Appendix A. NetFlow Switching

Although many people think of NetFlow as a switching path, it isn't; instead, it enables several key applications that customers can use for billing, traffic monitoring, and traffic profiling. Although NetFlow provides traffic accounting and feature acceleration services, packet switching is still performed by process switching, fast switching, optimum switching, or CEF. Therefore, NetFlow can be applied with other switching methods.

A *flow* is defined as a unidirectional sequence of packets between given source and destination endpoints. A flow in the context of NetFlow is defined as the combination of the following fields:

- Source IP address

- Destination IP address

- Source TCP/UDP application port number

- Destination TCP/UDP application port number

- IP protocol type

- IP ToS (Type of Service)

- Input logical interface

When NetFlow is configured on an interface, only packets that arrive into the interface are accounted by NetFlow. NetFlow does not account for packets that are going out an interface. The following steps illustrate the packet path for an IP packet arriving into a NetFlow-enabled interface:

Step 1. A flow lookup is done in the flow cache (the definition of what constitutes a flow is defined later).

Step 2. If this is the first packet for this flow, a new flow entry is created. If this is not the first packet belonging to a flow, the statistics for the flow are updated in the flow cache entry.

Step 3. If there are any input features (input access lists, for example) and this is the first packet for a flow, the access list is checked to make sure the packet is permitted or denied. Access list checking for all subsequent packets for the flow is bypassed.

Step 4. A lookup of the destination address is done in the CEF, optimum switching, fast switching, or routing table. If the destination lookup is successful, the packet has the new Layer 2 encapsulation for transmission on the outbound interface.

Step 5. An output feature check is performed (output access list, for example) for the first packet for a flow. Access list checking for all subsequent packets for the flow is bypassed.

Step 6. The packet is transmitted to the outbound interface.

The NetFlow feature is turned on by the interface level configuration command **ip route-cache flow**. The NetFlow cache is stored in the main memory in non-distributed platforms and on the Line Card main memory in the 7500 VIP cards and the GSR. As packets of the same flow arrive into the interface, the traffic statistic counters are incremented for that flow.

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