



# Virtualization Station 3.5

SR-IOV and Intel QAT enhance network  
and compression performance of VMs



**SR-IOV**  
**Reduce network**  
**bandwidth loss**



# The network problem of enterprise



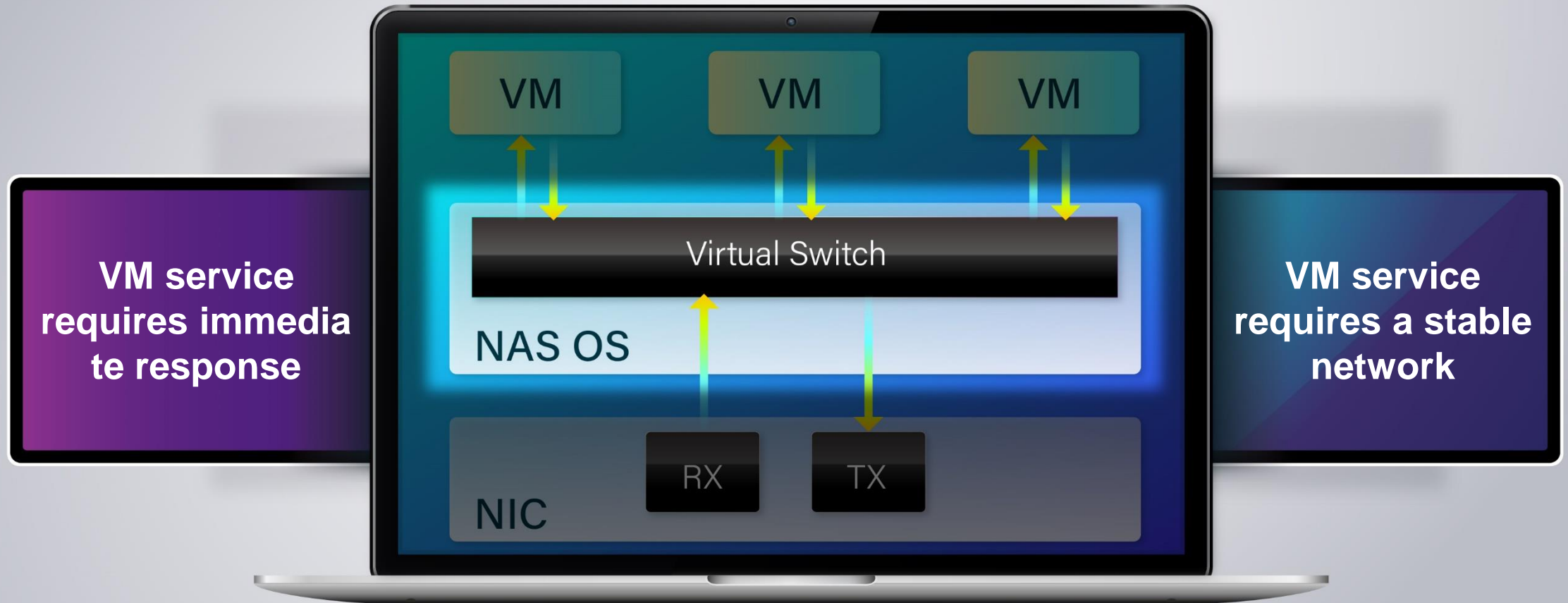
VM service requires  
immediate response



VM service requires a  
stable network



# How to reduce the network bandwidth loss of VM?

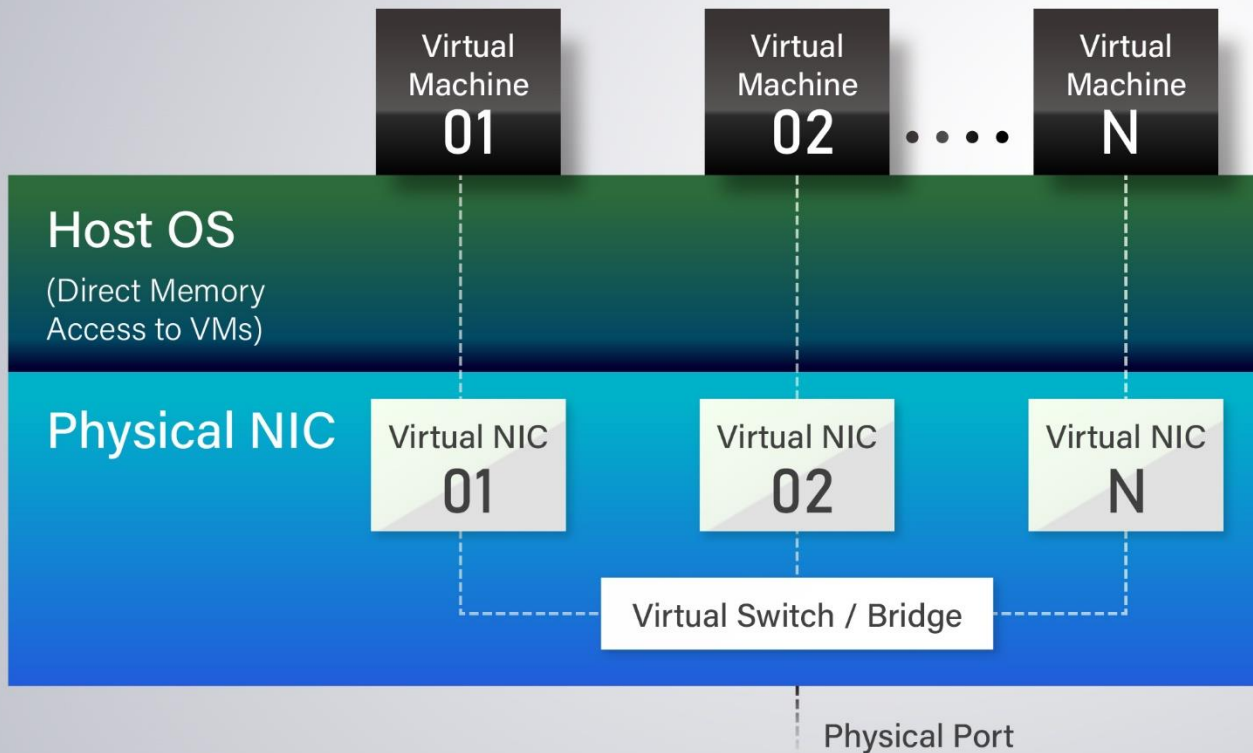


# SR-IOV- Single Root I/O Virtualization

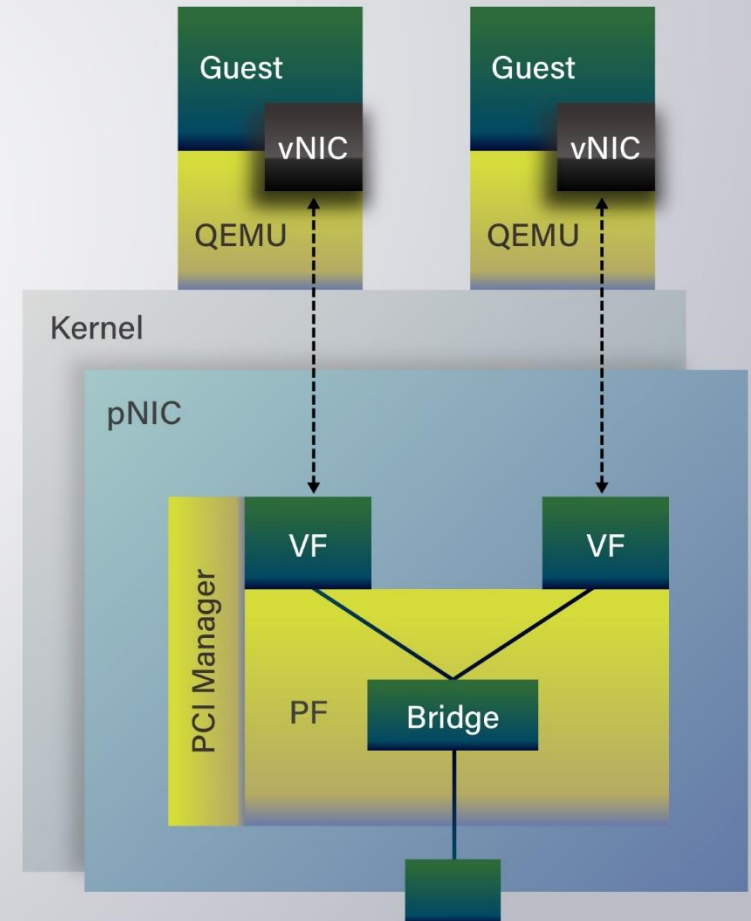


A physical network card (Physical Function, PF) can virtualize multiple lightweight PCI-e physical devices (Virtual Function, VF), which can be allocated to virtual machines.

In fact, the VMs uses the VF on the physical network card directly and enjoy the network speed from the network card.



## SR-IOV

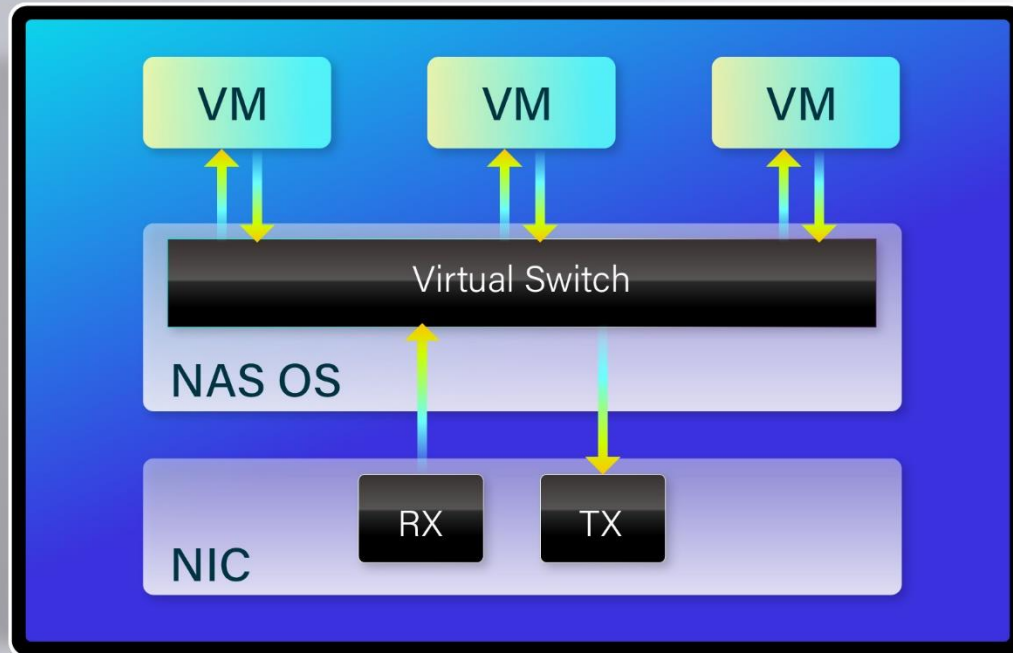




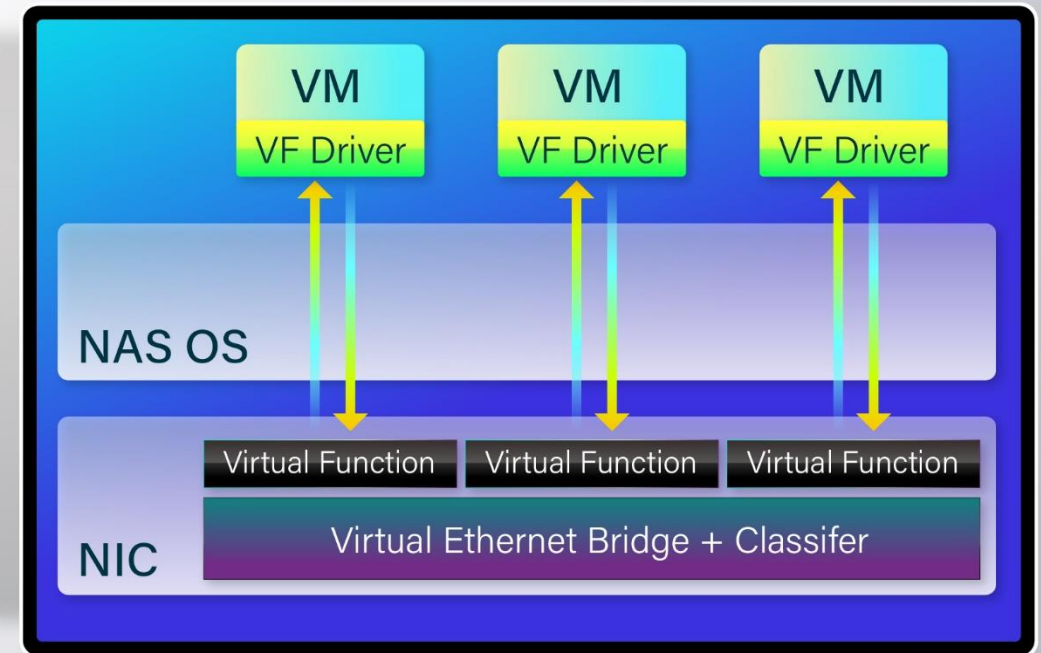
# SR-IOV Architecture



## Normal



## SR-IOV

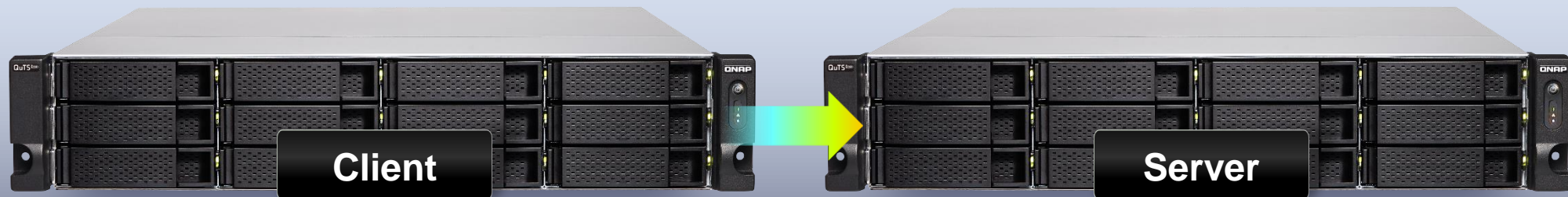


# The network speed used by SR-IOV is enhanced 20%



	VM NAS (Client) to NAS(server) <b>None SR-IOV</b>	VM (VF)NAS (Client) to NAS(server) - SR-IOV	
NAS CPU Usage	97%	95%	Reduce CPU usag
VM OS CPU Usage	13%	12%	Reduce CPU usage
Transfer speed	1GB/s	1.21 GB/s	Enhance performance 20%

## VM /NAS Client to Server data transfer test



Test environment setting	VM
TS-h868 (Client) / FW 4.5.1.1427 + NIC QXG-10G2SF-CX4	OS : windows server 2016
TS-h668 (Server) / FW 4.5.1.1427 +NIC QXG-10G2SF-CX4	Cores : 8 (NAS cores )
QVS 3.5.1_20200914	Memory : 3GB

Build 8 VM ,8 VF in QXG-10G2SF-CX48  
allocate 1 VF to 1 VM use

# QAT technology doubles compression performance



	ubuntu-18.04.1-desktop-amd64.iso (1.81GB) -None QAT	ubuntu-18.04.1-desktop-amd64.iso (1.81GB) - QAT	
Compression Time	122.64s	62.28s	Double Compression Speed!
NAS CPU useage	95%	93%	CPU useage almost the same

VM1 VM2 VM3 VM4

VM5 VM6 VM7 VM8



Test environment setting	VM
Test model: TS-h886	VM OS: ubuntu 18.04
QVS 3.5.3	Cores : 8 (NAS cores )
	Memory : 1GB

8 VM,each VM allocate 1 QAT VF compression test at the same time.



# The visual UI is more easy to use



Control Panel Station 虛擬機工作站

## ControlPanel

- System
  - General Settings
  - Storage & Snapshots
- Privilege
  - Security
- Hardware
- Power
- Notification Center
- Firmware Update
- Backup / Restore
- External Device
- System Status

General Audio Alert Smart Fan **Hardware Resources**

Device	PF/ VF	VM
QNAP Systems, Inc. QXG-25G2SF-NXE Virtual Function	VF 01:01.0	VM Ubuntu-Server-20.04
	VF 06:02.0	
	VF 06:02.1	
QNAP Systems, Inc. Ethernet Connection X553 10 GbE SFP+SFP	PF 0a:00.0	
	VF 0a:10.0	
Connection X553 1GbE	PF 0c:00.0	
	VF 0c:10.0	

### Win10

Information Settings Snapshot Log

Status: ● Powered off

Description:

**General**

VM Name	Win10
Core (s)	4
Memory	6 GB
UUID	431878c1-2c36-48ca-a0c4-58a82d70994b

**Network**

Adapter 1	SR-IOV Adapter 1
Physical Function	0a:00.1   Ethernet Connection X553 10 GbE SFP+SFP
Virtual Function	0a:1e.3   Ethernet Connection X553 10 GbE SFP+SFP Virtual Function
MAC Address	52:54:00:87:0f:b9

# SR-IOV advantages and benefits for user



## Advantage

- Let the services on your virtual machine enjoy the physical network speed.

## Benefits

- If you need real-time service needs, such as ticket booking service, cash flow service, audio-visual service, you can directly enjoy the speed of the hardware network card, reducing network delay.
- Reduce the usage of the host's CPU.
- Increase network efficiency by at least 20%.



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**SR-IOV**

**LIVE  
DEMO**



# SR-IOV Support list



## SR-IOV support model list and BIOS Version :

- TS-h686(Q05SAR01)/TS-h886(Q05SAR01)
- TS-1886XU-RP(Q047AR03)/ TS-h1886XU-RP(Q047AR03)
- TDS-16489U(QX31AR19)/TDS-16489U-R2(QX31AR19)
- QGD-1602P(Q03OAR05)
- TS-h2490FU(Q03XAR15)

## QAT support model :

- QGD-1602P

## NIC Card :

- Intel : LAN-10G2T-X550
- Mellanox :LAN-10G2SF-MLX/LAN-40G2SF-MLX
- Mellanox :QXG-10G2SF-CX4/QXG-25G2SF-CX4

# SR-IOV notice



- SR-IOV needs to be matched with a supported model, BIOS version and supported network card to support it.
- SR-IOV support SW version QTS 4.5.2 & QVS 3.5.3.
- QAT needs to install the corresponding virtual function driver in the Guest OS.
  - Currently, the downloadable driver version on the official website is Linux and FreeBSD.
  - Intel driver download link - <https://01.org/intel-quick-assist-technology/downloads>
- The VM Live Migration function cannot be used when using SR-IOV (Device Passthrough).
  - Because the physical device used by the VM will not recognize the original physical device ID after VM Live migration.







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**Your Best Choice!**

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