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# Introduction

This chapter provides examples for configuring control plane-based QoS policies.

## Prerequisites

The configuration examples in this document were created and verified in a lab environment, and all the devices were started with the factory default configuration. When you are working on a live network, make sure you understand the potential impact of every command on your network.

This document assumes that you have basic knowledge of QoS policies.

## Example: Rate limiting ICMP packets

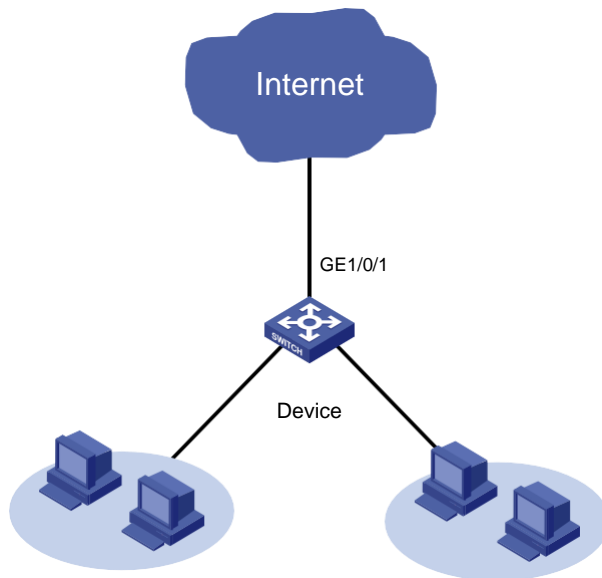
### Network configuration

As shown in [Figure 1](#), the device receives a large number of ICMP packets from the Internet. As a result, CPU usage is high, and device performance degrades.

Configure a control plane-based QoS policy to meet the following requirements:

- Rate limit ICMP packets sent to the control plane to 320 kbps.
- Drop excess ICMP packets.

**Figure 1 Network diagram**



# Supported protocols

arp	icmp6	ospf3-unicast
arp-snooping	igmp	pim-multicast
bfd	ip-option	pim-unicast
bgp	ipv6-option	pim6-multicast
bgp4+	isis	pim6-unicast
dhcp	lacp	snmp
dhcp-snooping	lldp	ssh
dhcp6	mvrp	stp
dldp	ospf-multicast	telnet
dot1x	ospf-unicast	vrrp
icmp	ospf3-multicast	vrrp6

# Analysis

To meet the network requirements, you must perform the following tasks:

- Use the `if-match` command to classify ICMP packets into a class.
- Use the `car` command to configure the rate limit value for ICMP packets and drop excess packets.

# Applicable hardware and software versions

The following matrix shows the hardware and software versions to which this configuration example is applicable:

Hardware	Software version
SC 3570 switch series	Release 11xx
SC 5525 switch series	Release 63xx, Release 65xx, Release 6615Pxx, Release 6628Pxx
SC 5520 switch series	Release 63xx, Release 65xx, Release 6615Pxx, Release 6628Pxx
SC 3170 switch series	Release 11xx
SC 3130 switch series	Release 63xx

## Restrictions and guidelines

When you configure a control plane-based QoS policy to rate limit ICMP packets, follow these restrictions and guidelines:

- By default, the predefined QoS policy is applied to the control plane. The predefined QoS policy identifies packet types by system index and uses a default rate limit value for each packet type. To display the predefined QoS policy, use the **display qos policy control-plane pre-defined** command.
- You can use the **if-match control-plane protocol** or **if-match control-plane protocol-group** command to classify protocol packets.
- You can only configure the **car** command or a combination of the **car** and **accounting packet** commands in the behavior associated with the class.

## Procedures

# Create a class named **ICMP**, and use the ICMP protocol as the match criterion.

```
<Device> system-view
[Device] traffic classifier ICMP
[Device-classifier-ICMP] if-match control-plane protocol icmp
[Device-classifier-ICMP] quit
```

# Create a behavior named **ICMP**, and configure a CAR action for ICMP packets.

```
[Device] traffic behavior ICMP
[Device-behavior-ICMP] car cir 320
[Device-behavior-ICMP] quit
```

# Create a QoS policy named **ICMP**, and associate the class **ICMP** with the behavior **ICMP** in the QoS policy.

```
[Device] qos policy ICMP
[Device-qospolicy-ICMP] classifier ICMP behavior ICMP
```

```
[Device-qospolicy-ICMP] quit
```

# Apply the QoS policy **ICMP** to the inbound direction of the control plane.

```
[Device] control-plane slot 1
```

```
[Device-cp-slot1] qos apply policy ICMP inbound
```

```
[Device-cp-slot1] quit
```

## Verify the configuration

# Verify that the QoS policy is correctly applied to the control plane.

```
[Device] display qos policy control-plane slot 1
```

```
Control plane slot 1
```

```
Direction: Inbound
```

```
Policy: ICMP
```

```
Classifier: ICMP
```

```
Operator: AND
```

```
Rule(s) :
```

```
  If-match control-plane protocol icmp
```

```
Behavior: ICMP
```

```
Committed Access Rate:
```

```
  CIR 320 (kbps), CBS 20480 (Bytes), EBS 0 (Bytes)
```

```
  Green action : pass
```

```
  Yellow action : pass
```

```
  Red action   : discard
```

```
  Green packets : 0 (Packets)
```

```
  Red packets  : 0 (Packets)
```

# Configuration files

```
#
traffic classifier ICMP operator and
  if-match control-plane protocol icmp
#
traffic behavior ICMP
  car cir 320 cbs 20480 ebs 0 green pass red discard yellow pass
#
qos policy ICMP
  classifier ICMP behavior ICMP
#
control-plane slot 1
  qos apply policy ICMP inbound
```