WHAT IS CLAIMED IS:

1. A provider network, comprising;

a network substrate;

a plurality of multi-tenant host devices, wherein each host device includes a plurality of client resource instances, wherein each client resource instance is assigned to one of a plurality of clients of the provider network, and wherein at least two client resource instances on at least one host device are assigned to different ones of the plurality of clients; and

one or more computing devices implementing an overlay network analysis service;

wherein each host device is configured to collect performance data for one or more overlay network tunnels, wherein each overlay network tunnel carries overlay network packets from a respective host device to another one of the host devices over the network substrate, wherein each overlay network packet on the respective overlay network tunnel includes client data obtained from one of the client resource instances on the respective host device and targeted at one of the client resource instances on the other host device, wherein the performance data includes round-trip times determined for overlay network packets delivered via the overlay network tunnels; and

wherein the overlay network analysis service is configured to:

obtain the performance data from the plurality of host devices; and

generate performance information for the overlay network according to the obtained performance data, wherein the performance information includes a latency metric for the overlay network tunnels calculated according to the determined round-trip times for the tunnels.

2. The provider network as recited in claim 1, wherein each host device is further configured to, for at least one overlay network packet sent via an overlay network tunnel to another host device:

record a sent time indicating when the overlay network packet was sent on the overlay network tunnel;

receive an acknowledgement of receipt of the overlay network packet from the other host device via the overlay network tunnel; and

calculate the round-trip time for the overlay network packet according to the recorded sent time and the acknowledgement.

3. The provider network as recited in claim 1, wherein each host device is further configured to, for two or more overlay network packets sent via an overlay network tunnel to another host device:

receive a single acknowledgement message for the two or more overlay network packets from the other host device via the overlay network tunnel; and

determine performance data for the two or more overlay network packets according to the acknowledgement message.

4. The provider network as recited in claim 1, wherein the performance data obtained by the overlay network analysis service includes performance data collected for overlay network tunnels between client resource instances of two or more of the plurality of clients, and wherein the performance information is generated according to aggregated performance data for the two or more clients.

5. The provider network as recited in claim 4, wherein the overlay network analysis service is further configured to:

generate a mapping of the overlay network according to the aggregated performance data and topology information for the network substrate, wherein the mapping indicates the host devices and routes over the network substrate between the host devices; and

generate performance metrics for each of one or more components of the network substrate according to the aggregated performance data and the topology information.

6. A method, comprising:

obtaining, by a service implemented on one or more computing devices on a provider network, performance data for client data packets sent over an overlay network on a network substrate between different hosts in the provider network, wherein each client data packet is tagged with overlay network metadata for routing the client data packet over the network substrate via the overlay network;

determining one or more performance metrics for the overlay network according to the performance data, wherein the performance metrics include a latency metric for each of one or more overlay network routes over the network substrate; and

generating output indicating the one or more performance metrics for the overlay network.

7. The method as recited in claim 6, wherein each host includes a plurality of client resource instances, wherein each client resource instance is assigned to one of a plurality of clients of the provider network, and wherein at least two client resource instances on at least one host are assigned to different clients of the provider network.

8. The method as recited in claim 7, wherein the client resource instances are implemented as virtual machines (VMs) on the hosts, wherein each host includes a virtual machine monitor (VMM) that monitors the plurality of virtual machines (VMs) on the respective host and sends client data packets originating at client resource instances on the host over the network substrate via overlay network routes.

9. The method as recited in claim 7, further comprising generating the performance data at the hosts, wherein said generating the performance data comprises, at each host, collecting performance data for client data packets originating at one or more client resource instances at the host and tagged with overlay network metadata according to an overlay network protocol at the host for delivery as overlay network packets to one or more other client resource instances at one or more other hosts via respective overlay network routes.

10. The method as recited in claim 9, wherein generating the performance data at each host comprises, for each of one or more overlay network packets sent via an overlay network route to another host:

recording a sent time indicating when the overlay network packet was sent on the overlay network route;

receiving an acknowledgement of receipt of the overlay network packet from the other host via the overlay network route; and

calculating a round-trip time for the overlay network packet on the overlay network route according to the recorded sent time and the acknowledgement.

11. The method as recited in claim 9, wherein generating the performance data at each host comprises, for overlay network packets sent via an overlay network route to another host:

requesting, by the host, an acknowledgement message from the other host at every *N*th overlay network packet sent to the other host;

receiving, by the host, a single acknowledgement message from the other host indicating receipt of two or more of the *N* sent overlay network packets; and

generating performance data for the *N* sent overlay network packets according to the acknowledgement message.

12. The method as recited in claim 6, wherein the performance data includes round-trip times determined for each overlay network route, and wherein the latency metric for each overlay network route is determined from the round-trip times for the respective overlay network route.

13. The method as recited in claim 6, wherein the performance data indicates dropped packets for the overlay network routes, and wherein the performance metrics determined for each overlay network route further include a packet loss rate calculated according to the indication of dropped packets for the overlay network route.

14. The method as recited in claim 6, wherein the performance data obtained by the service comprises performance data collected for overlay network routes between client resource instances in a private network implementation of a particular client on the provider network, and wherein the one or more performance metrics are determined for the particular client's private network implementation on the provider network.

15. The method as recited in claim 14, further comprising generating a mapping of the client's private network implementation according to the performance data, wherein the mapping indicates the client resource instances and the overlay network routes between the client resource instances in the private network implementation.

WHAT IS CLAIMED IS:

1. A provider network, comprising;

a network substrate;

a plurality of multi-tenant host devices, wherein each host device includes a plurality of client resource instances, wherein each client resource instance is assigned to one of a plurality of clients of the provider network, and wherein at least two client resource instances on at least one host device are assigned to different ones of the plurality of clients; and

one or more computing devices implementing an overlay network analysis service;

wherein each host device is configured to determine performance data for one or more overlay network tunnels, wherein each overlay network tunnel carries overlay network packets from a respective host device to another one of the host devices over the network substrate, wherein each overlay network packet on the respective overlay network tunnel includes client data obtained from one of the client resource instances on the respective host device and targeted at one of the client resource instances on the other host device and overlay network metadata including information for routing the client data over the network substrate via the overlay network;

wherein the host devices are configured to determine the performance data for the one or more overlay network tunnels according to analysis information included in the overlay network metadata of the overlay network packets;

wherein the performance data includes round-trip times determined by the host devices for overlay network packets delivered via the overlay network tunnels; and

wherein the overlay network analysis service is configured to:

obtain the performance data from the plurality of host devices; and

generate performance information for the overlay network according to the obtained performance data, wherein the performance information includes a latency metric for the overlay network tunnels calculated according to the round-trip times determined for overlay network packets delivered via the overlay network tunnels.

2. The provider network as recited in claim 1, wherein the performance data determined for an overlay network tunnel further indicates dropped packets for the overlay network tunnel, and wherein the performance information further includes a packet loss rate calculated for at least one overlay network tunnel according to the indication of dropped packets for the overlay network tunnel.

3. The provider network as recited in claim 1, wherein each host device is further configured to, for at least one of the overlay network packets sent via an overlay network tunnel to another host device:

record a sent time indicating when the overlay network packet was sent on the overlay network tunnel;

receive an acknowledgement of receipt of the overlay network packet from the other host device via the overlay network tunnel; and

calculate the round-trip time for the overlay network packet according to the recorded sent time and the acknowledgement.

4. The provider network as recited in claim 1, wherein each host device is further configured to, for two or more overlay network packets sent via an overlay network tunnel to another host device:

receive a single acknowledgement message for the two or more overlay network packets from the other host device via the overlay network tunnel; and

determine performance data for the two or more overlay network packets according to the acknowledgement message.

5. The provider network as recited in claim 1, wherein the performance data obtained by the overlay network analysis service comprises performance data determined for overlay network tunnels between client resource instances in a private network implementation of a particular client on the provider network, and wherein the performance information is generated for the particular client's private network implementation on the provider network.

6. The provider network as recited in claim 5, wherein the overlay network analysis service is further configured to generate a mapping of the client's private network implementation according to the performance data, wherein the mapping indicates the client resource instances and the overlay network tunnels between the client resource instances in the client's private network implementation.

7. The provider network as recited in claim 1, wherein the performance data obtained by the overlay network analysis service includes performance data determined for overlay network tunnels between client resource instances of two or more of the plurality of clients, and wherein the performance information is generated according to aggregated performance data for the two or more clients.

8. The provider network as recited in claim 7, wherein the overlay network analysis service is further configured to:

generate a mapping of the overlay network according to the aggregated performance data and topology information for the network substrate, wherein the mapping indicates the host devices and routes over the network substrate between the host devices; and

generate performance metrics for each of one or more components of the network substrate according to the aggregated performance data and the topology information.

9. A method, comprising:

obtaining, by a service implemented on one or more computing devices on a provider network, performance data for client data packets sent over an overlay network on a network substrate between different hosts in the provider network, wherein each client data packet is tagged by a respective host with overlay network metadata including information for routing the client data packet over the network substrate via the overlay network, wherein the performance data is determined by the hosts

according to analysis information included in the overlay network metadata tagged to the client data packets by the respective hosts;

determining one or more performance metrics for the overlay network according to the performance data, wherein the performance metrics include a latency metric for each of one or more overlay network routes over the network substrate; and

generating output indicating the one or more performance metrics for the overlay network.

10. The method as recited in claim 9, wherein each host includes a plurality of client resource instances, wherein each client resource instance is assigned to one of a plurality of clients of the provider network, and wherein at least two client resource instances on at least one host are assigned to different clients of the provider network.

11. The method as recited in claim 10, wherein the client resource instances are implemented as virtual machines (VMs) on the hosts, wherein each host includes a virtual machine monitor (VMM) that monitors the plurality of virtual machines (VMs) on the respective host and sends tagged client data packets originating at client resource instances on the host over the network substrate via overlay network routes.

12. The method as recited in claim 10, wherein determining the performance data by the hosts comprises, at each host, determining performance data for client data packets originating at one or more client resource instances at the respective host and tagged with overlay network metadata according to an overlay network protocol at the respective host for delivery as overlay network packets to one or more other client resource instances at one or more other hosts via respective overlay network routes.

13. The method as recited in claim 12, wherein determining the performance data at each host comprises, for each of one or more of the overlay network packets sent via an overlay network route to another host:

recording, by the sending host, a sent time indicating when the overlay network packet was sent on the overlay network route;

receiving, by the sending host, an acknowledgement of receipt of the overlay network packet from the other host via the overlay network route; and

calculating, by the sending host, a round-trip time for the overlay network packet on the overlay network route according to the recorded sent time and the acknowledgement.

14. The method as recited in claim 12, wherein determining the performance data at each host comprises, for overlay network packets sent via an overlay network route to another host:

requesting, by the sending host, an acknowledgement message from the other host at every *N*th overlay network packet sent to the other host;

receiving, by the sending host, a single acknowledgement message from the other host indicating receipt of two or more of the *N* sent overlay network packets; and

determining, by the sending host, performance data for the *N* sent overlay network packets according to the acknowledgement message.

15. The method as recited in claim 12, wherein determining the performance data at each host comprises, for at least one overlay network packet sent via an overlay network route to another host, receiving, by the sending host, an acknowledgement of receipt of the overlay network packet from the other host via the overlay network route.

16. The method as recited in claim 15, wherein the acknowledgement of receipt is included with a client acknowledgement packet tagged with overlay network metadata at the other host for routing the client acknowledgement packet over the network substrate to the sending host via the overlay network.

17. The method as recited in claim 9, wherein the performance data includes round-trip times determined for each overlay network route, and wherein the latency metric for each

overlay network route is determined from the round-trip times for the respective overlay network route.

18. The method as recited in claim 9, wherein the performance data indicates dropped packets for the overlay network routes, and wherein the performance metrics determined for each overlay network route further include a packet loss rate calculated according to the indication of dropped packets for the overlay network route.

19. The method as recited in claim 9, wherein the performance data obtained by the service comprises performance data determined for overlay network routes between client resource instances in a private network implementation of a particular client on the provider network, and wherein the one or more performance metrics are determined for the particular client's private network implementation on the provider network.

20. The method as recited in claim 19, further comprising generating a mapping of the client's private network implementation according to the performance data, wherein the mapping indicates the client resource instances and the overlay network routes between the client resource instances in the private network implementation.

21. The method as recited in claim 9, wherein the performance data obtained by the service includes performance data determined for overlay network routes between client resource instances of two or more of a plurality of clients of the provider network, and wherein the performance metrics are determined according to aggregated performance data for the two or more clients.

22. The method as recited in claim 21, further comprising generating a mapping of the overlay network according to the aggregated performance data and topology information for the network substrate, wherein the mapping indicates the hosts and routes over the network substrate between the hosts.

23. The method as recited in claim 21, further comprising generating performance metrics for each of one or more components of the network substrate according to the aggregated performance data and topology information for the network substrate.

24. A non-transitory computer-accessible storage medium storing program instructions computer-executable to implement:

collecting performance data for client data packets sent over a network substrate via an overlay network between different hosts in a provider network, wherein the performance data includes round-trip times determined for overlay network packets delivered via the overlay network, wherein an overlay network packet is a client data packet encapsulated by a respective host according to an overlay network protocol for routing over the overlay network, wherein the performance data is determined by the hosts according to analysis information included in the overlay network protocol encapsulation of the client data packets;

determining performance information for the overlay network according to the performance data, wherein the performance information include a latency metric for each of one or more overlay network routes, wherein the latency metric for each overlay network route is determined from the round-trip times for the respective overlay network route; and

generating output indicating the performance information for the overlay network.

25. The non-transitory computer-accessible storage medium as recited in claim 24, wherein each host includes a plurality of client resource instances, wherein each client resource instance is assigned to one of a plurality of clients of the provider network, and wherein at least two client resource instances on at least one host are assigned to different clients of the provider network.

26. The non-transitory computer-accessible storage medium as recited in claim 24, wherein the collected performance data further indicates dropped packets for the overlay network routes, and wherein the performance information further includes a packet loss rate for each of

the one or more of the overlay network routes calculated according to the indication of dropped packets for the respective overlay network route.

27. The non-transitory computer-accessible storage medium as recited in claim 24, wherein the collected performance data comprises performance data determined for overlay network routes between client resource instances in a private network implementation of a particular client on the provider network, and wherein the performance information is determined for the particular client's private network implementation on the provider network.

28. The non-transitory computer-accessible storage medium as recited in claim 24, wherein the collected performance data includes performance data determined for overlay network routes between client resource instances of two or more of a plurality of clients of the provider network, and wherein the performance information is determined according to aggregated performance data for the two or more clients.

29. The non-transitory computer-accessible storage medium as recited in claim 24, wherein the program instructions are further computer-executable to implement generating a mapping of the overlay network according to the collected performance data and topology information for the network substrate, wherein the mapping indicates the hosts and the overlay network routes between the hosts over the network substrate between the hosts.

30. The non-transitory computer-accessible storage medium as recited in claim 24, wherein the program instructions are further computer-executable to implement generating performance metrics for each of one or more components of the network substrate according to the collected performance data and topology information for the network substrate.