

QNAP Network & Virtual Switch

Experience high speed transmission & performance, and virtual network infrastructure

Use cases of high speed transmission









Mass Media



Healthcare



High speed transmission is no longer luxuries...

Why do you need higher performance?



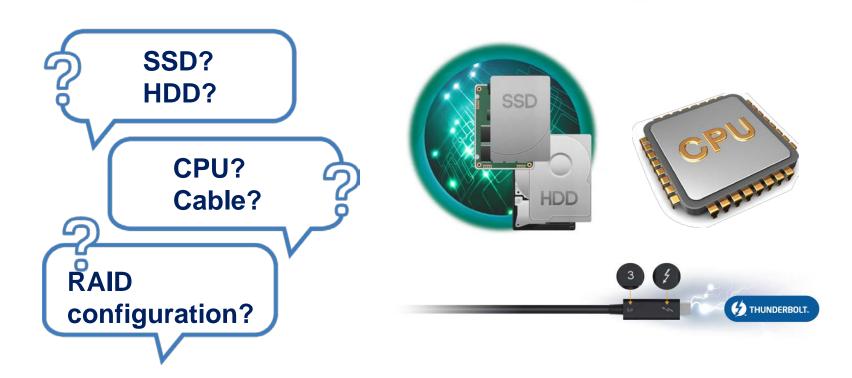


QNAP network advantages

| | QNAP QTS 4.3.4 | Synology DSM 6.2 |
|---|--|--|
| Hardware design optimized for high speed transmission | 10G supported from entry to high-end (with QM2 expansion) | High-end only |
| 4K/6K/8K online editing | Long-term collaboration with video editors and provides high-speed transmission solution | Btrfs is less used for video post-production |
| Thunderbolt connectivity | Supports shared storage for Mac and Windows through Thunderbolt | Not supported |
| Support diversified virtual networks for VM and container | Win Dedicated UI | Less choices |
| Flexible virtual switch infrastructure | Win The virtual switch can be adjusted at any time | Only set on VM/Container |



What else do you need for high speed network?



As the old proverb says, time is money

If need to process 4TB of raw data:

```
1 GbE
```

11 hours

```
(4TB ÷ 100MB/s ÷ 60sec ÷ 60min)
```

10 GbE / Thunderbolt 2

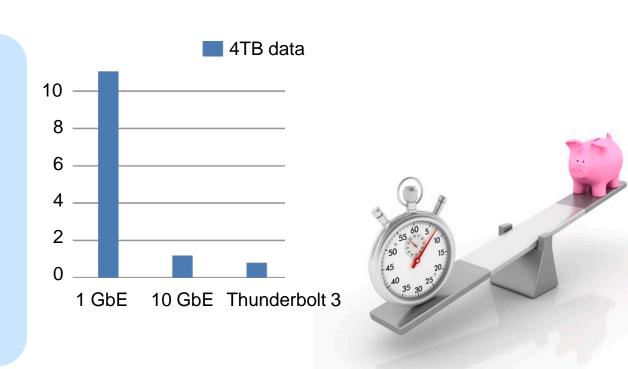
1.2 hours

```
(4TB ÷ 950MB/s ÷ 60sec ÷ 60min)
```

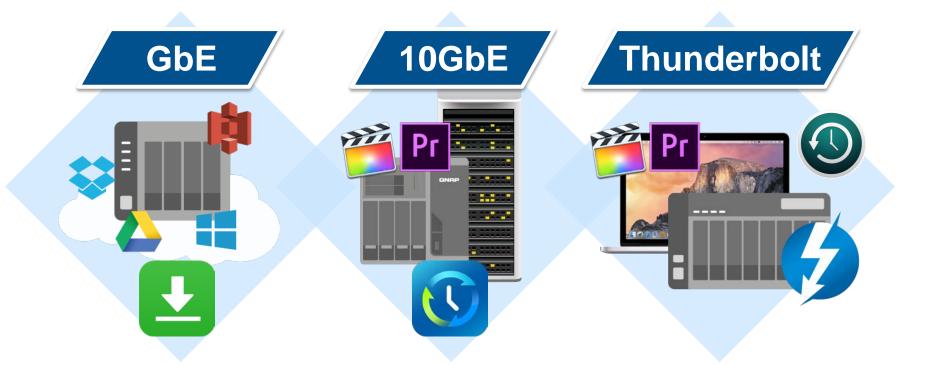
Thunderbolt 3

•0.75 hour

(4TB ÷ 1400MB/s ÷ 60sec ÷ 60min)



Applications of various high-speed network interfaces



Faster Wi-Fi, delivered: new products under way

QWA-AC1900U USB WiFi dongle



QW-AC2600 PCle Wi-Fi expansion card





Demo – File transfer

Performance comparison



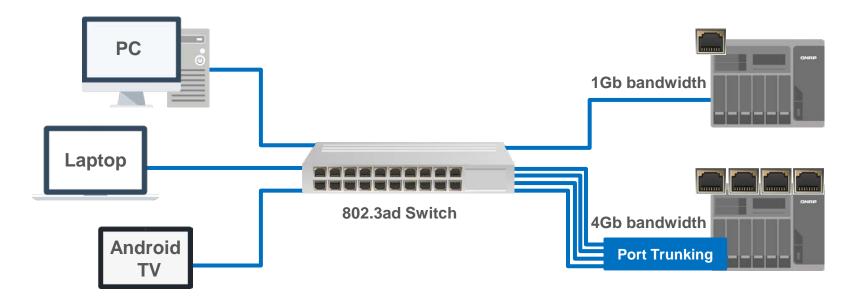
QNAP NAS Network functionality introduction

- Port Trunking
- VLAN
- DHCP server
- Default Gateway
- WiFi



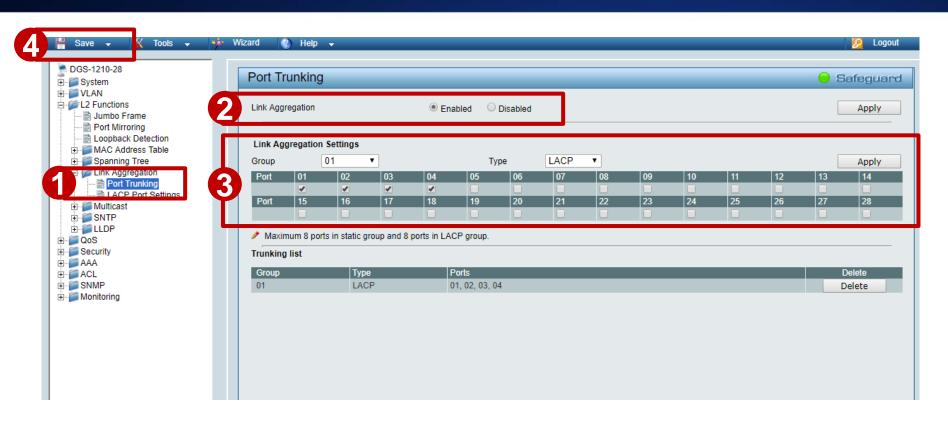
Port Trunking (load balancing and failover)

- Increases bandwidth and adds load balancing for more clients.
- Provides a failover mechanism to maintain network availability.



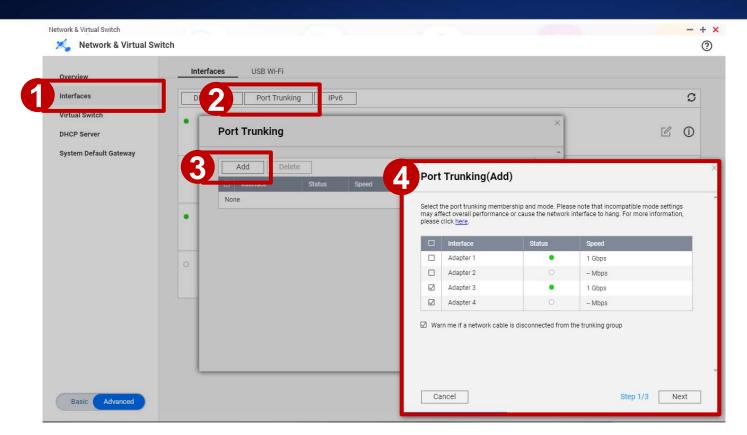


Port Trunking – switch setting



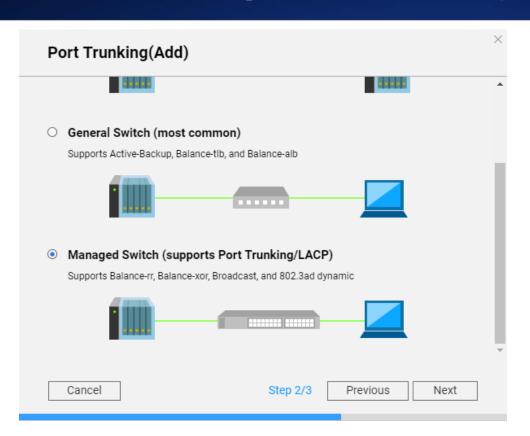


Port Trunking – interface





Port Trunking – switch type





Port Trunking - mode

Port Trunking(Add)

Transmits the same network packets to all the network interface cards.

Load balancing & Failover

Increases the bandwidth to maintain the transmission speed for multiple clients and provides failover to ensure that the network connection will remain available even if a port fails.

Balance-rr

Transmits network packets sequentially to each network interface card in order to distribute the internet traffic among all the NICs.

Balance-xor

Transmits network packets using the XOR algorithm, which selects the same NIC slave for each destination MAC address.

802.3ad dynamic

Uses a complex algorithm to aggregate NICs and configure speed and duplex settings, providing load balancing and fault tolerance.

Note: The switches also need to be configured.

Cancel

Step 3/3

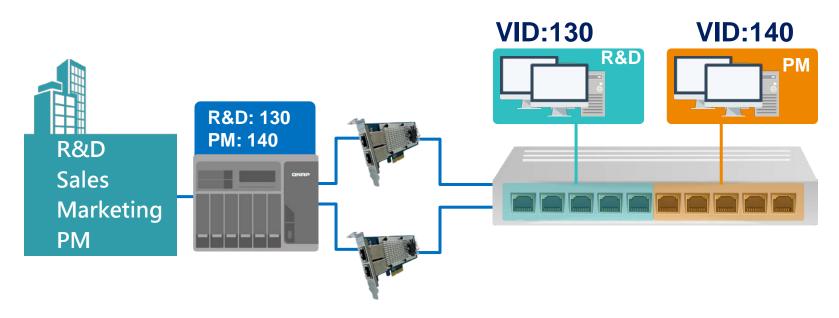
Previous

Apply



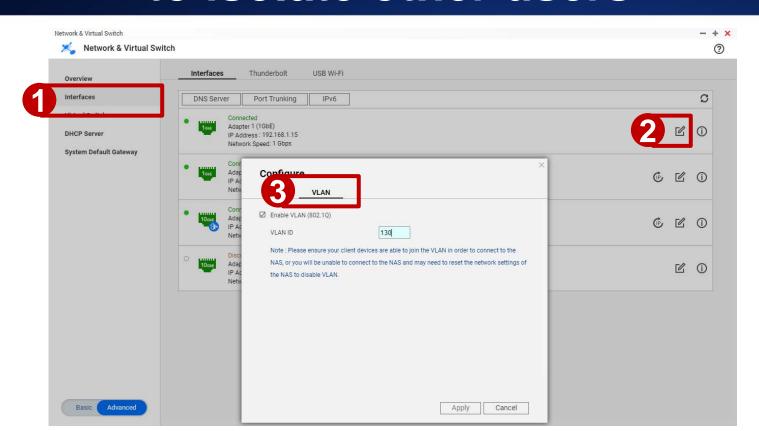
VLAN (Virtual LAN)

- Ensures the network will not be affected by duplication of packets.
- Enhances network access security.



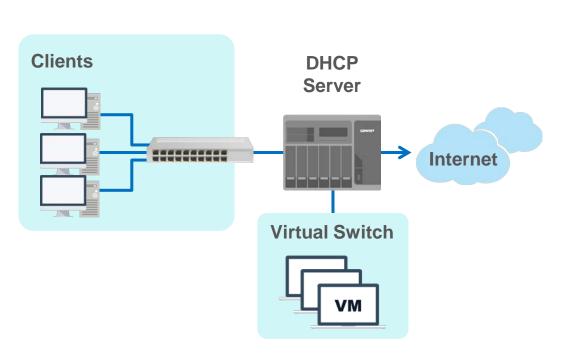


VLAN – set R&D VID to isolate other users





Built-in DHCP service

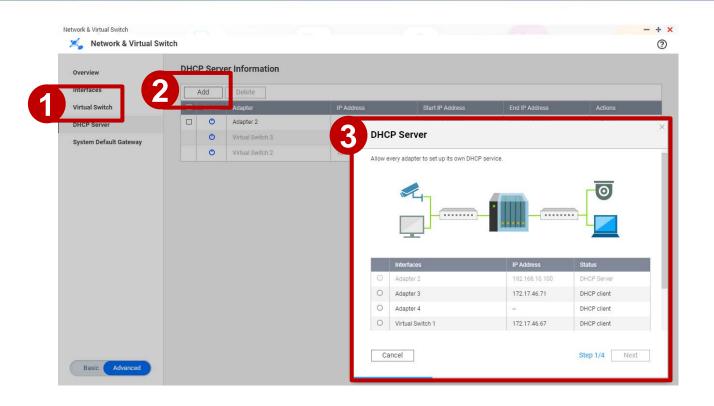


DHCP Server

- Assigns IP address to other physical interfaces in the private network.
- Assigns IP address to virtual machines via virtual switch.



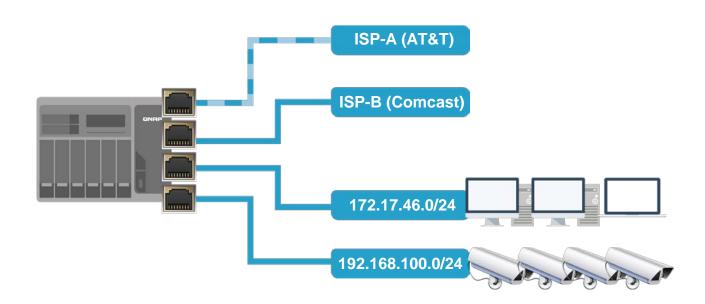
DHCP service - setting





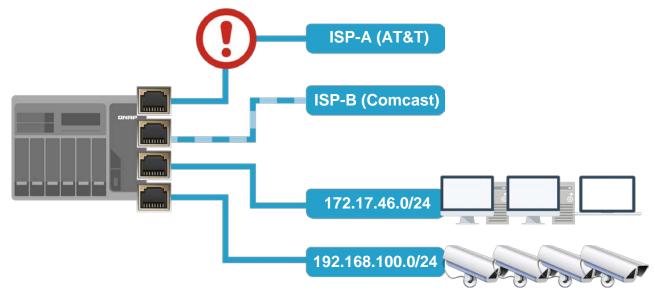
System Default Gateway

 Automatically detect adapters that can connect to the Internet (provides failover).



Auto failover when a connection is interrupted

- ♦ It checks the status of NAS network connections automatically (similar to Microsoft NCSI)
- Or, set the default gateway manually



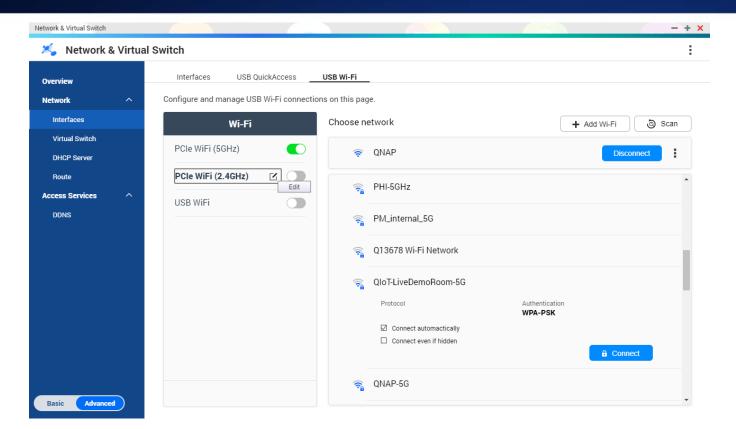


Wi-Fi makes things easier...



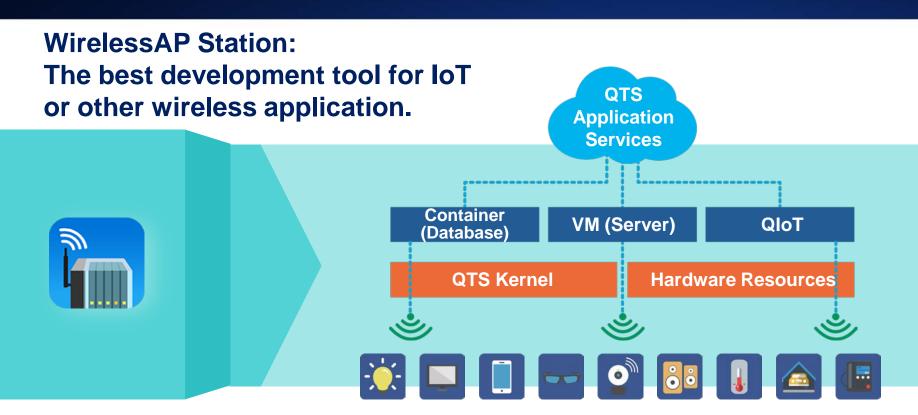


New UI for setting up Wi-Fi





Your NAS is now a Wi-Fi AP





Introduction to Virtual Switch functionality



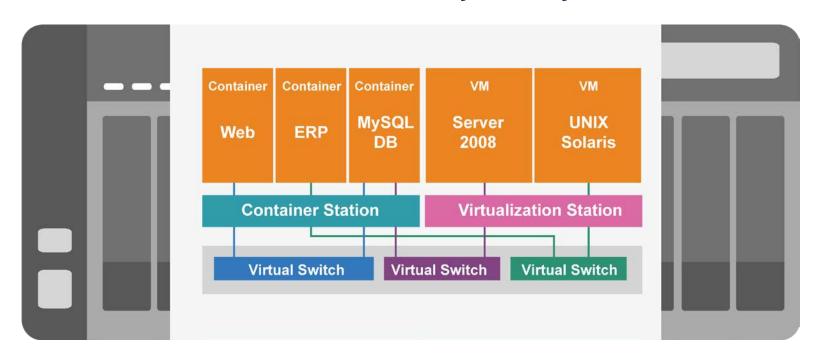
Connect between physical and virtual interfaces





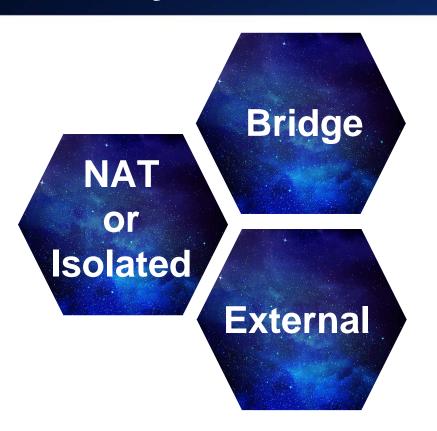
Application Defined Network Micro-Segmentation

Define the network infrastructure your way via virtual switch





Flexibly define different network modes



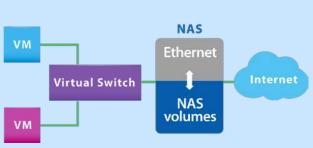
- Bridge mode bridges different types or segments
- ♦ NAT or Isolated Improves safety and security with network address translation (NAT) available
- External Exclusive access to all available bandwidth.



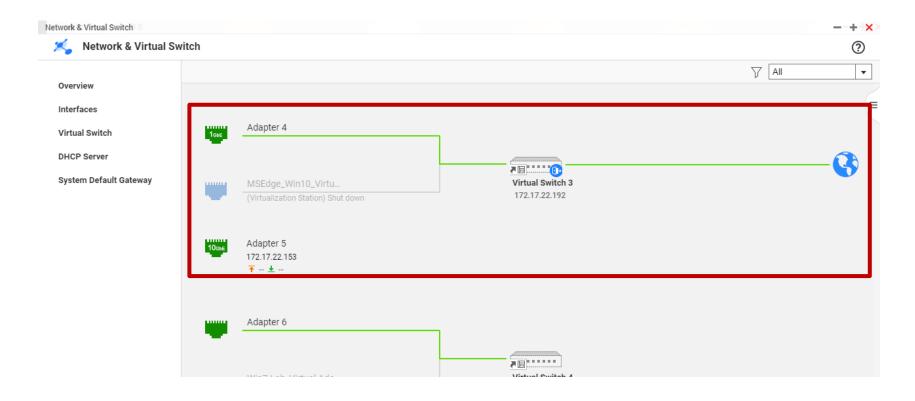
Bridge Mode

◆ Connect your virtualized network to external physical networks. (Every virtual device is considered a real PC in the network)

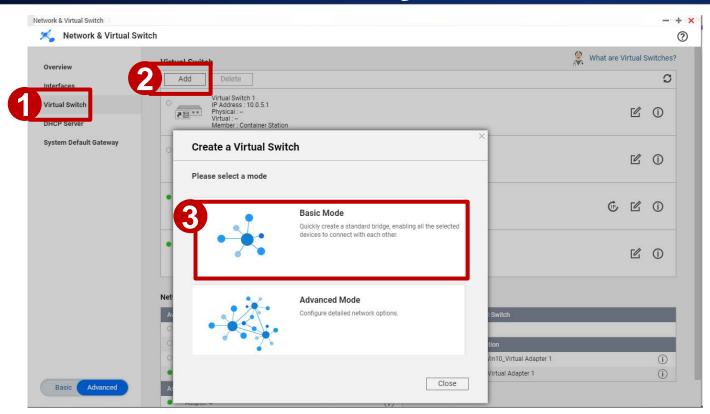














| hysical | Adapter | | |
|-----------|-------------------|---|--------------------|
| | Status | Adapter | IP Address |
| | 0 | Adapter 1 | |
| | 0 | Adapter 2 | |
| | 0 | Adapter 3 | |
| | • | Adapter 4 | 172.17.22.192 (V |
| \square | • | Adapter 5 | 172.17.22.153 |
| | • | Adapter 6 | 0.0.0.0 (Virtual S |
| irtual Ad | dapter (Cannot mo | dify Container NIC or Linux internal NIC) | |
| | Application | Adapter | Name |
| ☑ | Virtualization | MSEdge_Win10_Virtual Adapter 1 | MSEdge_Win10 |
| Ø | Virtualization | Win7-Lab_Virtual Adapter 1 | Win7-Lab |

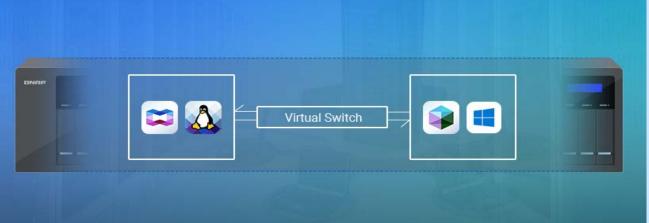


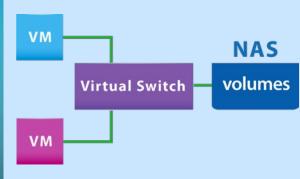




Isolated mode

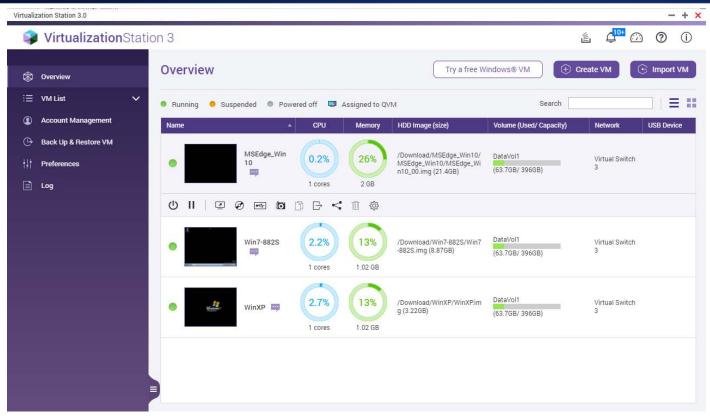
- Absolutely closed and secure virtual network
 - Perform functional verification
 - Internal data computing
 - Sandbox testing
- Provides DHCP service and NAT (if Internet access is temporarily needed)





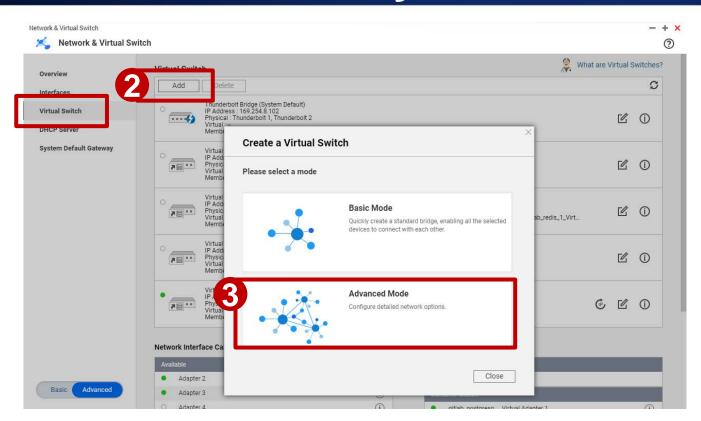


Set up isolated mode virtual switch for your VM





Set up isolated mode virtual switch for your VM



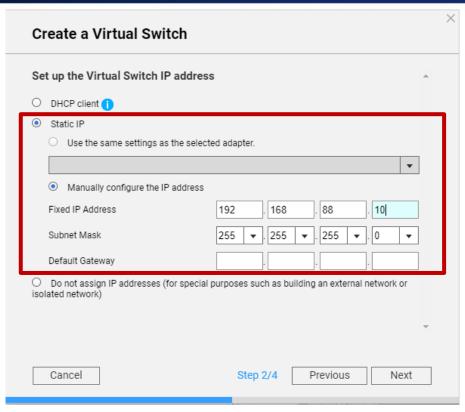


| Create a Virtual Switch | | | | | | |
|---|--|---------------|-----------------------------------|-------------------|--|--|
| Se | Select the devices for the Virtual Switch. | | | | | |
| Ph | Physical Adapter | | | | | |
| | | Status | Adapter | IP Address | | |
| П | | • | Adapter 1 | 192.168.1.15 (Vi | | |
| | | • | Adapter 2 | 169.254.100.100 | | |
| | | • | Adapter 3 | 172.17.46.74 | | |
| | | 0 | Adapter 4 | | | |
| Virtual Adapter (Cannot modify Container NIC or Linux internal NIC) | | | | | | |
| | | Application | Adapter | Name | | |
| | | Container Sta | gitlab_postgresqVirtual Adapter 1 | gitlab_postgresql | | |
| | | Container Sta | gitlab_redis_1_Virtual Adapter 1 | gitlab_redis_1 | | |
| | | Container Sta | gitlab_gitlab_1_Virtual Adapter 1 | gitlab_gitlab_1 | | |
| ☑ Enable the Spanning Tree Protocol to prevent bridge loops. | | | | | | |
| Cancel Step 1/4 Previous Next | | | | | | |



| | Container Sta | gitiab_postgresqvirtuai Adapter i | gitiap_postgresqi | 4 |
|-----------|----------------|-----------------------------------|-------------------|---|
| | Container Sta | gitlab_redis_1_Virtual Adapter 1 | gitlab_redis_1 | |
| | Container Sta | gitlab_gitlab_1_Virtual Adapter 1 | gitlab_gitlab_1 | |
| | Container Sta | fedora-twentyfouVirtual Adapter 1 | fedora-twentyfou | |
| | Container Sta | mongo-1_Virtual Adapter 1 | mongo-1 | |
| abla | Virtualization | WinXP_Virtual Adapter 1 | WinXP | |
| abla | Virtualization | MSEdge_Win10_Virtual Adapter 1 | MSEdge_Win10 | |
| \square | Virtualization | Win7-882S_Virtual Adapter 1 | Win7-882S | |
| Thund | erbolt | | | I |
| | Status | Adapter | IP Address | |
| | 0 | Thunderbolt 1 | 169.254.8.102 (T | |
| | 0 | Thunderbolt 2 | 169.254.8.102 (T | |
| | | | | 7 |

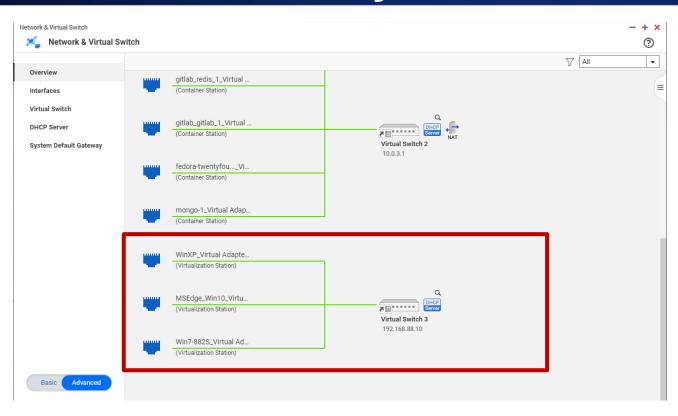




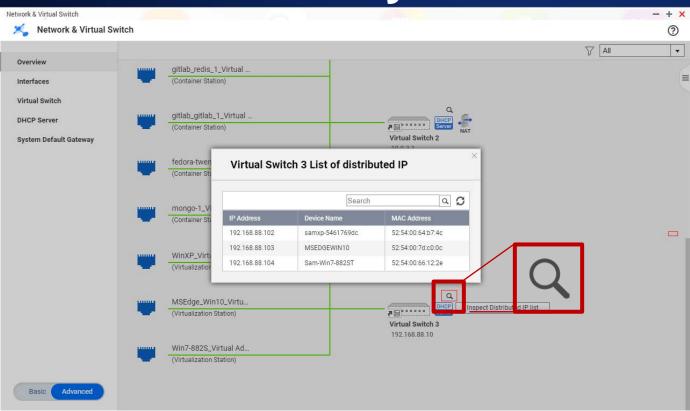


| | Create a Virtual Switch | | × |
|---|-----------------------------------|--------------------------|---|
| | Set up the Virtual Switch service | _ | |
| 1 | ☐ Enable NAT | | |
| | ☐ Enable DHCP Server | | П |
| | Start IP address | 192 . 168 . 88 . 101 | ш |
| | End IP address | 192 | ш |
| 2 | Subnet Mask | 255 ▼ .255 ▼ .255 ▼ .0 ▼ | ш |
| | Lease time | 1 ▼ Day(s) 0 ▼ Hour(s) | ш |
| | Default Gateway | 192 . 168 . 88 . 10 | ш |
| | DNS Server | 10 .8 .2 .11 | 4 |
| | WINS Server | | |
| | DNS suffix | • | |
| | Cancel | Step 3/4 Previous Next |] |

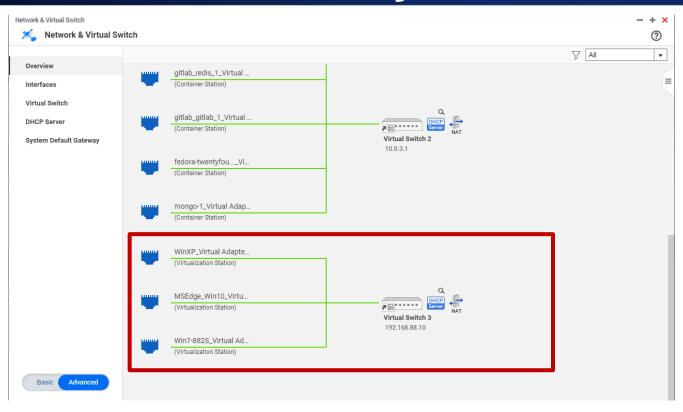










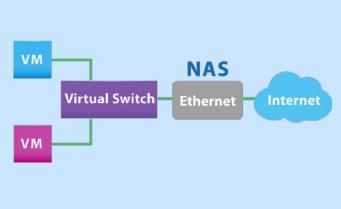




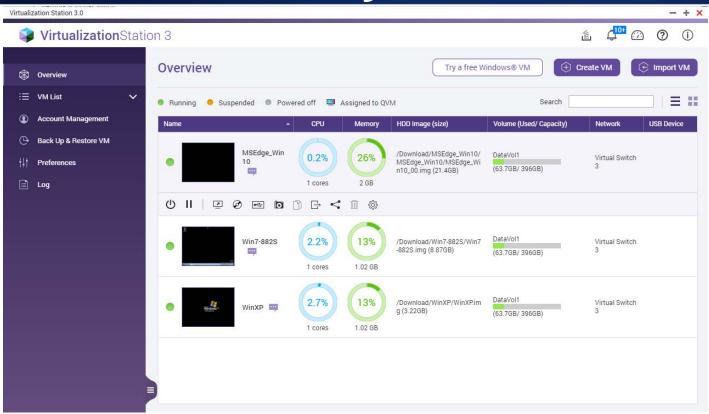
External mode

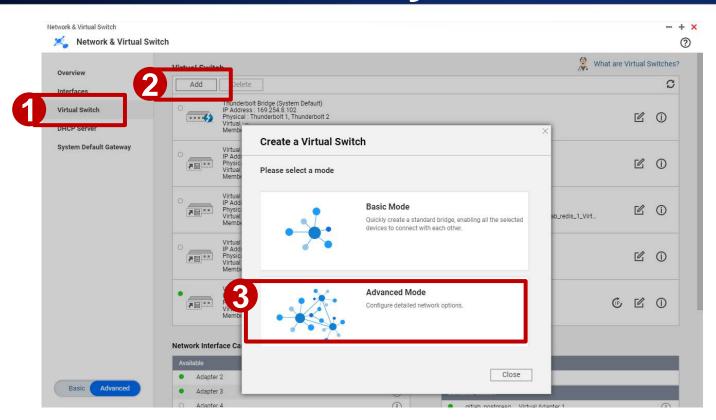
◆ Assign an Ethernet port dedicated to the virtual network; all packets are directed out to the network without going through the NAS, as this ensures that the bandwidth of the specific Ethernet port can be fully utilized by the virtual device.

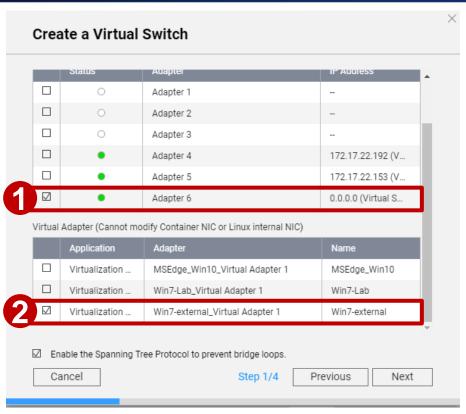


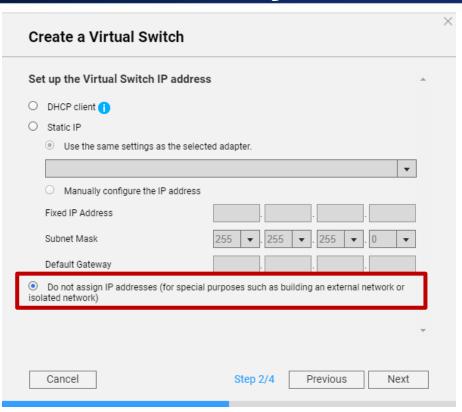


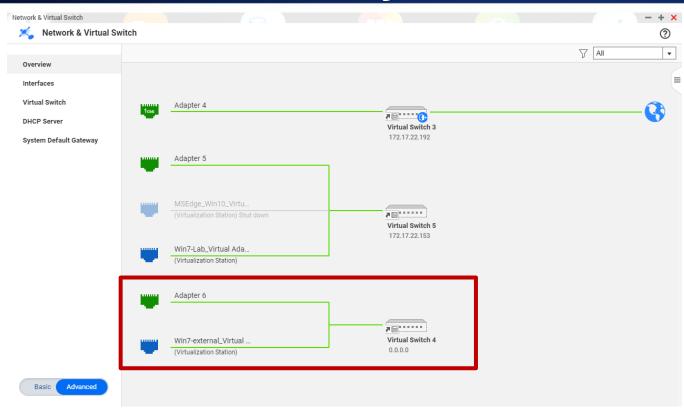




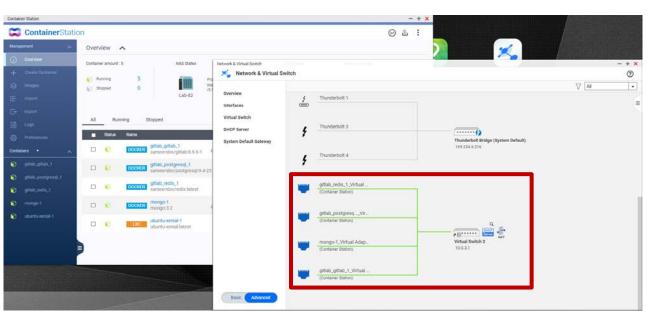








Two modes available for your containers

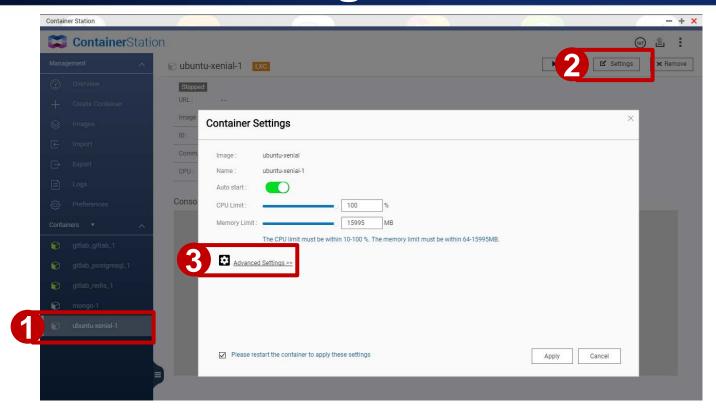


Network modes available for containers:

- ◆ NAT mode (default)
- **♦** Bridge mode



Set containers to connect in bridge mode



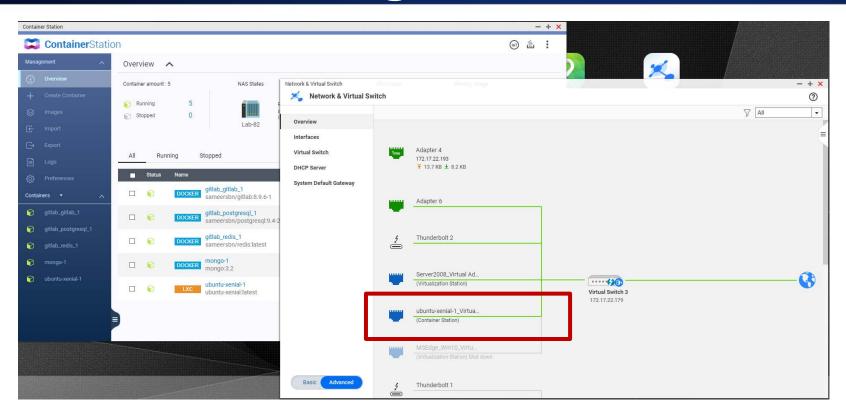


Set containers to connect in bridge mode

| Container Se | ettings | | | × |
|----------------|---|--|-------|--------|
| Advanced S | Settings >> | | | 4 |
| Network | Container Hostname : Container MAC Address : | | | |
| Device | Network Mode : | Bridge | | ¥ |
| Shared F | Use Interface : | Adapter 6 (Virtual Switch 3) | | ▼ |
| | | Use DHCP Use static IP | | |
| | | Use virtual switch for each container to have an individual IP | | |
| | | | | |
| | | | | |
| | | | | |
| ✓ Please resta | art the container to apply these | e settings | Apply | Cancel |



Set containers to connect in bridge mode





Demo Network functionality for virtual machines

