QOS Command usage

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Document Revision History

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Table of Contents

Document Revision History 2
Table of Contents 3
1 qoscmd switch 4
2 qoscmd discpline 5
3 qoscmd dev 8
4 qoscmd type 9
5 qoscmd remark 13
6 qoscmd app 15
7 qoscmd vlan 17
8 QoS configuration flow 19
9 QoS code merge 20

1 qoscmd switch

Notice: The end of this doc introduces the method of merge code.

QoS on/off command。

【DESCRIPTION】This command enables/disables QoS function. When enables QoS function, it will create QoS rule set, when disables QoS function, it will remove QoS rule set. After enables QoS function, it will only create QoS rule set, but not set QoS rule, it need 'qoscmd type/remark/app' to set QoS rule.

【USAGE】

qoscmd switch {on|off} **IPVersion** {v4|v6|all}

【PRECODITION】ebtables/iptables/ip6tables/tc modules is loaded.

【PARAMETERS】

Parameters	Usage	Notice
switch {on|off}	enables / disable QoS function.	compulsory
IPVersion {v4|v6|all}	QoS version v4: only support IPv4 v6: only support IPv6 all: support IPv4 and IPv6 at the same time	Compulsory Notice: 'all' is not simple combination of v4 and v6.

【NOTICE】

If QoS don't need support IPv6, the ip6tables modules and ebtables module for IPv6 don't need load.

This qoscmd does not use ip6tables because ebtables module of IPv6 is enough for almost QoS application is from LAN side to WAN side. If it need support IPv6 QoS for packet from CPE, Macro 'QOS_FOR_IPV6_OUT_PACKET' should be defined, and recompile qoscmd.

'qoscmd app' command is used for packet from CPE, it will not use ip6tables, so it does not support IPv6 QoS.

The following doc supposes macro 'QOS_FOR_IPV6_OUT_PACKET' has been defined, but be careful, in fact, it does not.

【EXAMPLE】

qoscmd switch on IPVersion v4

qoscmd swtich off IPVersion v4

qoscmd switch on IPVersion all

2 qoscmd discpline

QoS discipline command.

This command uses for configuring QoS discipline. The QoS mechanism support 'PQ/WRR/CAR' three kinds of QoS discipline, and it supports four QoS queue with 'PQ/WRR' discipline, six QoS queues with 'CAR' discipline.

1、qoscmd discpline PQ

【DESCRIPTION】This command configure QoS discipline to 'PQ'.

【USAGE】

qoscmd discpline PQ [**uplink-bandwidth** {bandwidth} **queumask** {qm}]

【PARAMETERS】

Parameters	Usage	Notice
uplink-bandwidth {bandwidth}	Uplink total bandwidth(kbit/s) e.g.: 600 means 600kbit/s	optional
queumask {qm}	QoS queue switch, every bit indicate every queue, '0' means disables this queue, '1' means enables this queue. Every queue is enable default. e.g.: 15 means enable all queue. 2 means enable the second queue. 3 means enable the first and second queue. range: 1~15	optional

【NOTICE】

1. The default uplink total bandwidth is 1M;

2. If 'uplink-bandwidth' and 'queuemask' is set at the same time, 'uplink-bandwidth' must be before 'queuemask'.

3. Priority queue order is 1>2>3>4.

【EXAMPLE】

qoscmd discpline PQ queuemask 15

qoscmd discpline PQ uplink-bandwidth 800

2、qoscmd discpline WRR

【DESCRIPTION】This command configure QoS discipline to 'WRR'.

【USAGE】

qoscmd discpline WRR w1 w2 w3 w4 [**uplink-bandwidth** {bandwidth}] [forcebw]

【PARAMETERS】

Parameters	Usage	Notice
WRR w1 w2 w3 w4	every queue weight.	compulsory

uplink-bandwidth {bandwidth}	Uplink total bandwidth(kbit/s) e.g.: 600 means 600kbit/s	optional
queumask {qm}	QoS queue switch, every bit indicate every queue, '0' means disables this queue, '1' means enables this queue. Every queue is enable default. e.g.: 15 means enable all queue. 2 means enable the second queue. 3 means enable the first and second queue. range: 1~15	optional
forcebw	enable force bandwidth function, when set this parameter, 'WRR' will become 'CAR'.	optional

【NOTICE】

1. The default uplink total bandwidth is 1M;

2. If 'uplink-bandwidth' and 'queuemask' is set at the same time, 'uplink-bandwidth' must be before 'queuemask'.

3. Priority queue order is 1>2>3>4.

【EXAMPLE】

qoscmd discpline WRR 1 1 1 1 queuemask 3

qoscmd discpline WRR 1 2 3 4 uplink-bandwidth 800

3、qoscmd discpline CAR

【DESCRIPTION】This command configure QoS discipline to 'CAR.

【USAGE】

qoscmd discpline CAR b1 b2 b3 b4 b5 b6 [**uplink-bandwidth** {bandwidth}]

【PARAMETERS】

Parameters	Usage	Notice
CAR b1 b2 b3 b4 b5 b6	every queue bandwidth	compulsory
uplink-bandwidth {bandwidth}	Uplink total bandwidth(kbit/s) e.g.: 600 means 600kbit/s	optional
queumask {qm}	QoS queue switch, every bit indicate every queue, '0' means disables this queue, '1' means enables this queue. Every queue is enable default. e.g.: 15 means enable all queue. 2 means enable the second queue. 3 means enable the first and second queue. range: 1~15	optional

【NOTICE】

1. The default uplink total bandwidth is 1M;

2. If ‘uplink-bandwidth’ and ‘queuemask’ is set at the same time, ‘uplink-bandwidth’ must be before ‘queuemask’.

3. Priority queue order is 1>2>3>4>5>6.

【EXAMPLE】

qoscmd discpline CAR 100 100 100 100 100 100 queuemask 15

qoscmd discpline CAR 100 200 300 100 200 100 uplink-bandwidth 800

qoscmd discpline CAR 100 200 300 100 200 100 uplink-bandwidth 800 queuemask 14

4、qoscmd discpline off

【DESCRIPTION】This command uses for remove QoS discipline.

【USAGE】qoscmd discpline off

【NOTICE】

After executing ‘qoscmd discipline PQ/WRR/CAR’, it will delete QoS discipline, then create new QoS discipline; When disable QoS function by executing ‘qoscmd switch off’, QoS discipline will be deleted, so this command will not use in most case.

3 qoscmd dev

The QoS mechanism mainly means uplink QoS. But packet from wan side will go through different wan interface. ‘qoscmd dev’ uses for add some wan interface to QoS flow. In theory, all up wan interface should add to QoS flow, but here has a option.

In other words, if wan interface adds QoS flow, the packet from this wan interface will have QoS function, or it will not have.

1、qoscmd dev add

【DESCRIPTION】Adds some wan interface to QoS flow.

【USAGE】

qoscmd dev add {wan interface}

【PRECODITION】The specific wan interface has been up.

【PARAMETERS】

Parameters	Usage	Notice
wan interface	Wan interface	compulsory

【NOTICE】

When wan interface from down to up, it must use ‘qoscmd dev add’ to add wan interface to QoS flow.

【EXAMPLE】

#qoscmd dev add nas2

2、qoscmd dev del

【DESCRIPTION】Delete the specific wan interface from QoS flow.

【USAGE】

qoscmd dev del {wan interface}

【PRECODITION】The specific wan interface has been up.

【PARAMETERS】

Parameters	Usage	Notice
wan interface	wan端Interface	compulsory

【NOTICE】

When enables QoS function, this command will not be used in general. When wan interface down, it need not delete wan interface from QoS flow for it will delete automatically.

When disables QoS function, this command uses for delete wan interface from QoS flow.

【EXAMPLE】

qoscmd dev del nas2

4 qoscmd type

Add or deleter QoS rule based type。

The types table that qoscmd supports.

Parameters	Usage	Notice
LanIf	Lan side interface	support more than one interface, separated by ‘,’ .e.g.: eth0,eth1,ra0
WanIf	Wan side Interface	support more than one interface, separated by comma. e.g.: nas1,nas0,ppp8
smac	src mac address	only one allowed mac addr format xx:xx:xx:xx:xx:xx
dmac	dst mac addresss	only one allowed mac addr format xx:xx:xx:xx:xx:xx
sip	src ip address	For IPv4： IP and mask can be set at the same time, ip and mask separated by ‘/’. Start ip and end ip separated by ‘-‘. When set ip range, start ip and end ip must at the same subnet. e.g.: 192.168.1.20/255.255.255.0-192.168.1.30/255.255.255.0 192.168.1.10 For IPv6: not support range.
dip	dst ip address	For IPv4： IP and mask can be set at the same time, ip and mask separated by ‘/’. Start ip and end ip separated by ‘-‘. When set ip range, start ip and end ip must at the same subnet. e.g.:

		192.168.1.20/255.255.255.0- 192.168.1.30/255.255.255.0 192.168.1.10 For IPv6: not support range.
sport	src port	Support port range, separated by ‘:’ e.g.: 10 10:20
dport	dst port	Support port range, separated by ‘:’ e.g.: 10 10:20
ipp	ip priority	only for IPv4 support range, separated by ‘:’ range: 0~7 e.g.: 0:2
tos	type of service	only for IPv4 not support range based by Hex e.g.: 0x10 means Minimize delay 0x08 means Maximize throughput 0x04 means Maximize reliability 0x02 means Minimize monetary cost 0x00 means normal service
dscpORTC	DSCP for IPv4 TC for IPv6	DSCP for IPv4 TC for IPv6 Support range, separated by ‘:’ range: 0~63 e.g.: 20:30
proto	IP protocol	support protocol only one allowed tcp | udp | icmp | icmp6 | igmp | tcp/udp | all | rtp

vlanid	vlan id	Support range, separated by ':' e.g.: 1:10
dot1p	802.1p value	Support range, separated by ':' e.g.: 1:10 range: 0~7

1. qoscmd type add

【DESCRIPTION】Add a QoS Rule based type.

【USAGE】

qoscmd type add -i {index} **IPVersion** {v4|v6|all} [{type_name} {type_value} …]

【PRECODITION】

ebtables modules is loaded.

ebt_ip6.ko and ebt_tc.ko don't need load if it need support IPv6 QoS.

【PARAMETERS】

Parameters	Usage	Notice
-i {index}	QoS rule index range: 0～15	compulsory
IPVersion {v4|v6|all}	support IPversion v4: Only for IPv4 v6: Only for IPv6 all: Support IPv4 and IPv6 at the same time	compulsory
type_name {type_value}	refer to type table.	compulsory

【NOTICE】:

When execute 'qoscmd type add' command, it will delete old rule info, then add new rule, so it need not delete old rule before add new rule.

There is no parameter check in 'qoscmd type' cmd, so it should check parameters before use this command.

【EXAMPLE】

qoscmd type add -i 0 sip 192.168.1.20 sport 10:20 proto tcp

2. qoscmd type del

【DESCRIPTION】Delete a QoS rule based type.

【USAGE】

qoscmd type del -i {index}

【PRECODITION】

ebtables modules is loaded.

ebt_ip6.ko and ebt_tc.ko don't need load if it need support IPv6 QoS.

【PARAMETERS】

Parameters	Usage	Notice
-i {index}	QoS rule index range: 0～15	compulsory

【NOTICE】

This command will delete the QoS rule.

【EXAMPLE】

qoscmd type del -i 0

5 qoscmd remark

QoS remark list in the following table.

Parameters	Usage	Notice
queue	priority queue For PQ/WRR, range:1~4 For CAR, range 1~6	compulsory
dscpORTC	For IPv4, it means DSCP For IPv6, it means TC rang: 0~63	optional
dot1p	802.1p value range: 0~7	optional

1、qoscmd remark add

【DESCRIPTION】This command uses for remarking.

【USAGE】

qoscmd remark add -i {index} **IPVersion** {v4|v6|all} **queue** {queue} [**ipp** {ippVal} **tos** {tosVal} **dscpORTC** {dtVal} **dot1p** {dot1pVal}]

【PRECODITION】

ebtables modules is loaded.

ebt_ip6.ko and ebt_tc.ko don't need load if it need support IPv6 QoS.

Parameters	Usage	Notice
-i {index}	QoS rule index range: 0～15	compulsory
IPVersion {v4|v6|all}	support IPversion v4: Only for IPv4 v6: Only for IPv6 all: Support IPv4 and IPv6 at the same time	compulsory
queue {queue} [**ipp** {ippVal} **tos** {tosVal} **dscpORTC** {dtVal} **dot1p** {dot1pVal}]	refer to remark table above.	compulsory for queue optional for others

【NOTICE】

This command usually use with 'qoscmd type'. After use 'qoscomd type', then user 'qoscmd remark'.

The index in 'qoscmd type' and 'qoscmd remark' must be the same.

When execute 'qoscmd remark add' command, it will delete old rule info, then add new rule, so it need not delete old rule before add new rule.

【EXAMPLE】

qoscmd remark add -i 0 IPVersion all queue 1 dscpORTC 10:20

2、qoscmd remark del

【DESCRIPTION】This command uses for deleting a QoS remark rule.

【USAGE】

qoscmd remark del -i {index}

【PRECODITION】

ebtables modules is loaded.

ebt_ip6.ko and ebt_tc.ko don't need load if it need support IPv6 QoS.

Parameters	Usage	Notice
-i {index}	QoS rule index range: 0～15	compulsory

【NOTICE】

This command will delete the QoS rule.

【EXAMPLE】

qoscmd remark del -i 0

6 qoscmd app

Notice:

(1) This command uses for match packet from CPE;

(2) If application uses for IPv4, 'IPVersion' is 'v4', if application uses for IPv6, 'IPVserion' is v6;

(3) According to IP and port to distinguish different application.

e.g.: tr069 application

dst IP is acs ip address

dst port is acs port

protocol is tcp

1、qoscmd app add

【DESCRIPTION】Add a QoS app rule.

【USAGE】

qoscmd app add -i {index} **IPVersion** {v4|v6} {app_name} {dst_ip} {proto} {dst_port} {queue_num}

【PRECODITION】

iptables modules is loaded.

If it need support IPv6 application, ip6tables should load.

Parameters	Usage	Notice
-i {index}	QoS rule index range: 0 ~ 3	compulsory
IPVersion {v4|v6}	support IPversion v4: Only for IPv4 v6: Only for IPv6	compulsory
{app_name} {dst_ip} {proto} {dst_port} {queue_num}	protocol support tcp and udp	compulsory

【NOTICE】

When execute 'qoscmd app add' command, it will delete old rule info, then add new rule, so it need not delete old rule before add new rule.

【EXAMPLE】

qoscmd app add -i 0 IPVersion v4 tr069 122.193.99.166 tcp 80 1

2、qoscmd app del

【DESCRIPTION】Delete a QoS app rule.

【USAGE】

qoscmd app del -i {index}

【PRECODITION】

iptables modules is loaded.

If it need support IPv6 application, ip6tables should load.

Parameters	Usage	Notice
-i {index}	QoS rule index range: 0 ~ 3	compulsory

【NOTICE】

【EXAMPLE】

qoscmd app del -i 0

7 qoscmd vlan

QoS vlan command

(1) vlan remark on/off function，including vlan id and 802.1p remark switch.

(2) Setting vlan id. Be careful, 802.1p is remarked by 'qoscmd remark' command.

Notice:

(1) qoscmd vlan sets vlan id based pvc not based interface.

(2) qoscmd vlan implements mark operation, it will insert vlan header into the packet.

(3) For 802.1p remark, there are three type.

zero remar：qoscmd remark add -i 0 IPVersion {v4|v6|all} dot1p 8

remark：qoscmd remark add -i 0 IPVersion {v4|v6|all} dot1p 0~7

pass through：qoscmd remark add -i 0 IPVersion {v4|v6|all} dot1p 9

If type is pass through, the packet from wan side will not bring vlan header.

1、qoscmd vlan on

【DESCRIPTION】enable vlan function.

【USAGE】

qoscmd vlan on vpidotvci {vpi.vci} **vlanid** {vlanid}

【PRECODITION】sar driver is loaded.

Parameters	Usage	Notice
vpidotvci {vpi.vci}	vpi and vci separated by ','	compulsory
vlanid {vlanid}	vlan id that will insert into packet from wan side	compulsory

【NOTICE】

If the pvc is restart, the vlan id and on/off info will be cleared, so it should use qoscmd vlan reset.

【EXAMPLE】

qoscmd vlan on vpidotvci 0.35 vlanid 1

2、qoscmd vlan off

【DESCRIPTION】disable vlan function.

【USAGE】

qoscmd vlan off vpidotvci {vpi.vci} **vlanid** {vlanid}

【PRECODITION】sar driver is loaded.

Parameters	Usage	Notice
vpidotvci {vpi.vci}	vpi and vci separated by ','	compulsory
vlanid {vlanid}	Vlan id that will insert into packet from wan side	compulsory

【NOTICE】

【EXAMPLE】

qoscmd vlan off -i 0 vpidotvci 0.35 vlanid 1

8 QoS configuration flow

Enable QoS function

1、QoS init operation

qoscmd switch on

enable QoS function，create QoS rule set

qoscmd discpline

configure QoS discipline

qoscmd dev add

Add up wan interface to QoS flow.

2、QoS rule configuration

Usr qoscmd type / qoscmd remark / qoscmd app to config QoS rule

Disable QoS function

qoscmd swtich off

disable QoS function，including delete QoS rule set, QoS discipline

qoscmd dev del

remove wan interface from QoS flow

9 QoS code merge

(1) code modification

Notice:

The code in kernel has been included in compile option “CONFIG_QOS”.

1. patch linux-2.6.22-imq.diff

driver/net/imq.c

driver/net/Kconfig

driver/net/Makefile

include/linux/imq.h

include/linux/netfilter_ipv4/ipt_IMQ.h

include/linux/netfilter_ipv6/ip6t_IMQ.h

include/linux/skbuff.h

net/core/dev.c

net/ipv4/netfilter/ipt_IMQ.c

net/ipv4/netfilter/Kconfig

net/ipv4/netfilter/Makefile

net/ipv6/netfilter/ip6t_IMQ.c

net/ipv6/netfilter/Kconfig

net/ipv6/netfilter/Makefile

net/sched/sch_generic.c

2. modifiy merge linux/net/sch_generic.c， for patch this file will fail.

3. merge

net/core/dev.c

driver/net/imq.c

linux/include/linux/imq.h

4.merge

net/packet/af_packet.c

net/sched/act_mirred.c

net/bridge/br_forward.c

net/ipv4/ip_output.c

net/ip6/ip6_output.c

driver/net/pppoe.c

5.merger ebtables

net/bridge/netfilter

Kconfig

Makefile

ebt_ftos.c

ebt_ip.c

ebt_ip6.c
ebt_tc.c
linux/include/netfilter_bridge
ebt_ip.h
ebt_ip6.h
ebt_tc.h
6.merge sar driver
sar_driver.c
7. tc modified
merger
apps/iproute2-2.6.22-070710/tc/f_fw.c
8. ebtables modified
apps/ebtables-v2.0.8-2/extensions
Makefile
ebt_ip.c
ebt_ip6.c
ebt_tc.c
9. CONFIG_QOS
linux/net/Kconfig

(2) kernel config

Notice:
Here only new config will list.

IMQ configuration

Device Drivers--->
Network device support----->
IMQ (intermediate queue device) support
IMQ behavior (PRE/POSTROUTING) (IMQ AB) ---->
(2) Number of IMQ devices

QoS modules configuration

Networking ------>
Networking support
Networking options---->
QoS and/or fair queueing ----->
<M> Hierarchical Token Bucket(HTB)
<M> Multi Band Priority Queueing (PRIO)
<M> Netfilter mask(FW)
[*] Actions
<M> Redirecting and Mirroring

ebtables configuration

Networking ------>

Networking support

Networking options---->

[*] Network packet filtering framework (Netfilter) ---->

Bridge: Netfilter Configuration --- >

<M> ebt: IP6 filter support

<M> ebt: tc target support