What is claimed is : ~~CLAIMS~~

1. One or more computing devices comprising:

processors; and

memory;

the one or more computing devices configured, via computer-executable instructions, to perform operations for operating a virtualized packet gateway in a cloud computing environment to process data plane network packets for a cellular network, the operations comprising:

receiving an entire copy of an external key -value store, wherein the external key-value store comprises bearer details for all current bearers of the cellular network, wherein the bearer details define network flows associated with user equipment using the cellular network;

saving the entire copy of the external key -value store in a local cache;

receiving data plane network packets from a load balancer; and

processing, by the virtualized packet gateway, the data plane network packets, wherein the processing comprises identifying bearers associated with the data plane network packets in the local cache.

2. The one or more computing devices of claim 1 wherein the operations are performed during a scale out event in which the virtualized packet gateway is instantiated within the cloud computing environment.

3. The one or more computing devices of claim 1 wherein the virtualized packet gateway is a serving gateway / packet gateway for data plane network packets (SPGW-U) that operates on a virtual machine running in the cloud computing environment.

4. The one or more computing devices of claim 3 wherein the SPGW-U operates as part of a long-term evolution (LTE) cellular network for a telecom provider.

5. The one or more computing devices of claim 1, the operations further comprising:

receiving, from the load balancer, a new data plane network packet that is associated with a new bearer that is not present in the local cache;

responsive to receiving the new data plane network packet:

obtaining bearer details for the new bearer from the external key-value store;

storing the bearer details for the new bearer in the local cache; and

processing the new data plane network packet based at least in part upon the bearer details for the new bearer.

6. The one or more computing devices of claim 5, the operations further comprising:

responsive to receiving the new data plane network packet:

registering the virtualized packet gateway as the owner of the new bearer in the external key-value store.

7. The one or more computing devices of claim 1 wherein the load balancer directs network packets based upon internet protocol (IP) header and the user datagram protocol (UDP) or transmission control protocol (TCP) port numbers, and not based on encapsulated packet information.

8. The one or more computing devices of claim 1, the operations further comprising, for each of one or more bearers in the local cache:

marking the bearer in the local cache with an indication of when data plane network packets were last processed for the bearer.

9. The one or more computing devices of claim 8, the operations further comprising:

purging bearers from the local cache based on the indications of when data plane network packets were last processed.

10. A method, implemented by a computing device, for operating a virtualized packet gateway in a cloud computing environment to process data plane network packets for a cellular network, the method comprising:

by the virtualized packet gateway during a scale out event in which the virtualized packet gateway is instantiated within the cloud computing environment:

receiving an entire copy of an external key -value store, wherein the external key-value store comprises bearer details for all current bearers of the cellular network, wherein the bearer details define network flows associated with user equipment using the cellular network;

saving the entire copy of the external key -value store in a local cache;

receiving data plane network packets from a load balancer; and

processing, by the virtualized packet gateway, the data plane network packets, wherein the processing comprises identifying bearers associated with the data plane network packets in the local cache.

11. The method of claim 10, further comprising:

receiving, from the load balancer, a new data plane network packet that is associated with a new bearer that is not present in the local cache;

responsive to receiving the new data plane network packet:

obtaining bearer details for the new bearer from the external key-value store;

storing the bearer details for the new bearer in the local cache; and

processing the new data plane network packet based at least in part upon the bearer details for the new bearer.

12. The method of claim 11, further comprising:

responsive to receiving the new data plane network packet:

registering the virtualized packet gateway as the owner of the new bearer in the external key-value store.

13. The method of claim 10 wherein the virtualized packet gateway is a serving gateway / packet gateway for data plane network packets (SPGW-U) that operates on a virtual machine running in the cloud computing environment. ~~, and wherein the load balancer directs network traffic based upon internet protocol (IP) header information and not based on encapsulated packet information.~~

14. The method of claim 10 wherein the load balancer directs network traffic based upon internet protocol (IP) header information and not based on encapsulated packet information.

15.~~14.~~ A method, implemented by a computing device, for operating a virtualized packet gateway in a cloud computing environment to process data plane network packets for a cellular network, the method comprising:

by the virtualized packet gateway:

receiving a first data plane network packet associated with a first bearer;

upon determining that the first bearer is not in a local cache, retrieving bearer details for the first bearer from an external key-value store and storing the retrieved bearer details for the first bearer in the local cache;

processing the first data plane network packet based at least in part upon the bearer details for the first bearer stored in the local cache;

receiving a network communication indicating that the first bearer has been updated;

responsive to receiving the network communication, retrieving updated bearer details for the first bearer from the external key-value store and storing the retrieved updated bearer details in the local cache;

receiving a second data plane network packet associated with the first bearer; and

processing the second data plane network packet based at least in part upon the updated bearer details for the first bearer stored in the local cache.

16. The method of claim 15 wherein the network communication indicating that the first bearer has been updated is received from a mobile management entity (MME) or from a gateway handling control plane network traffic.

17.~~15.~~ The method of claim 15~~4~~, further comprising:

registering the virtualized packet gateway as the owner of the first bearer in the external key -value store.

18. The method of claim 15 wherein the virtualized packet gateway is a serving gateway/packet gateway for data plane network packets (SPGW-U) that operates on a virtual machine running in the cloud computing environment.

19. The method of claim 15 wherein the first data plane network packet and the second data plane network packet are received from a load balancer, wherein the load balancer directs network traffic based upon internet protocol (IP) header and the user datagram protocol (UDP) or transmission control protocol (TCP) port numbers, and not based on encapsulated packet information.

20. The method of claim 15, further comprising :

receiving a third data plane network packet associated with a second bearer;

upon determining that the second bearer is not in a local cache, retrieving bearer details for the second bearer from the external key-value store and storing the retrieved bearer details for the second bearer in the local cache;

registering the virtualized packet gateway as the owner of the second bearer in the external key-value store; and

processing the third data plane network packet based at least in part upon the bearer details for the second bearer stored in the local cache.