

## Delta-net Interface

Delta-net can be invoked through a simple string-based interface. The parser interprets each string as either a rule insertion (+) or removal (-) where the format of each line is as follows:

*(+|-)IPv4\_prefix,source,target,priority*

For example, suppose we want to insert an IP prefix based rule that satisfies the following constraints:

- 1) The new rule should be inserted into a forwarding node that is called "input\_node".
- 2) The newly inserted rule should have priority 555.
- 3) The new rule should match packets using the IP prefix "120.251.81.9/24".
- 4) Once a packet matches IP prefix "120.251.81.9/24", the packet should be forwarded to "output\_node". In other words, "output\_node" is the "next hop" for packets that match the IP prefix "120.251.81.9/24".

We can tell Delta-net about this new rule by passing it the following string:

*+120.251.81.9/24,input\_node,output\_node,555*

Similarly, as soon as we want to remove this rule from "input\_switch", we would pass to Delta-net the following string:

*-120.251.81.9/24,input\_node,output\_node,555*

Notice how the first character is now a minus (-) rather than a plus (+).

More generally, a node (either input or output node) may refer to many things in the network. For example, it could be simply a network switch. But it could also encode the combination of a switch and a particular port number that should be matched by the rule. This gives Delta-net the flexibility to handle certain non-prefix match conditions (e.g. matches on concrete MAC addresses or input ports).

By writing the appropriate layer on top of the SDN controller, Delta-net is invoked for each rule insertion, *+r*, and rule removal, *-r*. Here is an example of an SDN application that participates in a BGP setup (our experimental setup uses ONOS but other controllers can be supported):

