

□□□□□□□□□□

□□□□□□□□

2. 203?TCP???????

□□□□

Get-NetTCPConnection | Group-Object State

□□□

```
Established : 24
Listen      : 110
TimeWait    : 37
```

□□□

????????????

24□□□□□□□□□□

- RDP
- DNS
- Hyper-V□□
- SMB
- □□

□□□

□□□

□□□□TCP□□□□

3. 60?NAT?????????

□□□□□□

Hyper-V

└─ OpenClash

└─ Ubuntu

└─ RULR

└─ MongoDB

└─ MySQL

└─ ...

□□□□□

60□ NAT Session

□□□□□

600000+

□□□□□

VM□□

□□□□□□

Established 24

□□□□□

60□□□

4. ??????????

□□□□□

Windows Server 2025

Hyper-V

40□VM

□□□□

□□□□□□□

Get-NetTCPConnection

□□

PPS

□□□□

□□□

```
Get-Counter '\Network Interface(*)\Packets Received/sec'  
Get-Counter '\Network Interface(*)\Packets Sent/sec'
```

VMQ??

□□□

```
Get-NetAdapterVmq
```

CPU??

□□□

```
Get-Counter '\Processor Information(*)\% Interrupt Time'
```

DPC??

□□□

```
Get-Counter '\Processor Information(*)\% DPC Time'
```

5. ??????????????

□□□□□□□□

□□□□□□

```
1025-65535  
64511□□□□□
```

□□□□

□□□□□□□□

Intel 82599

□□□□□□□□

□□

82599 □□□ VMMQ

□□□□

RSS
VMQ
SR-IOV

□□□□□□

VMMQ
vRSS□□

□□□□

30~40□□□□
□□□□

□□□□

□□□□□□□□

CPU□□
VMQ□□

□□□ TCP□□□

6. ??????????

□□□□□□□□

Get-NetAdapterStatistics

□□□□

□□□ 30□

Get-NetAdapterStatistics

□□□□□

□□□□□

□□□□□

PPS

□□□□

□□□□

- □□□ 82599□
- □□□□□□
- □□□□ SR-IOV
- □□□□□ X710/X550/E810

7. ????????

□□□□□□□

□□	□□
TCP□□□□	□□
UDP□□□□	□□
AutoTuning	□□
RSS	□□□
Hyper-V vRSS	□□□
□□□□□	□□
□□□□□	□□
NAT□□□□	□□□□
TCP□□□□	□□□
□□□□	□□□

26223 □□□□□□

3. conntrack ??

```
cat /proc/sys/net/netfilter/nf_conntrack_max
```

1048576

□□

1048576 □

≈ 104□

??????

26223 / 1048576

≈ 2.5%

□□□□

2.5%

□□□

97.5%

□□□□

???????????? conntrack ??

□□□□□ conntrack □□□□□□□□

```
dmesg | grep conntrack
```

□□□

nf_contrack: table full, dropping packet

□□□□

26223 / 1048576

□□□□

???????? Linux ????

Linux NAT □□□□□□

□IP□□

+

□□□□

□□□

□□□□IP

□□□64000□□□□

□□□□

□□□□

1024~65000

≈63977□□□

□□□□□

????

□□□

1□□□IP

□□ SNAT□

```
10.1.1.1:50001
10.1.1.1:50002
...
```

□□□□

```
63977 □□□□
```

□□□□ IP:PORT□

? conntrack ? 104 ?

□□□□□□□□□□

□□□

```
□□□□IP
□□□□□□
```

□□□□□□□□

□□□

```
1.1.1.1:443
8.8.8.8:443
114.114.114.114:443
```

□□□□□□□□□□

conntrack □□□□□□□□

```
□IP
□□□
□□IP
□□□□
□□
```

????????? 60 ? NAT ??

■■■■■■■■■■

???? contrack

```
watch -n 1 'contrack -C'
```

■■■

```
while true
do
    date
    contrack -C
    sleep 5
done
```

?? contrack ???

```
echo $(( $(contrack -C) * 100 / $(cat /proc/sys/net/netfilter/nf_contrack_max) ))
```

???????

```
contrack -S
```

■■■

```
insert
insert_failed
drop
early_drop
```

■■■

```
insert_failed > 0
```

■■ contrack ■■■■■■

?? TCP ????

```
ss -ant | awk '{print $1}' | sort | uniq -c
```

□□□

```
ss -s
```

□□□□

```
ESTAB  
TIME-WAIT  
SYN-RCV
```

??????????

□□□□□

```
2□ Windows Server 2025  
Hyper-V  
40□□□□  
□□□□□□
```

□□□□ NAT □□ Ubuntu □□□□□□□□□□□□

```
Windows □□□□
```

□□□

```
nf_conntrack_count  
nf_conntrack_max  
  
CPU softirq  
  
□□ PPS  
  
TIME_WAIT □□  
  
SYN_RECV □□
```

□□□□□ NAT □□□□□□□□□□□□

CPU

>

conntrack

>

Windows

date

uptime

conntrack -C

cat /proc/sys/net/netfilter/nf_conntrack_max

ss -s

cat /proc/sys/net/ipv4/ip_local_port_range

sar -n DEV 1 5

mpstat -P ALL 1 5

- 60
- conntrack
- CPU softirq
- conntrack NAT

Revision #3

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