CLAIMS

1. A method comprising:

obtaining, by a computing system of the wireless communication service provider, a micro-cell performance parameter associated with a micro-cell of a mobile communication system;

obtaining, by the computing system of the wireless communication service provider, a macro-cell performance parameter associated with a macro-cell of the mobile communication system, the macro-cell including the micro-cell, and the macro-cell performance parameter including one or both of: (i) a number of wireless devices being serviced by a macro-cell access point that corresponds to the macro-cell and (ii) an overall capacity of the macro-cell access point;

determining, by the computing system of the wireless communication service provider, whether performance of mobile data operations by a wireless device connected to the macro-cell improves when performed via the micro-cell instead of the macro-cell, the determining based on a comparison between the micro-cell performance parameter and the macro-cell performance parameter, and the improved performance of the mobile data operations indicates a better quality of service at the wireless device; and

in response to the determining, directing, by the computing system of the wireless communication service provider, the macro-cell access point and a micro-cell access point corresponding to the micro-cell such that the mobile data operations for the wireless device are performed by the macro-cell access point and not offloaded to the micro-cell access point while the wireless device is connected to the micro-cell access point.

2. The method of claim 1, wherein the micro-cell is a first micro-cell, the micro-cell access point is a first micro-cell access point, the micro-cell performance parameter is a first micro-cell performance parameter, and the method further comprises offloading the mobile data operations to the first micro-cell access point from a second micro-cell access point of the mobile communications system based on one or more of the first micro-cell performance parameter and a second micro-cell performance parameter associated with a second micro-cell that corresponds to the second micro-cell.

3. The method of claim 1, further comprising:

based on an updated micro-cell performance parameter, offloading the mobile data operations from the macro-cell access point to the micro-cell access point; and

causing the micro-cell access point to perform the mobile data operations.

4. The method of claim 3, wherein offloading the mobile data operations from the macro-cell access point to the micro-cell access point is based on the macro-cell performance parameter.

5. The method of claim 4, wherein the macro-cell performance parameter further includes one or more of: a quality of communications between the macro-cell access point and the wireless device, a signal to noise ratio (SNR) of macro-cell communications between the macro-cell access point and the wireless device, and a latency associated with macro-cell communications between the macro-cell access point and the wireless device.

6. The method of claim 4, wherein the micro-cell performance parameter includes a micro-cell latency and the macro-cell performance parameter includes a macro-cell latency.

7. The method of claim 4, further comprising receiving one or more of the micro-cell performance parameter and the macro-cell performance parameter from one or more of the wireless device and a performance sensor.

8. The method of claim 1, wherein the micro-cell performance parameter includes a micro-cell latency.

9. The method of claim 8, further comprising monitoring one or more of control plane communications and data plane communications to determine the micro-cell latency.

10. The method of claim 9, wherein the control plane communications include Extensible Authentication Protocol (EAP) messages.

11. The method of claim 9, wherein the data plane communications include Address Resolution Protocol (ARP) pinging messages.

12. The method of claim 8, further comprising subtracting a wired latency from the micro-cell latency to determine a wireless latency of the micro-cell latency.

13. The method of claim 1, wherein the micro-cell performance parameter includes one or more of: a quality of communications between the micro-cell access point and the wireless device, a number of wireless devices being serviced by the micro-cell access point, an overall capacity of the micro-cell access point, a signal to noise ratio (SNR) of micro-cell communications between the micro-cell access point and the wireless device, and a latency associated with micro-cell communications between the micro-cell access point and the wireless device.

14. A system comprising:

a processor; and

a computer-readable storage medium including computer executable instructions configured to cause the processor to perform operations, the operations comprising:

obtaining, by a computing system of the wireless communication service provider, a micro-cell performance parameter associated with a micro-cell of a mobile communication system;

obtaining, by the computing system of the wireless communication service provider, a macro-cell performance parameter associated with a macro-cell of the mobile communication system, the macro-cell including the micro-cell, and the macro-cell performance parameter including one or both of: (i) a number of wireless devices being serviced by a macro-cell access point that corresponds to the macro-cell and (ii) an overall capacity of the macro-cell access point;

determining, by the computing system of the wireless communication service provider, whether performance of mobile data operations by a wireless device connected to the macro-cell improves when performed via the micro-cell instead of the macro-cell, the determining based on a comparison between the micro-cell performance parameter and the macro-cell performance parameter, and the improved performance of the mobile data operations indicates a better quality of service at the wireless device; and

in response to the determining, directing, by the computing system of the wireless communication service provider, the macro-cell access point and a micro-cell access point corresponding to the micro-cell such that the mobile data operations for the wireless device are performed by the macro-cell access point and not offloaded to the micro-cell access point while the wireless device is connected to the micro-cell access point.

15. The system of claim 14, wherein the micro-cell is a first micro-cell, the micro-cell access point is a first micro-cell access point, the micro-cell performance parameter is a first micro-cell performance parameter, and the operations further comprise offloading the mobile data operations to the first micro-cell access point from a second micro-cell access point of the mobile communications system based on one or more of the first micro-cell performance parameter and a second micro-cell performance parameter associated with a second micro-cell that corresponds to the second micro-cell.

16. The system of claim 14, wherein the operations further comprise:

based on an updated micro-cell performance parameter, offloading the mobile data operations from the macro-cell access point to the micro-cell access point based on the micro-cell performance parameter; and

causing the micro-cell access point to perform the mobile data operations.

17. The system of claim 16, wherein offloading the mobile data operations from the macro-cell access point to the micro-cell access point is based on the macro-cell performance parameter.

18. The system of claim 17, wherein the macro-cell performance parameter includes one or more of: a quality of communications between the macro-cell access point and the wireless device, a signal to noise ratio (SNR) of macro-cell communications between the macro-cell access point and the wireless device, and a latency associated with macro-cell communications between the macro-cell access point and the wireless device.

19. The system of claim 17, wherein the micro-cell performance parameter includes a micro-cell latency and the macro-cell performance parameter includes a macro-cell latency.

20. The system of claim 17, wherein the operations further comprise receiving one or more of the micro-cell performance parameter and the macro-cell performance parameter from one or more of the wireless device and a performance sensor.

21. The system of claim 14, wherein the micro-cell performance parameter includes a micro-cell latency.

22. The system of claim 21, wherein the operations further comprise monitoring one or more of control plane communications and data plane communications to determine the micro-cell latency.

23. The system of claim 22, wherein the control plane communications include Extensible Authentication Protocol (EAP) messages.

24. The system of claim 22, wherein the data plane communications include Address Resolution Protocol (ARP) pinging messages.

25. The system of claim 21, wherein the operations further comprise subtracting a wired latency from the micro-cell latency to determine a wireless latency of the micro-cell latency.

26. The system of claim 14, wherein the micro-cell performance parameter includes one or more of: a quality of communications between the micro-cell access point and the wireless device, a number of wireless devices being serviced by the micro-cell access point, an overall capacity of the micro-cell access point, a signal to noise ratio (SNR) of micro-cell communications between the micro-

cell access point and the wireless device, and a latency associated with micro-cell communications between the micro-cell access point and the wireless device.

27. A computer-readable storage medium including computer executable instructions configured to cause a system to perform operations, the operations comprising:

obtaining, by a computing system of the wireless communication service provider, a micro-cell performance parameter associated with a micro-cell of a mobile communication system;

obtaining, by the computing system of the wireless communication service provider, a macro-cell performance parameter associated with a macro-cell of the mobile communication system, the macro-cell including the micro-cell, and the macro-cell performance parameter including one or both of: (i) a number of wireless devices being serviced by a macro-cell access point that corresponds to the macro-cell and (ii) an overall capacity of the macro-cell access point;

determining, by the computing system of the wireless communication service provider, whether performance of mobile data operations by a wireless device connected to the macro-cell improves when performed via the micro-cell instead of the micro-cell, the determining based on a comparison between the micro-cell performance parameter and the macro-cell performance parameter, and the improved performance of the mobile data operations indicates a better quality of service at the wireless device; and

in response to the determining, directing, by the computing system of the wireless communication service provider, the macro-cell access point and a micro-cell access point corresponding to the micro-cell such that the mobile data operations for the wireless device are performed by the macro-cell access point and not offloaded to the micro-cell access point while the wireless device is connected to the micro-cell access point.

28. The computer-readable storage medium of claim 27, wherein the micro-cell is a first micro-cell, the micro-cell access point is a first micro-cell access point, the micro-cell performance parameter is a first micro-cell performance parameter, and the operations further comprise offloading the mobile data operations to the first micro-cell access point from a second micro-cell access point of the mobile communications system based on one or more of the first micro-cell performance parameter and a second micro-cell performance parameter associated with a second micro-cell that corresponds to the second micro-cell.

29. The computer-readable storage medium of claim 27, wherein the operations further comprise:

based on an updated micro-cell performance parameter, offloading the mobile data operations from the macro-cell access point to the micro-cell access point; and

causing the micro-cell access point to perform the mobile data operations.

30. The computer-readable storage medium of claim 29, wherein offloading the mobile data operations from the macro-cell access point to the micro-cell access point is based on the macro-cell performance parameter.

31. The computer-readable storage medium of claim 30, wherein the macro-cell performance parameter includes one or more of: a quality of communications between the macro-cell access point and the wireless device, a signal to noise ratio (SNR) of macro-cell communications between the macro-cell access point and the wireless device, and a latency associated with macro-cell communications between the macro-cell access point and the wireless device.

32. The computer-readable storage medium of claim 30, wherein the micro-cell performance parameter includes a micro-cell latency and the macro-cell performance parameter includes a macro-cell latency.

33. The computer-readable storage medium of claim 30, wherein the operations further comprise receiving one or more of the micro-cell performance parameter and the macro-cell performance parameter from one or more of the wireless device and a performance sensor.

34. The computer-readable storage medium of claim 27, wherein the micro-cell performance parameter includes a micro-cell latency.

35. The computer-readable storage medium of claim 34, wherein the operations further comprise monitoring one or more of control plane communications and data plane communications to determine the micro-cell latency.

36. The computer-readable storage medium of claim 35, wherein the control plane communications include Extensible Authentication Protocol (EAP) messages.

37. The computer-readable storage medium of claim 35, wherein the data plane communications include Address Resolution Protocol (ARP) pinging messages.

38. The computer-readable storage medium of claim 35, wherein the operations further comprise subtracting a wired latency from the micro-cell latency to determine a wireless latency of the micro-cell latency.

39. The computer-readable storage medium of claim 27 wherein the micro-cell performance parameter includes one or more of: a quality of communications between the micro-cell access point and the wireless device, a number of wireless devices being serviced by the micro-cell access point, an overall capacity of the micro-cell access point, a signal to noise ratio (SNR) of micro-cell communications between the micro-cell access point and the wireless device, and a latency associated with micro-cell communications between the micro-cell access point and the wireless device.