuration protocol message to the wireless device, and wherein the router advertisement/neighbor advertisement/dynamic host configuration protocol message comprises identification information for an IP flow of the at least one IP session that is being moved to the second access gateway.

33. The method of claim **29**, wherein the communication entity is the first access gateway, wherein the other communication entity is the wireless device, wherein the sending comprises sending a bearer modification message to the wireless device, and wherein the bearer modification message

comprises identification information for an IP flow of the at least one IP session that is being moved from the first access gateway.

34. The method of claim **29**, wherein the communication entity is a policy charging rule function, wherein the other communication entity is the second access gateway in which a policy charging function is deployed, wherein the sending comprises sending quality of service rules to the second access gateway, and wherein the quality of service rules are associated with an IP flow of the at least one IP session that is being moved to the second access gateway.

35. The method of claim **29**, wherein:

the communication entity is the wireless device;

the other communication entity is the second access gateway;

the sending information that is related to at least one of the wireless device's IP flows comprises sending at least one of a router solicitation message, a neighbor solicitation message and a dynamic host configuration protocol message to the access gateway; and

the router solicitation/neighbor solicitation/dynamic host configuration protocol message includes identification information for a new IP flow that is being added by the wireless device and assigned to the second access gateway.

36. The method of claim **29**, wherein:

the communication entity is the second access gateway;

the other communication entity is a packet data network gateway;

the sending information that is related to at least one of the wireless device's IP flows comprises sending a proxy binding update message to the packet data network gateway; and

the proxy binding update message includes identification information for a new IP flow that is being added by the wireless device and assigned to the second access gateway.

37. The method of claim **29**, wherein:

the communication entity is a packet data network gateway;

the other communication entity is a policy charging rule function;

the sending information that is related to at least one of the wireless device's IP flows comprises sending an IP connectivity access network message to the policy charging rule function; and

the IP connectivity access network message includes identification information for a new IP flow that is being added by the wireless device.

38. The method of claim **29**, wherein:

the communication entity is the second access gateway;

the other communication entity is the wireless device;

the sending information that is related to at least one of the wireless device's IP flows comprises sending at least one of a router advertisement message, a neighbor advertisement message and a dynamic host configuration protocol message to the wireless device; and

the router advertisement/neighbor advertisement/dynamic host configuration protocol message includes information for a new IP flow that is being added by the wireless device.

39. The method of claim **29**, wherein the communication entity is the wireless device, wherein the other communication entity is the second access gateway, wherein the notifying comprises sending an extensible authentication protocol message to the second access gateway, and wherein the extensible

authentication protocol message indicates that the wireless device intends to use the single IP address for the connections to the multiple access gateways.

40. The method of claim **29**, wherein the communication entity is the wireless device, wherein the other communication entity is the second access gateway, wherein the notifying comprises sending at least one of a router solicitation message, a neighbor solicitation message, and a dynamic host configuration protocol message to the second access gateway, and wherein the router solicitation/neighbor solicitation/dynamic host configuration protocol message indicates that the wireless device intends to use the single IP address for the connections to the multiple access gateways.

41. The method of claim **29**, wherein the communication entity is the second access gateway, wherein the other communication entity is a packet data network gateway, wherein the notifying comprises sending a proxy binding update message to the packet data network gateway, and wherein the proxy binding update message indicates that the wireless device intends to use the single IP address for the connections to the multiple access gateways.

42. The method of claim **29**, wherein the communication entity is a packet data network gateway, wherein the notifying comprises sending an IP connectivity access network message to a policy charging rule function, wherein the IP connectivity access network message indicates that the wireless device intends to use the single IP address for the connections to the multiple access gateways.

43. A non-transitory computer-readable storage medium having stored thereon processor-executable instructions configured to cause a processor of a communication entity in a Proxy Mobile IP communication environment to perform operations comprising:

notifying another communication entity that a wireless device intends to use a single Internet Protocol (IP) address for connections to multiple access gateways, wherein the wireless device has a plurality of IP sessions connected through a first access gateway;

sending information that is related to at least one of the wireless device's IP flows to the other communication entity, wherein at least one of the plurality of IP sessions is moved to a connection with a second access gateway while at least one other of the plurality of IP sessions remains connected through the first access gateway,

performing a quality of service (QoS) negotiation between the wireless device and the second access gateway, wherein the QoS negotiation comprises:

mapping QoS rules and a corresponding traffic flow template to the connection between the wireless device and the second access gateway, and

providing information instructing the wireless device to move data packets of the at least one of the plurality of IP sessions to the connection with the second access gateway while maintaining data packets of the at least one other of the plurality of IP sessions through the first access gateway.

44. The non-transitory computer-readable storage medium of claim **43**, wherein:

the communication entity is a policy charging rule function;

the other communication entity is a packet data network gateway; and

the stored processor-executable instructions are configured to cause a processor of a communication entity to perform operations such that:

sending information that is related to at least one of the

wireless device's IP flows comprises sending a response to an IP connectivity access network message to the packet data network gateway; and

the response comprises information about a distribution of the wireless device's IP flows among the multiple access gateways.

45. The non-transitory computer-readable storage medium of claim **43**, wherein:

the communication entity is a packet data network gateway;

the other communication entity is the second access gateway; and

the stored processor-executable instructions are configured to cause a processor of a communication entity to perform operations such that:

sending information that is related to at least one of the wireless device's IP flows comprises sending a proxy binding acknowledgement message to the second access gateway; and

the proxy binding acknowledgement message comprises identification information for an IP flow of the at least one IP session that is being moved to the second access gateway.

46. The non-transitory computer-readable storage medium of claim **43**, wherein:

the communication entity is the second access gateway;

the other communication entity is the wireless device; and

the stored processor-executable instructions are configured to cause a processor of a communication entity to perform operations such that:

sending information that is related to at least one of the wireless device's IP flows comprises sending at least one of a router advertisement message, a neighbor

advertisement message, and a dynamic host configuration protocol message to the wireless device; and

the router advertisement/neighbor advertisement/dynamic host configuration protocol message comprises identification information for an IP flow of the at least one IP session that is being moved to the second access gateway.

47. The non-transitory computer-readable storage medium of claim **43**, wherein:

the communication entity is the first access gateway;

the other communication entity is the wireless device; and

the stored processor-executable instructions are configured to cause a processor of a communication entity to perform operations such that:

sending information that is related to at least one of the wireless device's IP flows comprises sending a bearer modification message to the wireless device;

and

the bearer modification message comprises identification information for an IP flow of the at least one IP session that is being moved from the first access gateway.

48. The non-transitory computer-readable storage medium of claim **43**, wherein:

the communication entity is a policy charging rule function;

the other communication entity is the second access gateway in which a policy control and charging function is deployed; and

the stored processor-executable instructions are configured to cause a processor of a communication entity to perform operations such that:

sending information that is related to at least one of the wireless device's IP flows comprises sending quality of service rules to the second access gateway; and

the quality of service rules are associated with an IP flow of the at least one IP session that is being moved to the second access gateway.

49. The non-transitory computer-readable storage medium of claim **43**, wherein:

the communication entity is the wireless device;

the other communication entity is the second access gateway; and

the stored processor-executable instructions are configured to cause a processor of a communication entity to perform operations such that:

sending information that is related to at least one of the wireless device's IP flows comprises sending at least one of a router solicitation message, a neighbor solicitation message and a dynamic host configuration protocol message to the access gateway; and

the router solicitation/neighbor solicitation/dynamic host configuration protocol message includes identification information for a new IP flow that is being added by the wireless device and assigned to the second access gateway.

50. The non-transitory computer-readable storage medium of claim **43**, wherein:

the communication entity is the second access gateway;

the other communication entity is a packet data network gateway; and

the stored processor-executable instructions are configured to cause a processor of a communication entity to perform operations such that:

sending information that is related to at least one of the wireless device's IP flows comprises sending a proxy binding update message to the packet data network gateway;

and

the proxy binding update message includes identification information for a new IP flow that is being added by the wireless device and assigned to the second access gateway.