QNAP

Virtualization Station 3.5

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

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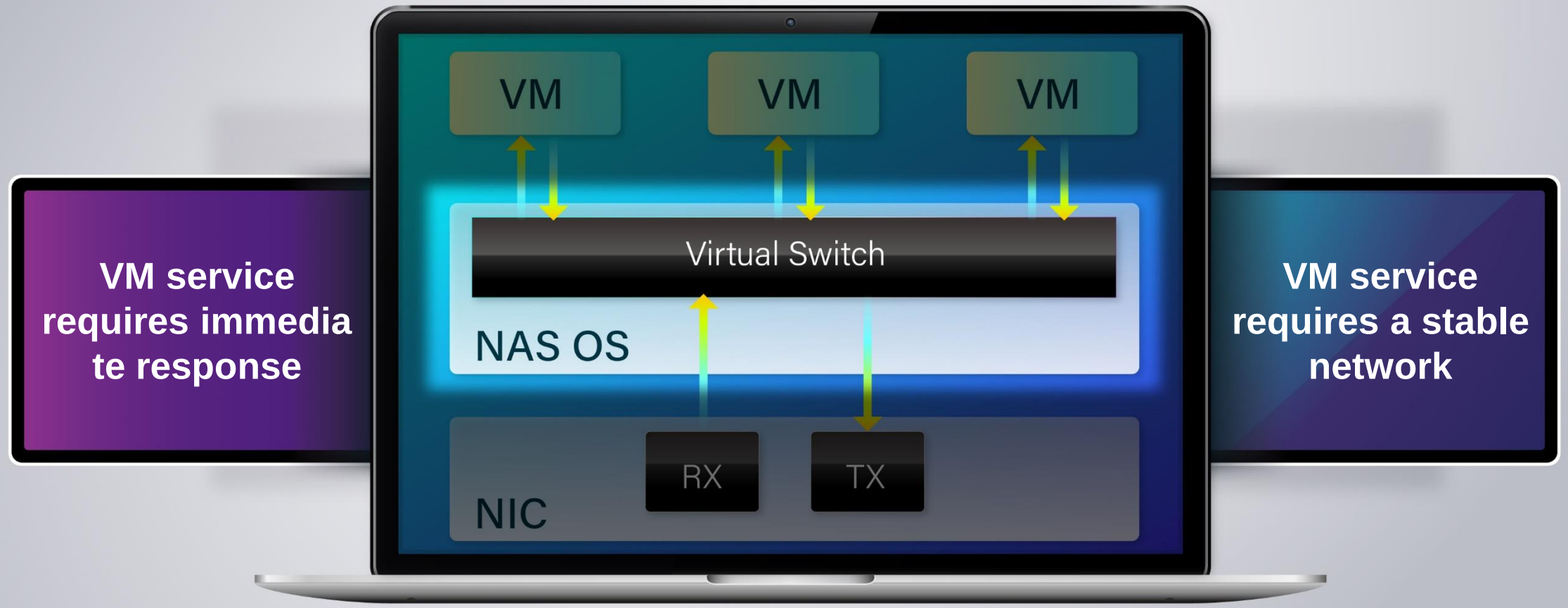
SR-IOV
Reduce network bandwidth loss

The network problem of enterprise

VM service requires immediate response

VM service requires a stable network

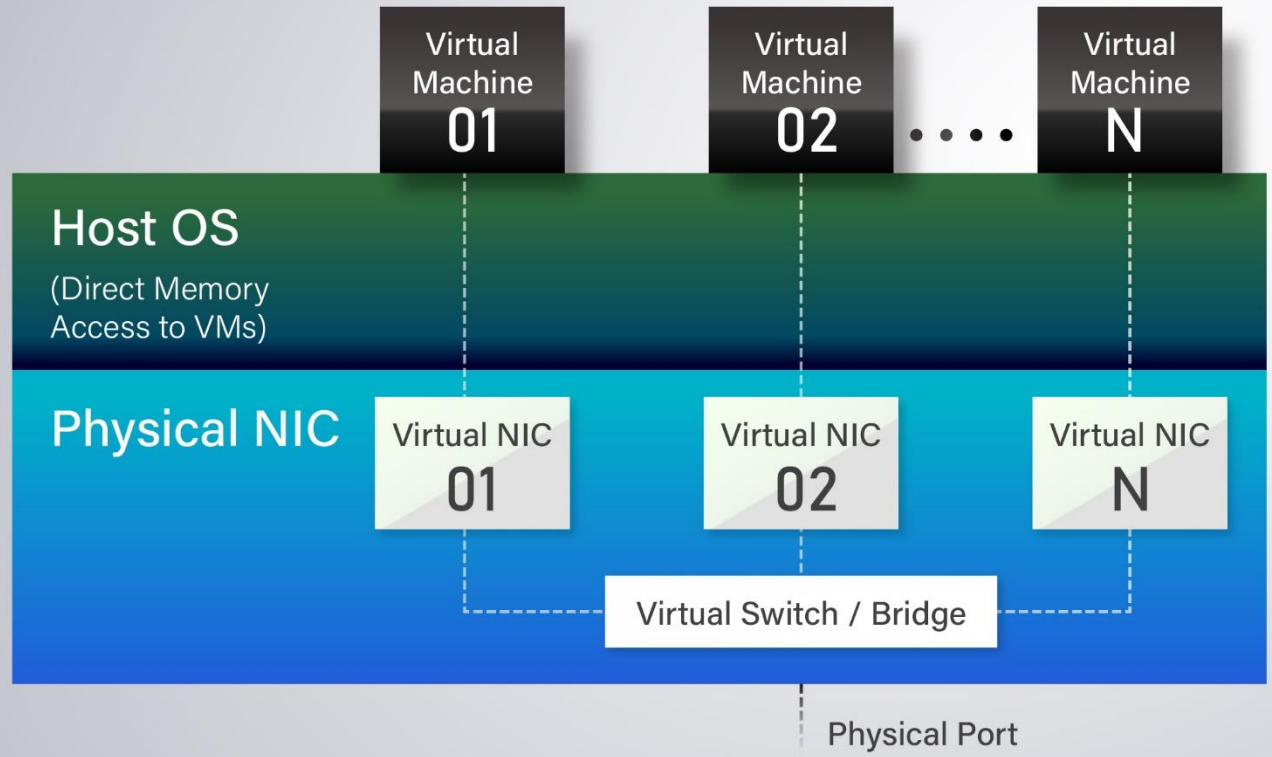
How to reduce the network bandwidth loss of VM?

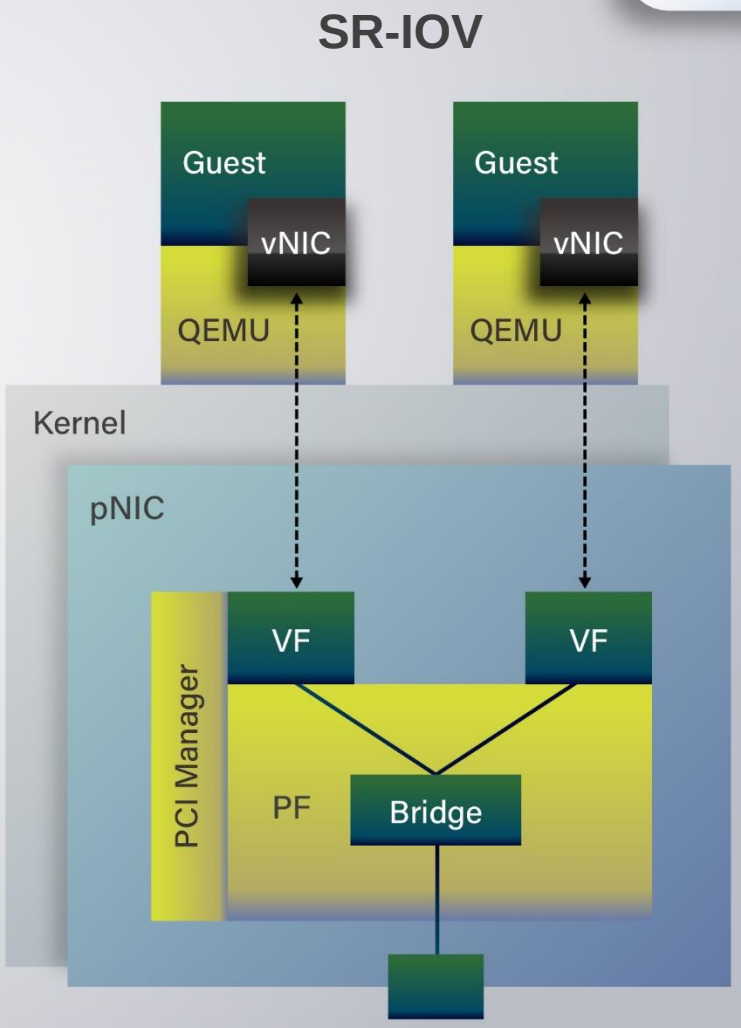


SR-IOV- Single Root I/O Virtualization

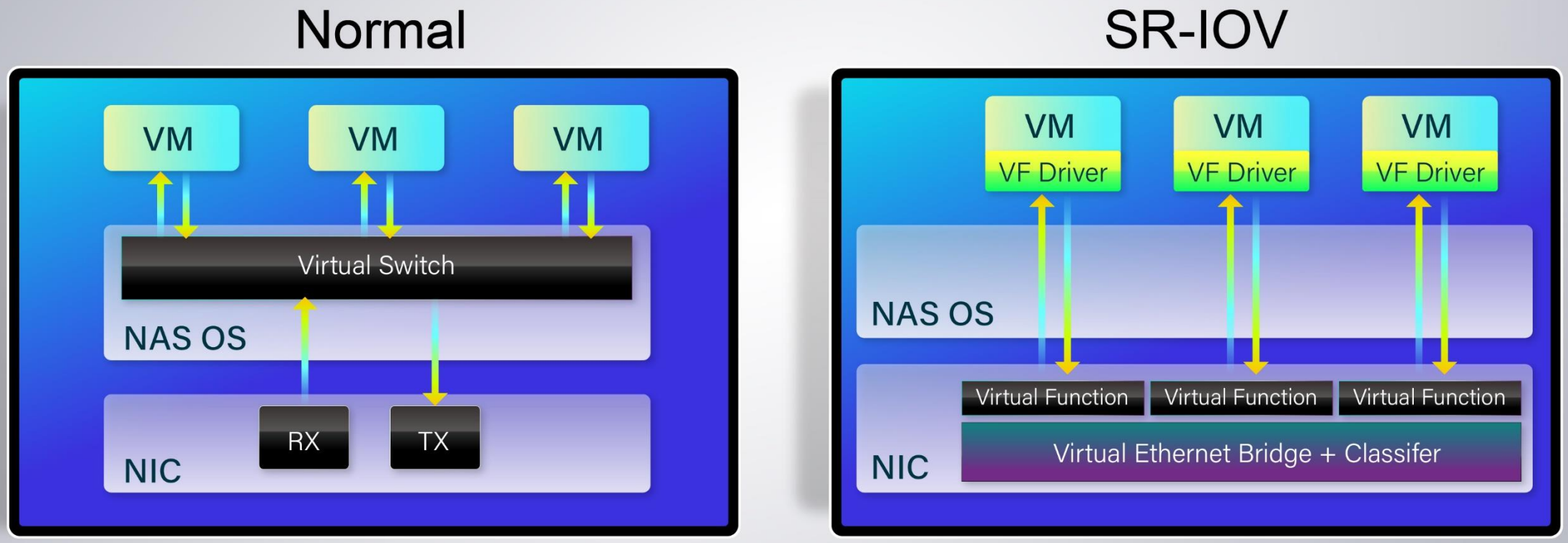
A physical network card (Physical Function, PF) can virtualize multiple lightweight PCI-e physical devices (Virtual Function, VF), which can be allocated to virtual machines.

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





SR-IOV Architecture



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

	VM NAS (Client) to NAS(server) None SR-IOV	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

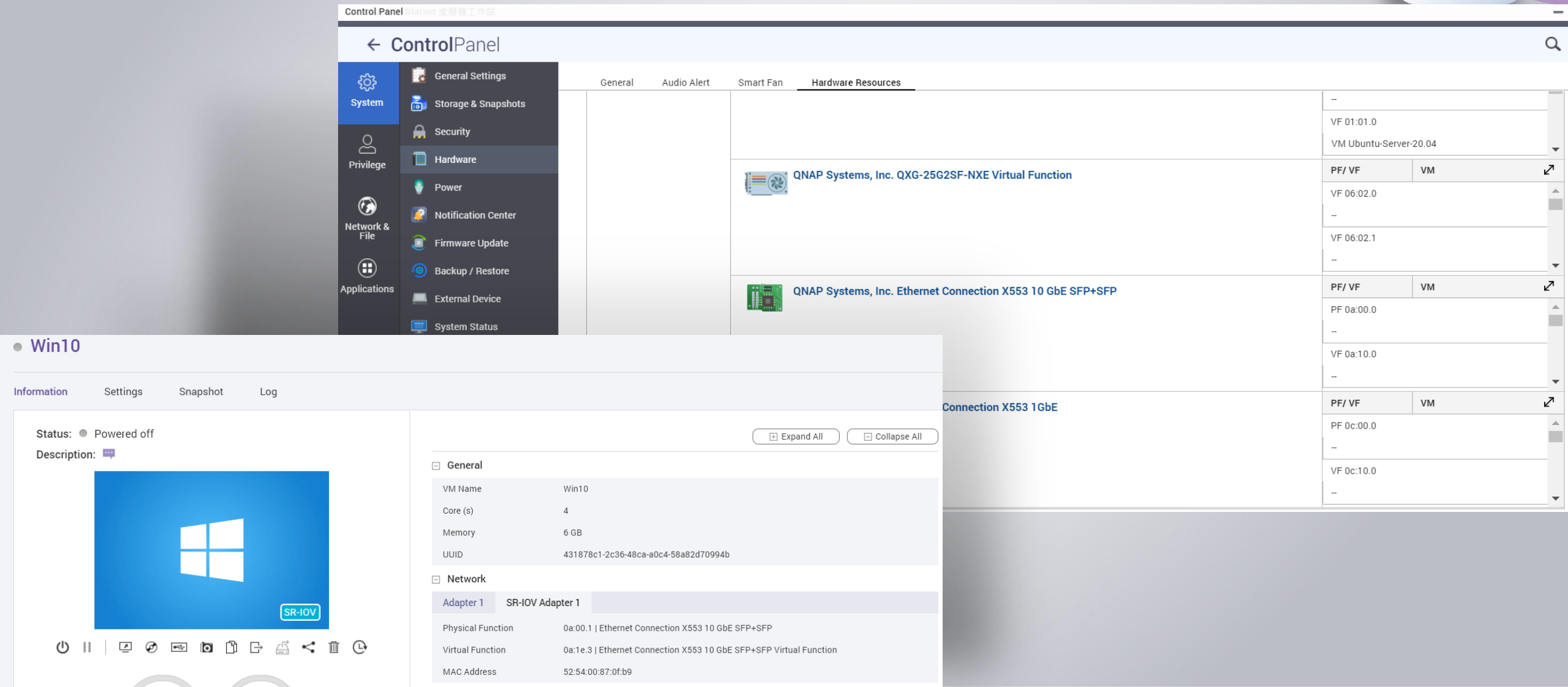
QAT technology doubles compression performance

	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**

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

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

The visual UI is more easy to use



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

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 FreeBS.
  - 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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