

# nat???60??hyper-v ????????????????

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

Windows Server 2025 + Hyper-V + ???

+ ?????? ?????????

??????

## 1. TCP ??????

???

49152-65535

16384???

???

1025-65535

64511???

???

```
netsh int ipv4 show dynamicport tcp
```

???

???: 1025

???: 64511

?????

???

- Hyper-V??
- ?????
- ?? TCP??
- IIS/Nginx????
- RabbitMQ
- MongoDB/MySQL??

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## 2. UDP ??????

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```
netsh int ipv4 set dynamicport udp start=1025 num=64511
```

□□

```
□□□□ : 1025
□□□  : 64511
```

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□□

- DNS
- SIP
- SNMP
- VXLAN
- □□□□

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## 3. TCP Auto-Tuning

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```
□□□□□□□□□□ : disabled
```

□□□

```
□□□□□□□□□□ : normal
```

□□□□□□□□

```
normal
```

□□□□

```
experimental
```

■■■■■■■■■■■■■■■■■■■■

experimental□

## 4. RFC1323 Timestamp

■■■

RFC 1323 ■■■ : allowed

■■■■ enabled■■■■

allowed

■■■

■■■■■■■■  
■■■■■■■■

□□ Windows Server 2022/2025 ■■■■■■

■■■■■

allowed

■■■ disabled□

■■■

- SMB3
- Hyper-V Live Migration
- ■■■■■■

■■■■ Timestamp□

## 5. ECN

■■■

ECN □□ : enabled

■■■■■■■

ECN□ Explicit Congestion Notification■■■■■■■■■

■■■

```
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- □□□□□□
- □ H3C□□□
- □□□□

```
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```

```
netsh int tcp set global ecncapability=disabled
```

```
□□□□□□□□□□
```

```
enabled□
```

## ?? winnat

```
□□□□
```

```
net stop winnat
```

```
□□□
```

```
□□□□ Windows NAT Driver □□
```

```
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```

```
□□□□□□□□□□
```

```
Hyper-V NAT
```

```
Docker NAT
```

```
Container NAT
```

```
□□□□□□
```

```
WinNAT□
```

□□□□

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

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PowerShell

```
Get-NetTCPConnection | Measure-Object
```

□□□□□□

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?? TIME\_WAIT ??

```
netstat -ano | find /c "TIME_WAIT"
```

□□□□□□

```
10000+
```

□□□

```
30000+
```

□□□□□□□□□□

---

???? Hyper-V ???

□□□□□□□□

```
netsh int tcp set global autotuninglevel=normal
```

```
netsh int ipv4 set dynamicport tcp start=1025 num=64511
```

```
netsh int ipv4 set dynamicport udp start=1025 num=64511
```

```
netsh int tcp set global timestamps=enabled
```

□□□□□□



```
netsh int ipv4 set dynamicport tcp start=1025 num=64511
```

■■■■■■■■■■■■■■■■■■■■

# ??82599????RSS??

■■■■■■■

```
Intel 82599 10G #1  
Intel 82599 10G #2
```

■■■

```
SLOT 4  2
```

■■■

```
Enabled : True  
NumberOfReceiveQueues : 128  
Profile : NUMAStatic
```

■■■

```
RSS  000
```

■■■■■

# ?????

## SLOT 4 ??1

■■■

```
NumberOfReceiveQueues : 8
```

■■■

```
RssProcessorArray :  
IndirectionTable :
```

☐☐☐

☐☐☐☐☐☐

```
RSS☐☐☐☐☐
☐☐☐☐☐
☐☐☐☐☐☐☐☐☐
```

☐☐☐☐

```
Get-NetAdapterStatistics -Name "SLOT 4 ☐☐ 1"

Get-NetAdapterStatistics -Name "SLOT 4 ☐☐ 2"
```

☐☐☐☐☐☐☐☐☐☐☐

# ??Hyper-V??????

☐☐☐

```
vEthernet (10.1.1.104-nic1)

vEthernet (10.2.2.4-slot4_2)
```

☐☐☐☐

```
NumberOfReceiveQueues : 16
```

☐☐☐

```
vRSS ☐☐☐
```

☐☐☐☐☐☐

# ??RSC??

☐☐☐☐

Get-NetAdapterRsc

☐☐☐

IPv4Enabled : True  
IPv4Operational : False  
FailureReason : ForwardingEnabled

☐☐☐☐☐☐

☐☐☐

Hyper-V Virtual Switch

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RSC☐☐☐☐☐☐

☐☐☐☐☐☐

☐☐☐

False

☐☐☐☐

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# ??????VMQ

Hyper-V☐☐☐☐☐☐☐☐

Get-NetAdapterVmq

☐☐☐☐

Enabled : True

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☐☐☐

Enabled : False

□□□□

```
Enable-NetAdapterVmq -Name "SL0T 4 □□ 2"
```

# ??????VMMQ

Windows Server 2022/2025□□□□

□□

```
Get-NetAdapterVmq
```

□□

```
Get-VMSwitch
```

□□

```
Get-VMSwitchTeam
```

□□□□□□

```
VMMQ  
Virtual Machine Multi Queue
```

□□

```
20□□□□□□  
10G□□□□
```

□□□□

# ??82599???????

Intel 82599 □□□□□□□□□□

□□□□

```
Get-NetAdapterAdvancedProperty -Name "SLOT 4 2"
```

□□□□

## Jumbo Frame

□□□

9014

□□

9000

□□□

- □□□□
- □□□

## Interrupt Moderation

□□□

Enabled

## Receive Side Scaling

□□□

Enabled

## Flow Control

□□□□ Hyper-V□□□□

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Rx & Tx Enabled



☐☐☐

☐☐☐☐☐☐203☐TCP☐☐

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- RDP
- SMB
- DNS
- Hyper-V☐☐☐☐
- ☐☐☐☐☐☐☐☐

☐☐☐☐

VM☐☐☐TCP☐☐  
VM☐☐☐NAT☐☐  
VM☐☐☐Docker☐☐  
VM☐☐☐☐☐☐☐☐

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



☐☐ NAT ☐☐☐☐☐☐☐☐ VM ☐☐☐

OpenClash  
Linux NAT

☐☐☐

RouterOS

pfSense

OpenWRT

☐☐☐

Get-NetTCPConnection

☐☐☐☐☐☐☐☐☐☐

100~500☐☐☐

☐☐ 60 ☐ NAT ☐☐☐☐☐☐☐

VM ☐☐☐

# ???? NAT ???

☐☐☐☐☐☐☐☐

NAT☐

Get-NetNat

☐☐☐☐

No MSFT\_NetNat objects found

☐☐☐

☐☐☐☐☐☐☐NAT

☐☐☐☐☐☐☐☐☐☐

Get-NetTCPConnection | Group-Object State

☐☐☐

Established : 150

TimeWait : 30

Listen : 20

☐☐☐☐☐☐☐☐☐☐

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# ?? NAT ? OpenWrt VM

☐☐☐

```
OpenWrt VM  
192.168.1.1
```

☐☐☐

```
cat /proc/sys/net/netfilter/nf_conntrack_count
```

☐☐☐

```
conntrack -C
```

☐☐☐☐

```
600000
```

☐☐☐☐☐☐

---

# ?? NAT ? Windows VM

☐☐☐

```
Get-NetNatSession | Measure-Object
```

☐☐☐

```
Get-NetNatSession
```

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# ???????

☐☐☐☐☐

- Hyper-V
- 40☐☐☐☐
- OpenClash
- ☐☐☐☐☐☐



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