**single rate, 2-color configuration [green/red]**

formula: averaging interval is Tc=Bc/CIR

Tc = time intervals (a second split up into intervals)

Bc = burst commit (bits allowed to send per time interval [Tc] )

CIR = committed information rate in bps

Example: 100mb/s interface, want to send at average rate of 50mb/s

CIR = 50mb/s

Suppose you want 8 time intervals (very slow for a router, each platform has range limits)

Each time interval would be 1 second / 8

.125 or 125 ms

You can't change Tc directly at CLI. Must do so by calculating and specifying Bc such that Tc will be derived from the formula.

Let's determine Bc first (inverting formula above)

Bc=CIR\*Tc

CIR = 50mb/s

50mb every 1 sec, so how many bytes every 1/8 second (125ms)

Bc=50000000 x .125

Bc=(50000000)/8 x .125

Bc=6,250,000 bytes x .125

Bc=781,250 bytes

Using token bucket analogy, every 125ms we can add 781,250 tokens

example:

0ms interval = bucket filled with 781,250 tokens

100ms interval = 500,000 byte packet comes in, marked conforming (green), tokens allocated, leaving 281,250 tokens

125ms interval = bucket re-filled with 500,000 tokens (281,250 tokens are discarded)

If packet does not conform (red), can be marked or discarded in which case tokens are not removed from bucket.

**single rate, 3-color policer [green/yellow/red]**

Be = burst excess, a new token bucket

0ms interval

Bc = filled with 781,250 tokens

Be = 0 tokens

50ms interval: 500,000 byte packet arrives

Bc = allocates 500,000 tokens, now has 281,250

Be = 0 tokens

125ms interval

Bc = leftover tokens spilled to Be, filled with 781,250 tokens

Be = 281,250 tokens

175ms interval - 1gb packet comes in, packet marked exceeding [yellow]

Bc = allocates 781,250 tokens

Be = allocates 218,750 tokens, 6300 tokens remain

180ms interval - 10000 byte packet arrives, marked violating [red], dropped

no tokens removed

**dual rate, 3-color policer [green/yellow/red]**

Be not refilled from Bc spillage, replenished independently by calculating against PIR (Peak Information Rate)

example formula:

CIR = 50mb/s

PIR = 75mb/s

Same basic calculation

Be = (PIR/8) \* (Tc/1000)

Be = (75,000,000/8) \* (125/1000)

Be = 9,375,000 bytes \* .125

Be = 1,171,875 bytes

walk-through of 2 packets

0ms interval

Bc = filled with 781,250 tokens

Be = filled with 1,171,875 tokens

50ms interval - 500,000 byte packet comes in, marked conforming

Bc bucket = 500,000 tokens removed, leaving 281,250

Be bucket = 500,000 tokens removed, leaving 671,875

100ms interval - 500,000 byte packet arrives, marked exceeding

Bc bucket = untouched, still have 281,250 tokens

Be bucket = 500,000 tokens removed, leaving 171,875

110 ms interval - 500,000 byte packet arrives, marked violating - dropped

125 ms interval = buckets refilled, no excess tokens