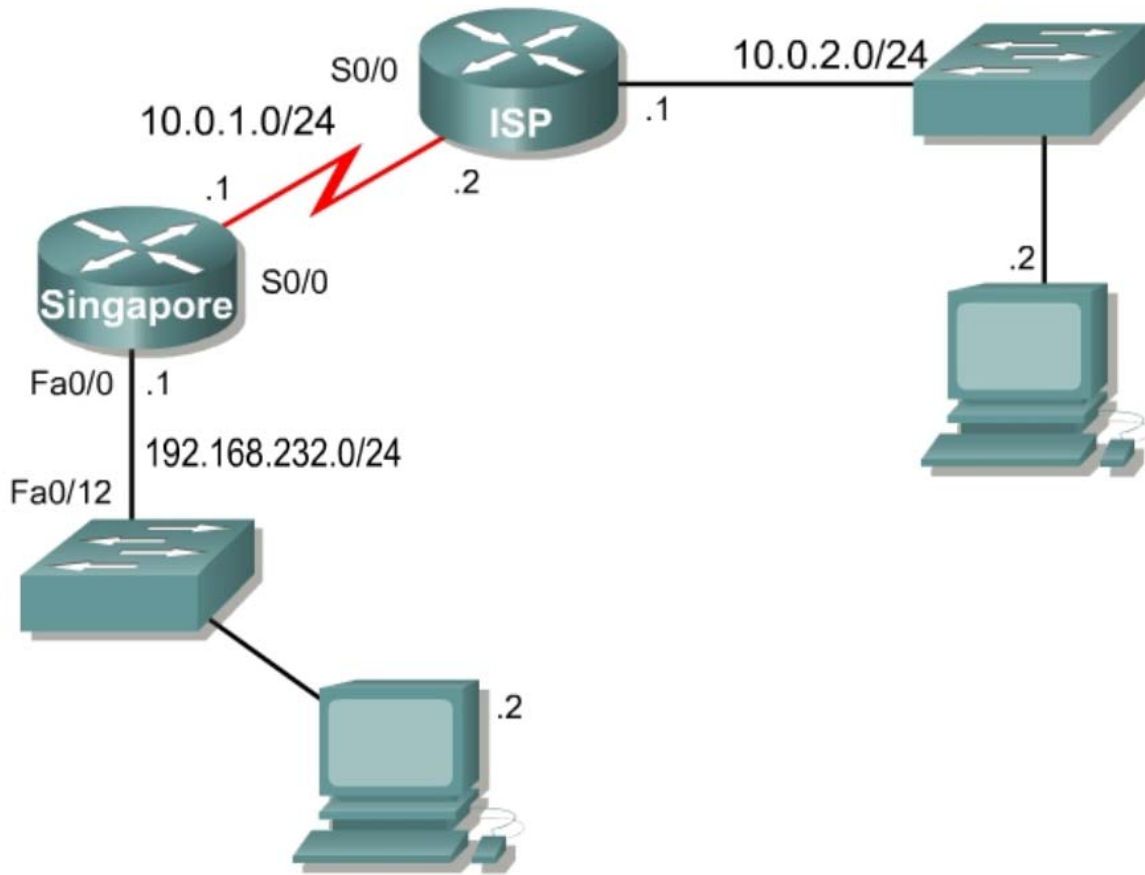


Lab 8.1.10.8 Configuring Generic Traffic Shaping (GTS)



Objective

Generic Traffic Shaping (GTS) shapes traffic by reducing outbound traffic flow to avoid congestion. It does this by constraining traffic to a particular bit rate using the token bucket mechanism. GTS applies to a per-interface basis and can use access lists to select the traffic to shape.

In this lab, GTS will be configured on an interface.

Scenario

In this scenario, assume the ISP has a policy of installing T1 links to all their customers and traffic shaping the data to match the bandwidth the customer has paid for. Configure the customer router and the ISP router to shape traffic to a maximum rate of 128 kbps using GTS.

Step 1

Build and configure the physical topology as shown in the diagram. Before beginning a lab, the configurations on all the routers should be cleared and then reloaded or power cycled to reset their default configurations. Delete the **vlan.dat** and startup configuration files on the switches before reloading them.

Configure the hostnames and interfaces on the routers. The WAN link should use a clock rate of approximately T1 speed, or 1,544,000 bps. Use Enhanced Interior Gateway Routing Protocol (EIGRP) with an autonomous system (AS) of 100 as the routing protocol. The switches can be left in their default configuration.

```
Router(config)#hostname Singapore
Singapore(config)#interface fastethernet 0/0
Singapore(config-if)#ip address 192.168.232.1 255.255.255.0
Singapore(config-if)#no shutdown
Singapore(config-if)#interface serial 0/0
Singapore(config-if)#ip address 10.0.1.1 255.255.255.0
Singapore(config-if)#clock rate 128000
Singapore(config-if)#no shutdown
Singapore(config-if)#router eigrp 100
Singapore(config-router)#network 192.168.232.0 0.0.0.255
Singapore(config-router)#network 10.0.1.0 0.0.0.255

Router(config)#hostname ISP
ISP(config)#interface fastethernet 0/0
ISP(config-if)#ip address 10.0.2.1 255.255.255.0
ISP(config-if)#no shutdown
ISP(config-if)#interface serial 0/0
ISP(config-if)#ip address 10.0.1.2 255.255.255.0
ISP(config-if)#clock rate 128000
ISP(config-if)#no shutdown
ISP(config-if)#router eigrp 100
ISP(config-router)#network 10.0.2.0 0.0.0.255
ISP(config-router)#network 10.0.1.0 0.0.0.255
```

Step 2

On each router serial interface configure GTS using the **traffic-shape rate** command:

```
Router(config-if)#traffic-shape [group access-list-number | rate] bit-rate
[burst-size [excess-burst-size]]
```

Note that the **traffic-shape** command uses either group or rate, depending on the presence or absence of an ACL.

The bit-rate determines the average data rate that will be permitted out of the specified interface. The burst-size is the number of bits that can be sent as a single burst within a time period. The instantaneous bit-rate can be much higher than the average bit-rate. The burst-size should be configured so that any peaks do not overwhelm the input queue of the destination interface. The time period (T_c) over which the bit-rate is measured is given by the following formula:

$$T_c = \frac{\text{burst-size}}{\text{bit-rate}}$$

The ISP requests that the burst-size be limited to 12800 bits. The ISP will police this rate and drop any packets that exceed this burst rate. Configure an excess-burst-size that is no higher than 12800 bits:

```
Singapore(config)#interface serial 0/0
Singapore(config-if)#traffic-shape rate 128000 12800 12800

ISP(config)#interface serial 0/0
ISP(config-if)#traffic-shape rate 128000 12800 12800
```

```
Singapore#show traffic-shape
```

```
Interface    Se0/0
```

	Access	Target	Byte	Sustain	Excess	Interval	Increment	Adapt
VC	List	Rate	Limit	bits/int	bits/int	(ms)	(bytes)	
Active		128000	3200	12800	12800	100	1600	

Step 3

Verify the configuration of the **traffic-shape** command using the **show traffic-shape** command:

```
Singapore#show traffic-shape
```

Interface	Se0/0
	Access Target Byte Sustain Excess Interval Increment Adapt
VC	List Rate Limit bits/int bits/int (ms) (bytes) Active
-	128000 3200 12800 12800 100 1600 -

Verify the operation of GTS using the **show traffic-shape statistics** command:

```
Singapore#show traffic-shape statistics
```

Shaping	Access Queue	Packets	Bytes	Packets	Bytes
I/F	List	Depth		Delayed	Delayed
Active					
Se0/0	0	0	0	0	0
					no

At this stage no traffic is flowing so no shaping is active.

```
Singapore#show traffic-shape
```

Interface	Se0/0
	Access Target Byte Sustain Excess Interval Increment Adapt
VC	List Rate Limit bits/int bits/int (ms) (bytes) Active
-	128000 3200 12800 12800 100 1600 -

```
Singapore#show traffic-shape queue
```

Traffic queued in shaping queue on Serial0/0

Queueing strategy: weighted fair

Queueing Stats: 0/1000/64/0 (size/max total/threshold/drops)

Conversations 0/0/16 (active/max active/max total)

Reserved Conversations 0/0 (allocated/max allocated)

Available Bandwidth 128 kilobits/sec

```
Singapore#show traffic-shape statistics
```

	Access Queue	Packets	Bytes	Packets	Bytes	Shaping
I/F	List	Depth		Delayed	Delayed	Active
Se0/0	0	0	0	0	0	no

```
ISP#show traffic-shape
```

```
Interface    Se0/0
             Access Target   Byte   Sustain   Excess   Interval   Increment Adapt
VC           List    Rate    Limit  bits/int  bits/int   (ms)      (bytes)  Active
-            -      128000  3200   12800    12800    100       1600    -
```

```
ISP#show traffic-shape queue
```

```
Traffic queued in shaping queue on Serial0/0
Queueing strategy: weighted fair
Queueing Stats: 0/1000/64/0 (size/max total/threshold/drops)
Conversations   0/0/16 (active/max active/max total)
Reserved Conversations 0/0 (allocated/max allocated)
Available Bandwidth 128 kilobits/sec
```

```
ISP#show traffic-shape statistics
```

```
             Access Queue   Packets   Bytes      Packets   Bytes      Shaping
I/F           List  Depth                                Delayed   Delayed   Active
Se0/0         0    0    0    0    0    no
```

Step 4

Enable file sharing on the PCs and copy a large file over the WAN link.

1. What is the maximum transfer speed achieved over the T1 WAN link?
2. How else could it be confirmed that Generic Traffic Shaping is active?

Use the **show traffic-shape**, **show traffic-shape queue** and **show traffic-shape statistics** commands to verify GTS operation.

```
Singapore#show traffic-shape
```

```
Interface    Se0/0
             Access Target   Byte   Sustain   Excess   Interval   Increment Adapt
VC           List    Rate    Limit  bits/int  bits/int   (ms)      (bytes)  Active
-            -      128000  3200   12800    12800    100       1600    -
```

```
Singapore#show traffic-shape queue
```

```
Traffic queued in shaping queue on Serial0/0
Queueing strategy: weighted fair
Queueing Stats: 3/1000/64/0 (size/max total/threshold/drops)
```

Conversations 1/2/16 (active/max active/max total)
Reserved Conversations 0/0 (allocated/max allocated)
Available Bandwidth 128 kilobits/sec

(depth/weight/total drops/no-buffer drops/interleaves) 3/32384/0/0/0
Conversation 0, linktype: ip, length: 1504
source: 192.168.232.2, destination: 10.0.2.2, id: 0x0CA3, ttl: 127,
TOS: 0 prot: 6, source port 445, destination port 3057

Singapore#show traffic-shape statistics

	Access Queue	Packets	Bytes	Packets	Bytes	Shaping	
I/F	List	Depth		Delayed	Delayed	Active	
Se0/0		1	2883	3873777	1772	2533276	yes

Singapore#