

Centos7 开启bbr

Centos7默认是3.10.0的内核，而要开启bbr至少在4.9.0以上内核，所以下面开始安装新内核并开启bbr

编译安装 内核版本4.19.224

#安装必要组件

```
yum groupinstall "Development Tools" -y
```

```
yum install -y elfutils-libelf-devel bc openssl openssl-devel ncurses-devel wget ntpdate vim net-tools
```

#下载4.19源码包

```
cd /usr/local/src
```

```
wget https://cdn.kernel.org/pub/linux/kernel/v4.x/linux-4.19.224.tar.xz
```

```
tar -xvf linux-4.19.224.tar.xz
```

```
cd linux-4.19.224
```

#编译内核的时候是根据该目录下的.config配置文件进行编译，拷贝本地配置文件，"cp /boot/config-`uname -r`*.config" 或"make localmodconfig"。

```
cp /boot/config-`uname -r`*.config
```

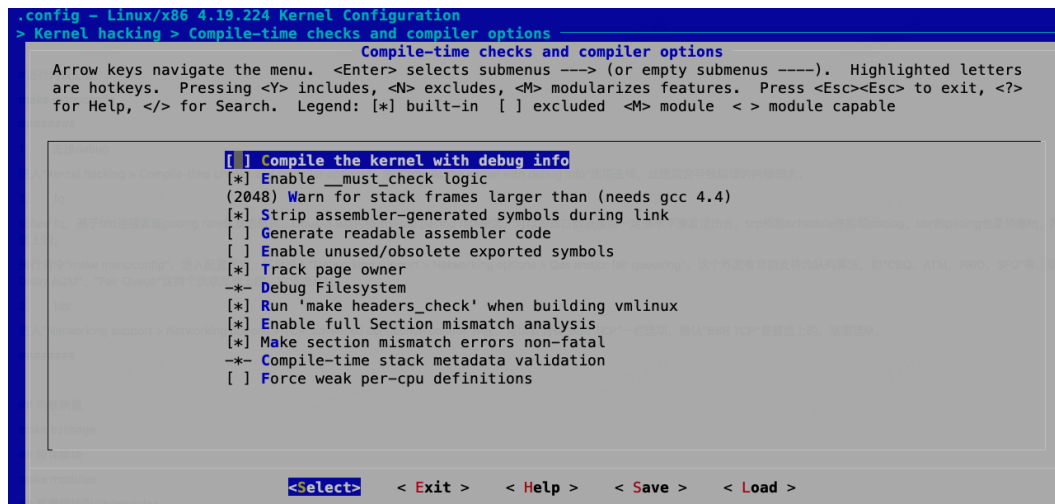
#进行内核配置

```
make menuconfig
```

#####

1. 去掉debug

进入"Kernel hacking > Compile-time checks and compiler options"，将"Compile the kernel with debug info"选项去掉，此选项会导致编译的内核很大。



2. fq

sched fq，基于tcp连接发现pacing rate来发送数据。Linux-3.9后内核出现tcp pacing rate概念，可以将窗口数据按照一定速率平滑发送出去，tcp依靠schedule来实现pacing。bbr的pacing也是依靠fq，所以这个选项一定确认是被选上的。

进入"Networking support > Networking options > Qos and/or fair queueing"，这个界面有目前支持的队列算法，如"CBQ, ATM, PRIO, SFQ"等，确认"Fair Queue Controlled Delay AQM"、"Fair Queue"这两个选项是选上的。这里选着M。

```
.config ~ Linux/x86 4.19.224 Kernel Configuration
> Networking support > Networking options > QoS and/or fair queueing
    QoS and/or fair queueing
    Arrow keys navigate the menu. <Enter> selects submenus ---- (or empty submenus ----). Highlighted letters
    are hotkeys. Pressing <Y> includes, <N> excludes, <M> modularizes features. Press <Esc><Esc> to exit, <?>
    for Help, </> for Search. Legend: [*] built-in [ ] excluded <M> module <> module capable

    ^(-)
    <M> Multi-queue priority scheduler (MQPRIORITY)
    <> SKB priority queue scheduler (SKBPRIORITY)
    <M> CHOOSE and Keep responsive flow scheduler (CHOKe)
    <M> Quick Fair Queueing scheduler (QFQ)
    <M> Controlled Delay AQM (CODEL)
    <M> Fair Queue Controlled Delay AQM (FQ_CODEL)
    <> Common Applications Kept Enhanced (CAKE)
    <M> Fair Queue
    <> Heavy-Hitter Filter (HHF)
    <> Proportional Integral controller Enhanced (PIE) scheduler
    <M> Ingress/classifier-action Qdisc
    <M> Plug network traffic until release (PLUG)
    [ ] Allow override default queue discipline ----
    *** Classification ***
    <M> Elementary classification (BASIC)
    <M> Traffic-Control Index (TCINDEX)
    ^(+)
```

3. bbr

进入” Networking support > Networking options > TCP: advanced congestion control” 界面，可以看到有” BBR TCP” 一栏选项，确认” BBR TCP” 是被选上的，这里选M。

```
.config ~ Linux/x86 4.19.224 Kernel Configuration
> Networking support > Networking options > TCP: advanced congestion control
    TCP: advanced congestion control
    Arrow keys navigate the menu. <Enter> selects submenus ---- (or empty submenus ----). Highlighted letters
    are hotkeys. Pressing <Y> includes, <N> excludes, <M> modularizes features. Press <Esc><Esc> to exit, <?>
    for Help, </> for Search. Legend: [*] built-in [ ] excluded <M> module <> module capable

    ^(-)
    <=> CUBIC TCP
    <M> TCP Westwood+
    <M> H-TCP
    <M> High Speed TCP
    <M> TCP-Hybla congestion control algorithm
    {M} TCP Vegas
    <> TCP NV
    <M> Scalable TCP
    <M> TCP Low Priority
    <M> TCP Veno
    <M> YeAH TCP
    <M> TCP Illinois
    <M> DataCenter TCP (DCTCP)
    <> CAIA Delay-Gradient (CDG)
    <M> BBR TCP
    Default TCP congestion control (Cubic) ----
```

#####

内核映像

make bzImage

编译模块

make modules

放置模块到/lib/modules

make modules_install

make install

查看内核并设置优先启动，从上向下顺序从0开始

awk -F\ ' \$1=="menuentry " {print \$2}' /etc/grub2.cfg

grub2-set-default 0

grub2-mkconfig -o /boot/grub2/grub.cfg

```
[root@bbr-test ~]# awk -F\' '$1=="menuentry "' {print $2}' /etc/grub2.cfg
CentOS Linux (4.19.224) 7 (Core)
CentOS Linux (3.10.0-1160.49.1.el7.x86_64) 7 (Core)
CentOS Linux (0-rescue-1d532804448ef6ef38c48a2678a715da) 7 (Core)
[root@bbr-test ~]# grub2-set-default 0
[root@bbr-test ~]# grub2-mkconfig -o /boot/grub2/grub.cfg
Generating grub configuration file ...
Found linux image: /boot/vmlinuz-4.19.224
Found initrd image: /boot/initramfs-4.19.224.img
Found linux image: /boot/vmlinuz-3.10.0-1160.49.1.el7.x86_64
Found initrd image: /boot/initramfs-3.10.0-1160.49.1.el7.x86_64.img
Found linux image: /boot/vmlinuz-0-rescue-1d532804448ef6ef38c48a2678a715da
Found initrd image: /boot/initramfs-0-rescue-1d532804448ef6ef38c48a2678a715da.img
done
```

#重启

reboot

开启bbr并查看

echo "net.core.default_qdisc=fq" >> /etc/sysctl.conf

echo "net.ipv4.tcp_congestion_control=bbr" >> /etc/sysctl.conf

sysctl -p

lsmod|grep bbr

```
[root@bbr-test ~]# sysctl net.ipv4.tcp_available_congestion_control
net.ipv4.tcp_available_congestion_control = reno cubic bbr
[root@bbr-test ~]# sysctl net.ipv4.tcp_congestion_control
net.ipv4.tcp_congestion_control = bbr
[root@bbr-test ~]# lsmod |grep bbr
tcp_bbr                20480  1
```