QNAP

Virtualization Station 3 explained

VM disaster recovery & data availability

Outline

Virtualization Station

- VM Introduction
- VM HDD Disks

VM Disaster Recovery

- VM Snapshot, Backup & Restore
- QTS Snapshot

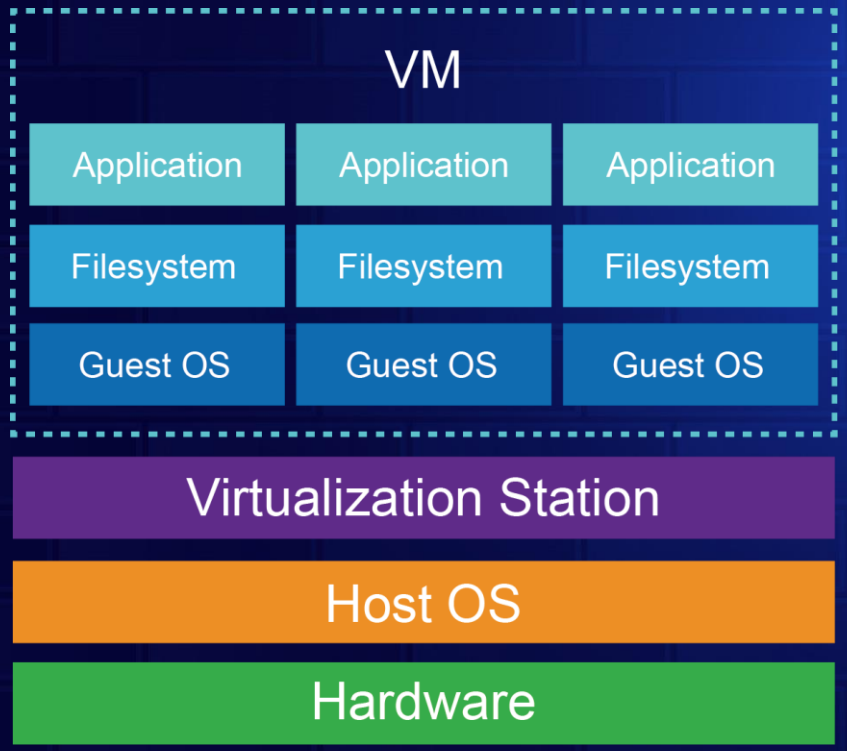
Data high availability

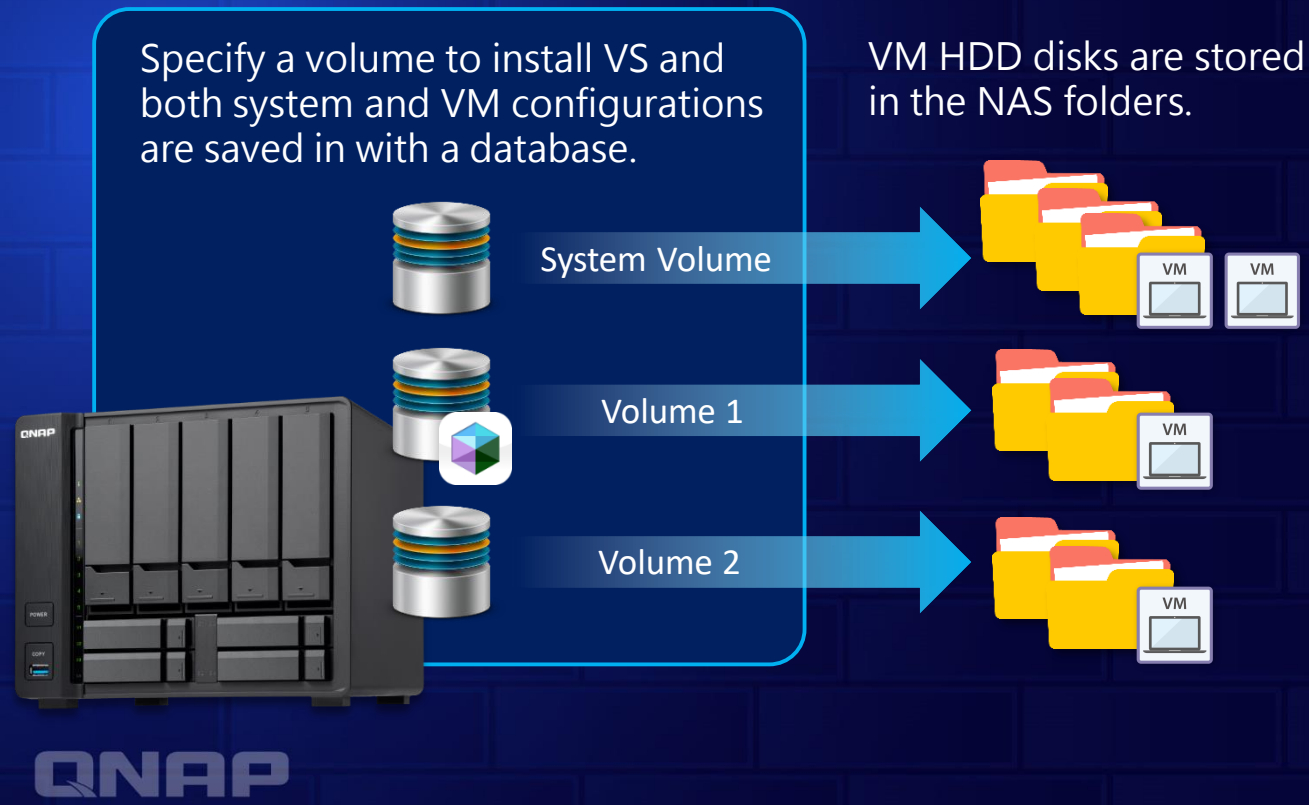
- NAS Mount NAS storage remotely
- Hybrid Cloud solution: VJBOD Cloud x CacheMount

Other settings and applications for security

Virtualization Station

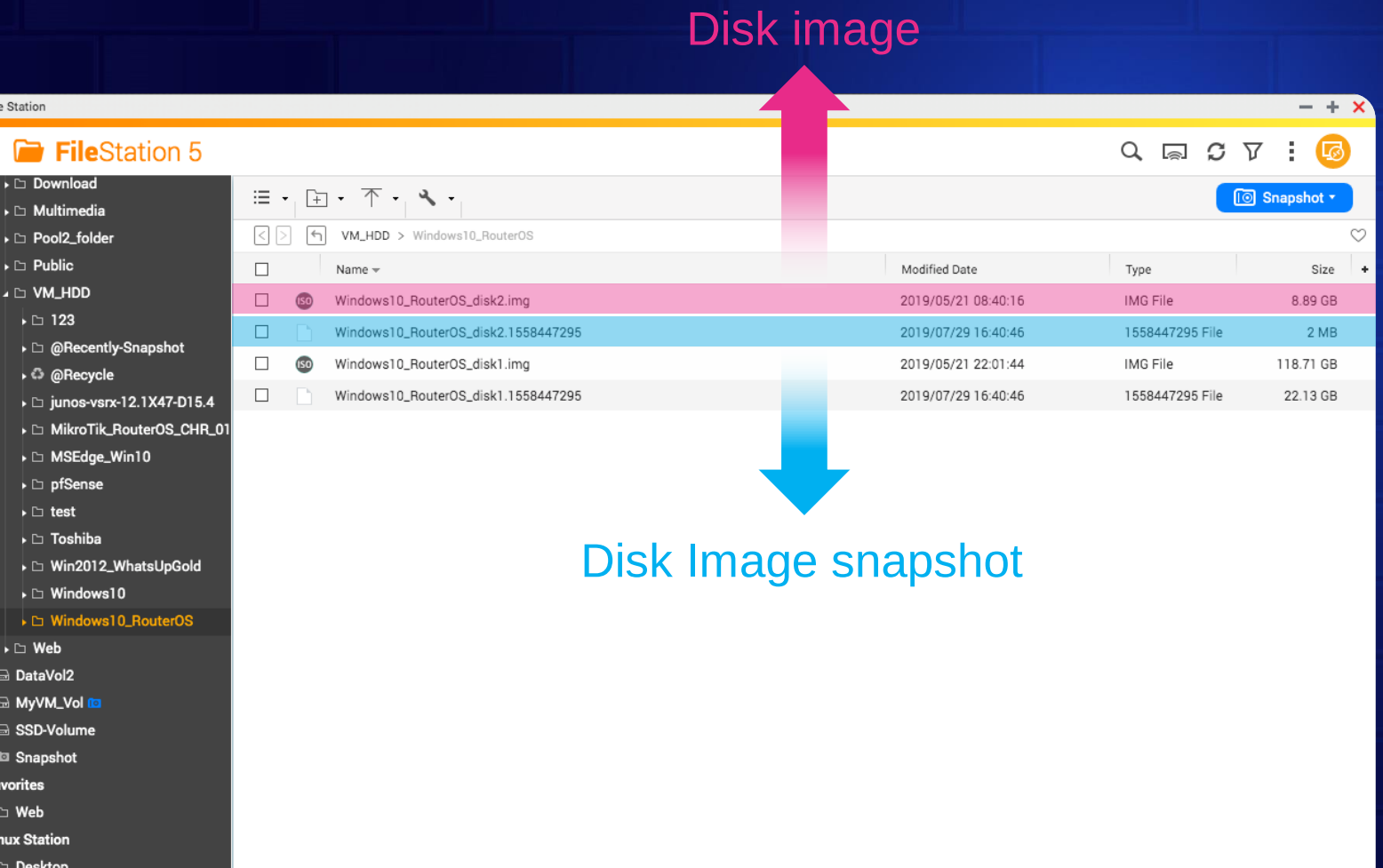
- A type-2 hypervisor running on top of NAS (Host).
- All VM configurations are stored in a centralized database.
- VM HDD disks are stored in the NAS folders.





VM HDD Disk image (1/2)

Bases on KVM (Kernel-based Virtual Machine) and uses qcow2 image format to be managed.



- Supports read-only backing
- Supports snapshot
- Compress and encryption

Hint：all extension of VM HDD disks image is *.img shown in the File Station.

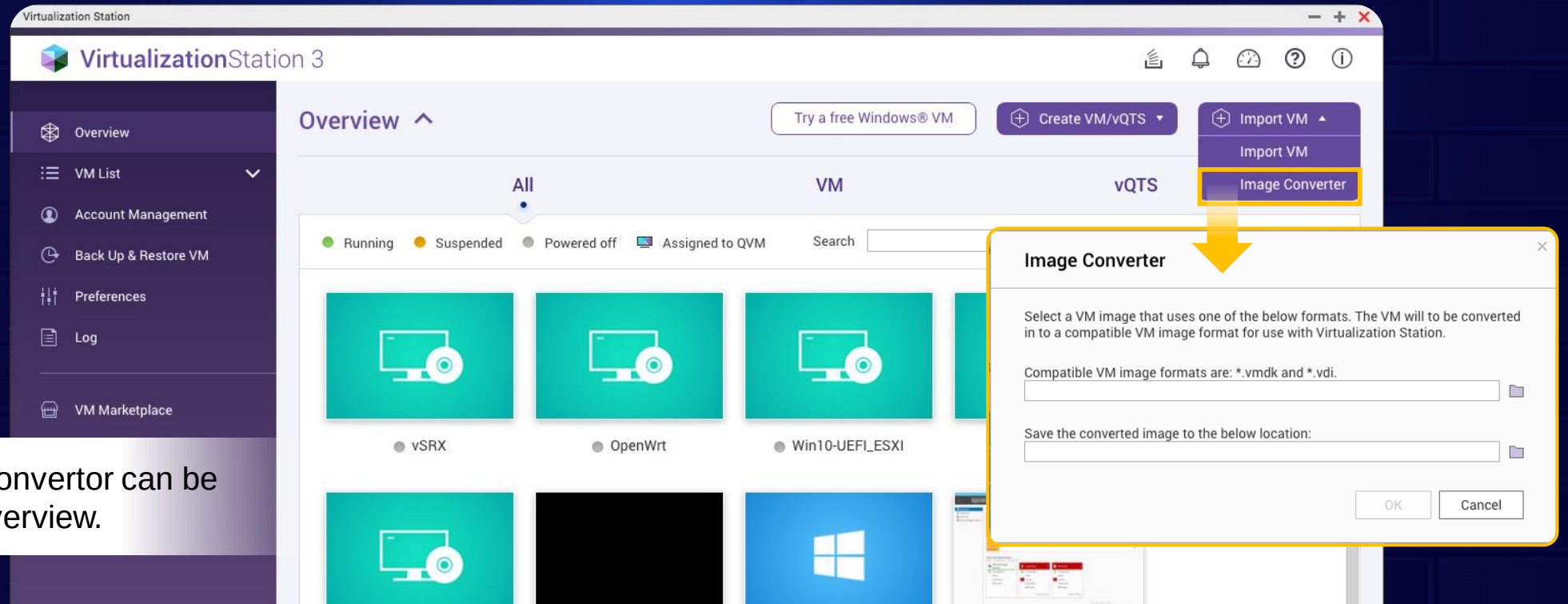
VM HDD Disk image (2/2)

Besides qcow2 image format:

RAW: Plain binary image of the disc image. Simple but doesn't support snapshot feature.

VMDK: VMware proprietary image format, used in VMware WorkStation, vSphere…etc.

VDI: used in VirtualBox.



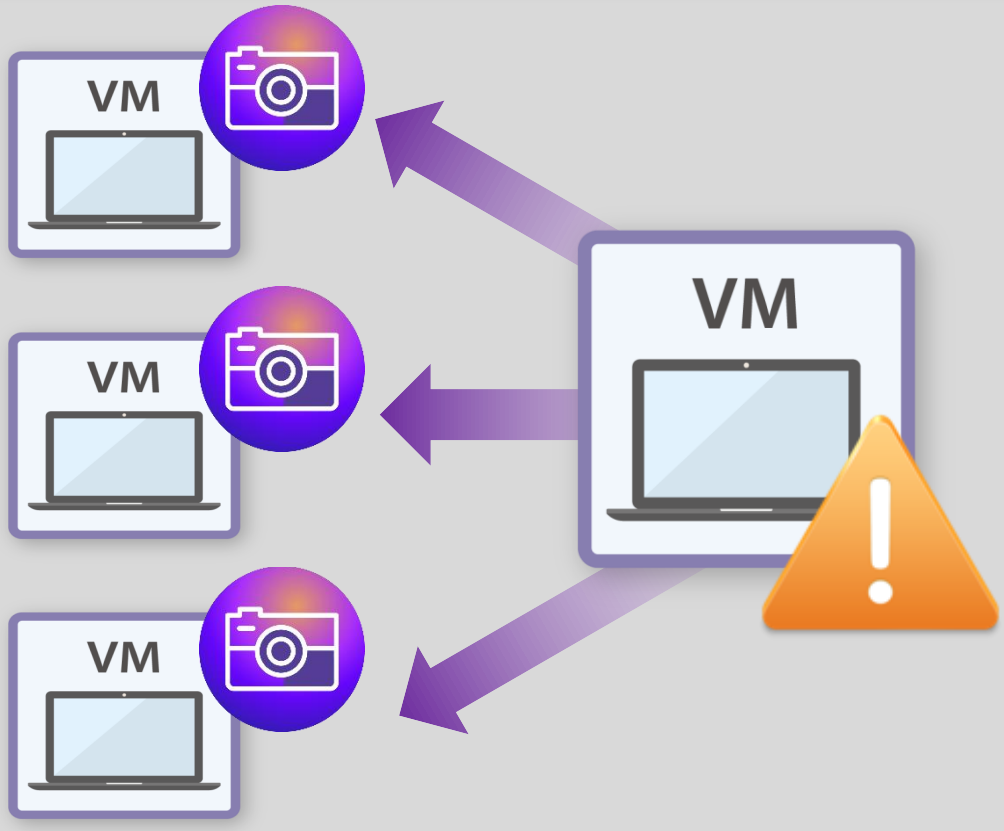
Hint：Image Convertor can be found in the Overview.

VM Disaster Recovery

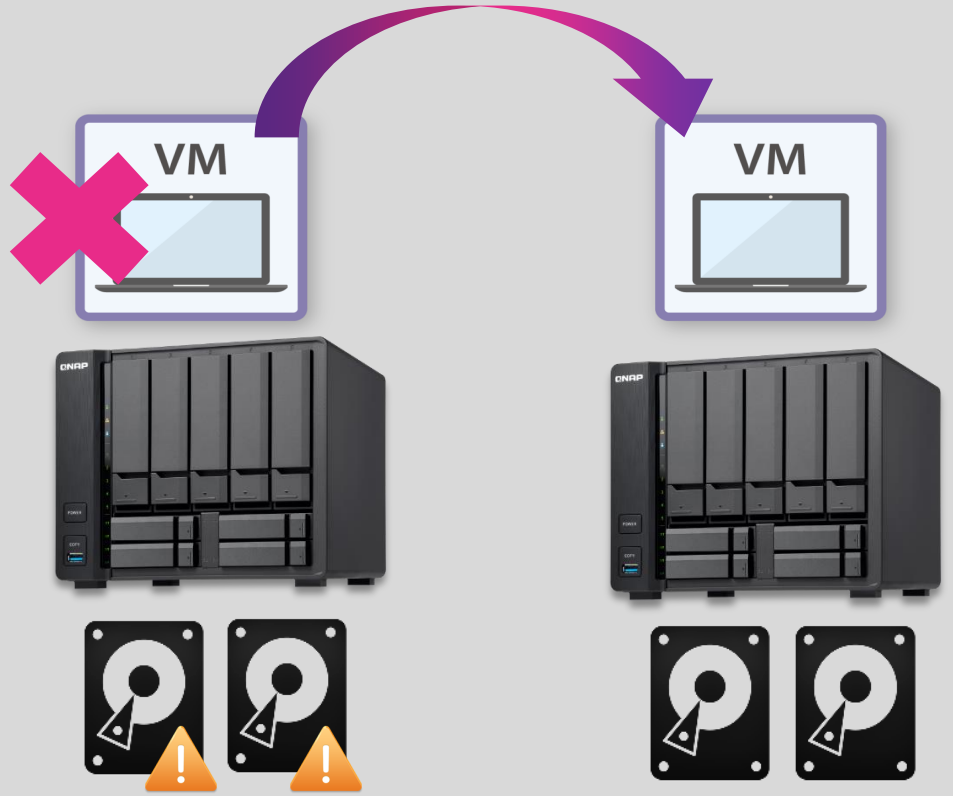
- Guest OS crash because of unexpected shut-down
- Ransomware attack, malicious application…
- Physical disks corrupted
- Power outage

Disaster Recovery: Leveraging Snapshot & Backup

Revert a snapshot to the normal status of VM

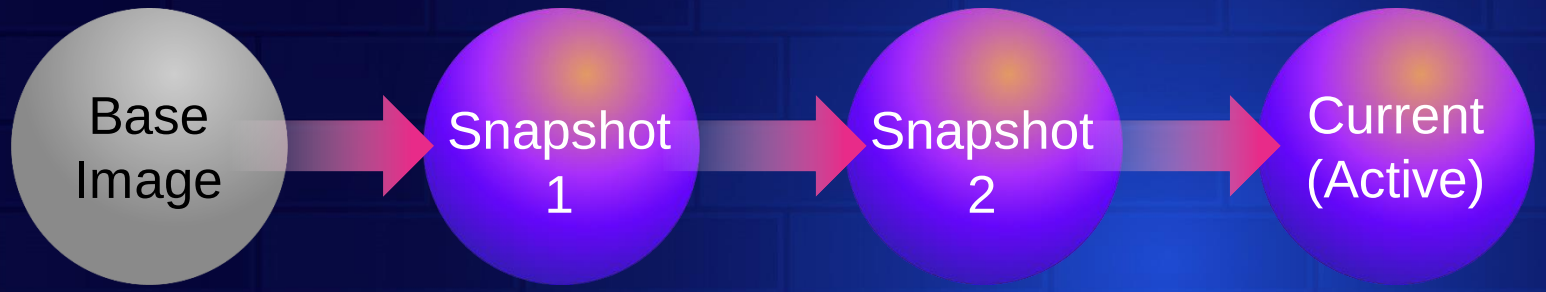


Restore a remote VM backup directly

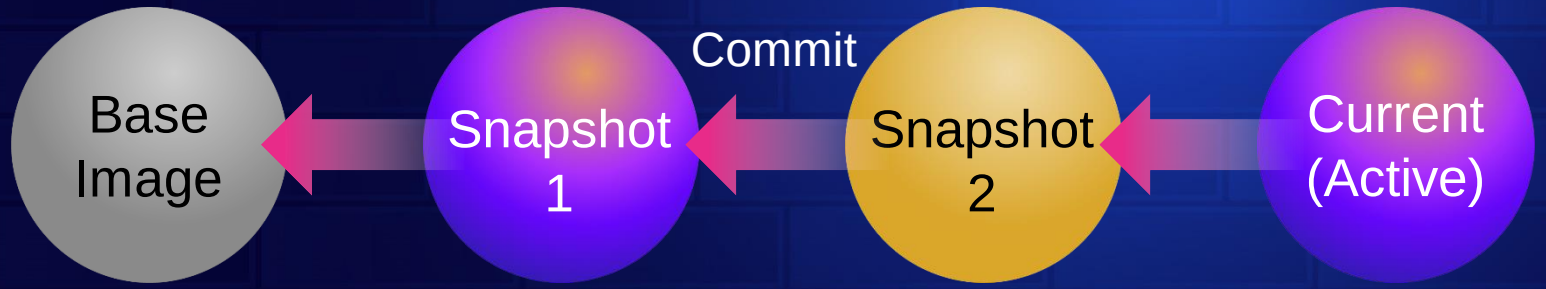


DR – Snapshot mechanism (1/2)

Bases on External Snapshot structure and manage multiple snapshot files with Blockcommit design.



While taking a snapshot, the disk image (backing file) enters the read-only status to create an overlay disk image (current) to keep record of the changes.



Merging the snapshot 2 into snapshot 1 when the snapshot 2 is being deleted.

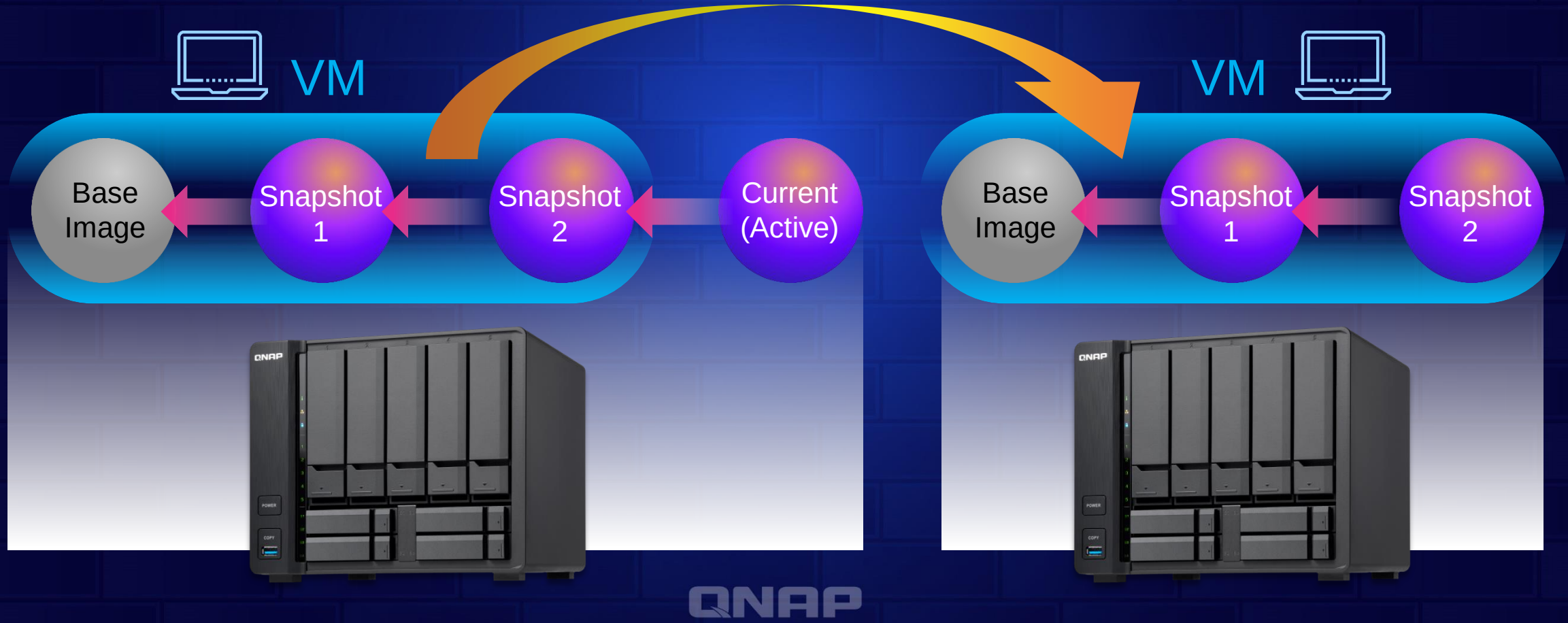
Hint: all snapshots record its backing file while Virtualization Station saves all VM HDD disk configurations. Regarding snapshot management, please manage them in the Virtualization Station instead of QTS File Station.

DR – Snapshot (2/2)

- Supports Copy-on-write without shutting down the VM
- Quickly revert to a known state
- Snapshot scheduling
- Snapshot keep and retention

DR – Back Up VM (1/2)

System creates a snapshot first and flushes memory data to HDD disk image while backing up the VM.



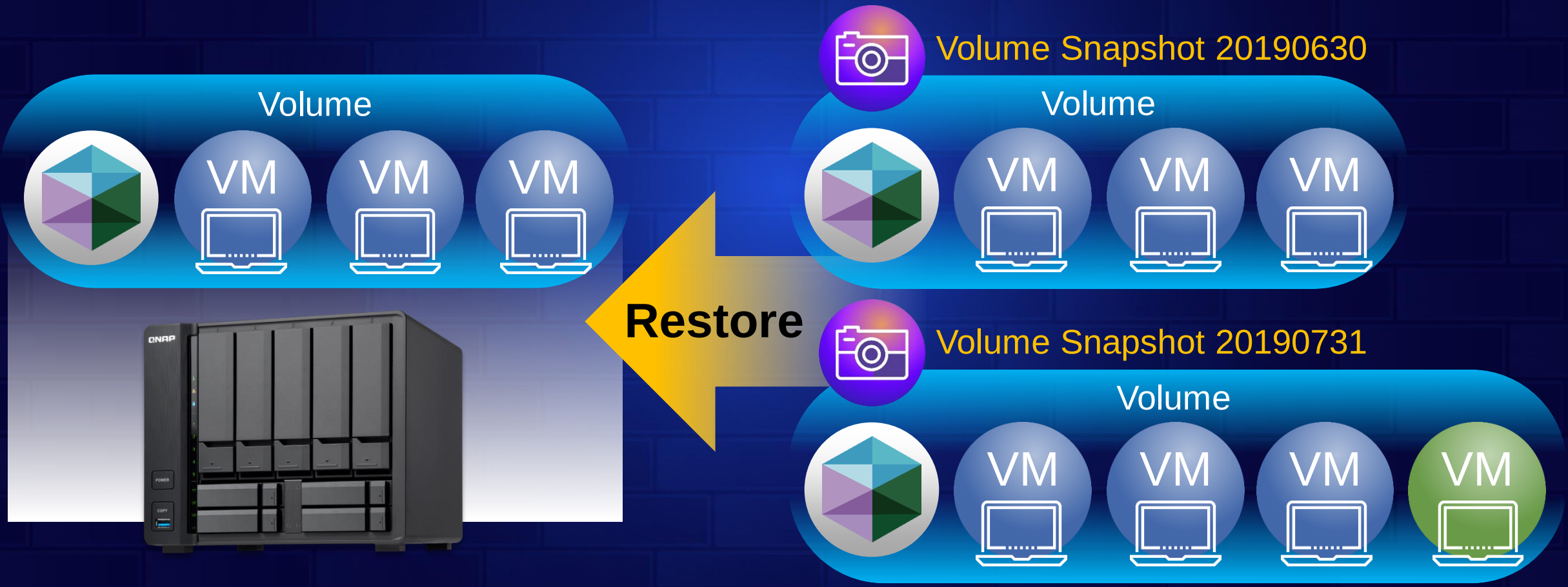
DR – Back Up VM (2/2)

- Supports backing up VM locally/remotely
- Non-stop VM back up
- Backup scheduling*
- Retention
- Restore VM backup remotely

Hint: A VM backup contains whole created snapshots. If the VM would be imported in the future, you may consider using to export the VM instead. The exported VM does not include snapshots.

DR – leveraging QTS Snapshot

Restores Virtualization Station settings and all VMs simultaneously (both of VS and VM has to be stored in the same volume).



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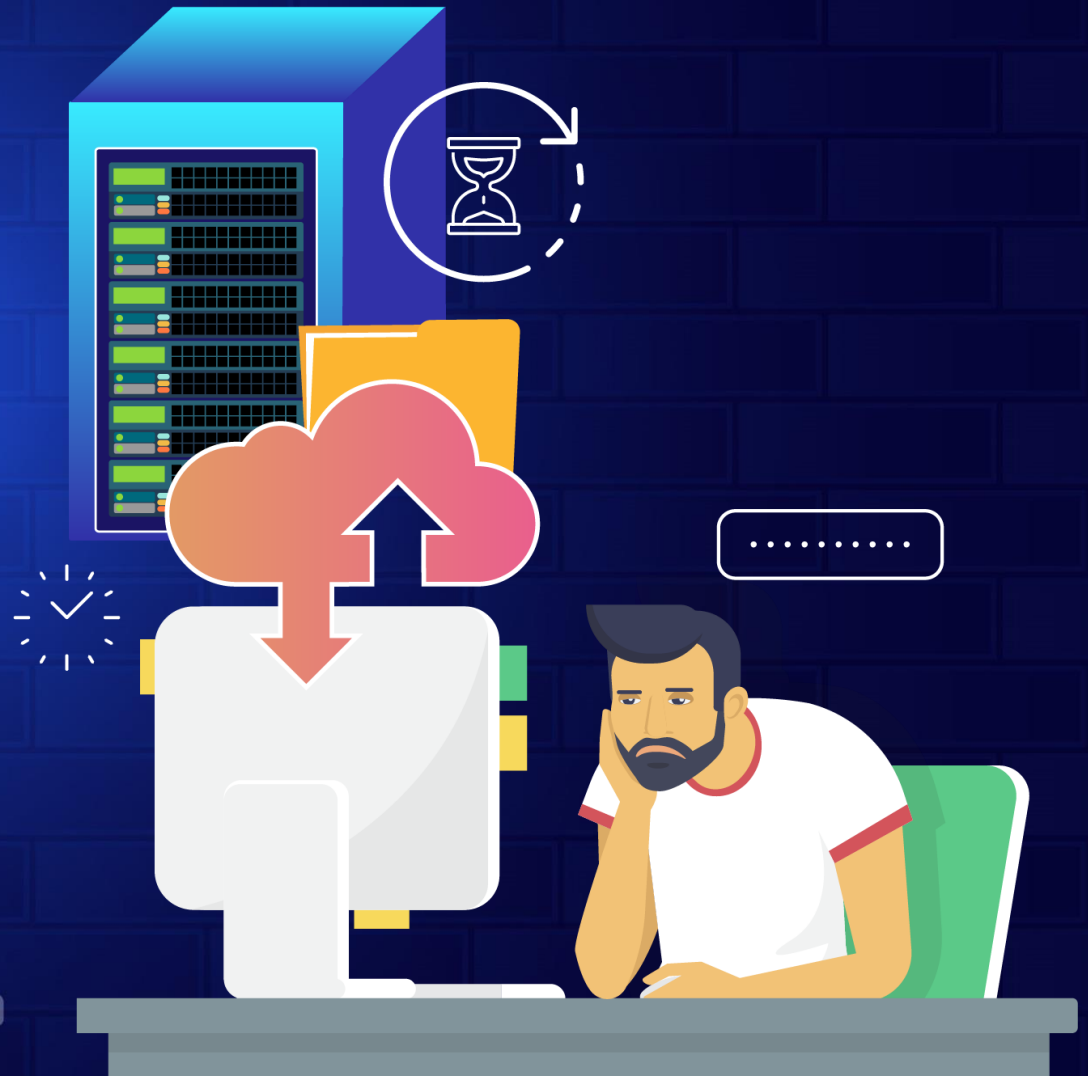
Live Demo

Lots of data inside VM

- Taking such a long time to back up VM
- Cannot access data inside the VM directly
- Less of data availability



Data high availability: guest OS + mounted storage

VM HDD disk is used to running guest OS, while data storage capacity leverages external storages throughout iSCSI or SAMBA.

Data availability – remote mount & hybrid cloud solution

File-level

- Mount NAS shared folders via CIFS/SMB
- Hybrid Cloud: VJBOD Cloud, CacheMount

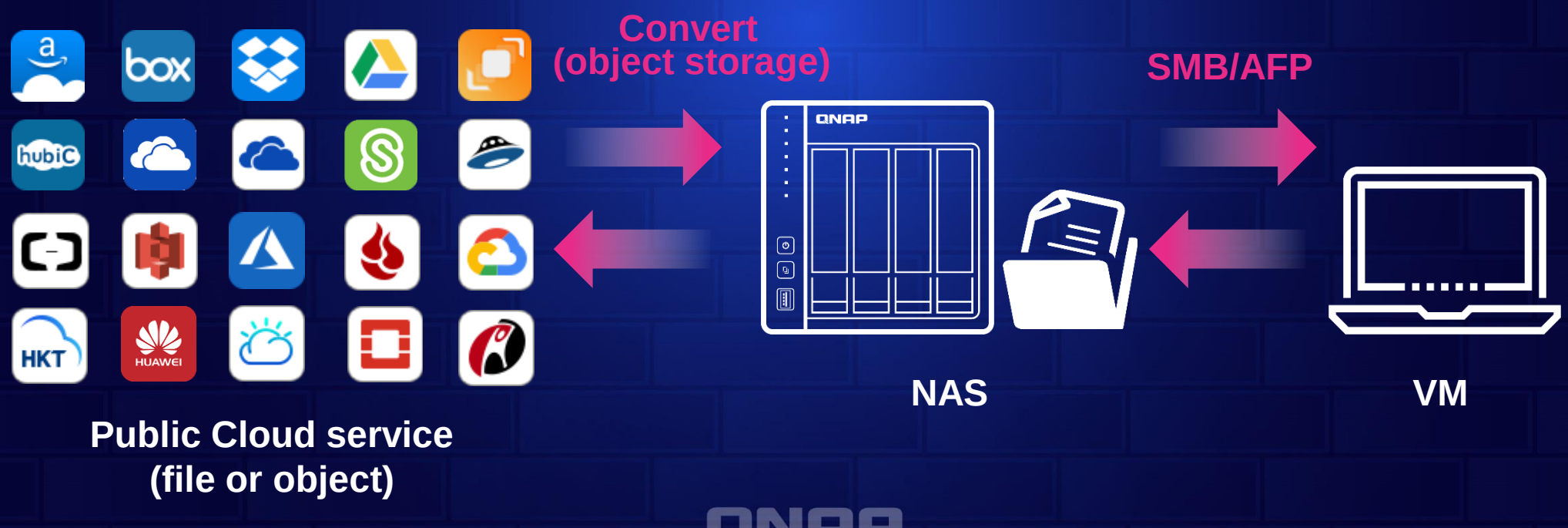
Block-level

- Mount NAS iSCSI LUN
- Hybrid Cloud: VJBOD Cloud

Data Availability – File Level (1/2)

Using CacheMount to mount public cloud storage as folders and allowing VM to access folders via SMB/AFP.

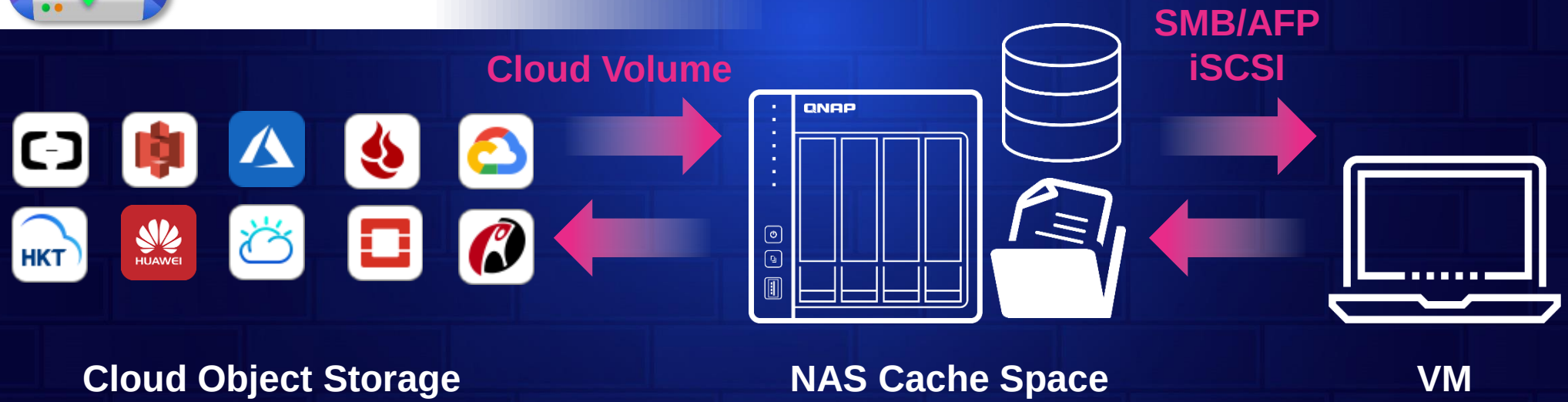
CacheMount



Data Availability – File Level (2/2)

A NAS can be used as Edge Storage by connecting to a Cloud Object Storage provider, create a cloud volume on the cloud, and mount it for application usage.

VJBOD Cloud



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Live Demo

Other settings and applications for security

- Cache modes for VM HDD image
- VM console configuration
- Running a virtual router to apply for firewall rules

Settings – VM HDD Cache Mode

Writeback

Using the host page cache to execute read/write data provides the better performance. But if a VM is closed unexpectedly and the data in the cache cannot be written to the HDD in time, there may be a risk of data inconsistency.

ForceWriteback

Similar to the Writeback but all flush commands from the guests are ignored (i.e. forcing to use the host page cache). It is a trade-off of performance over risk of data loss in case of a host failure.

Writethrough

Use NAS caching to read, but doesn't go through disk caching to write directly onto the drive. Its write performance is worse than Writeback, but doesn't risk data inconsistency.

None

Bypass the host page cache and leveraging hypervisor user space buffer to write data into the disk cache directly. Its read performance is worse than Writeback and Writethrough, but it has the best write speeds.

Settings – VM HDD Cache Mode

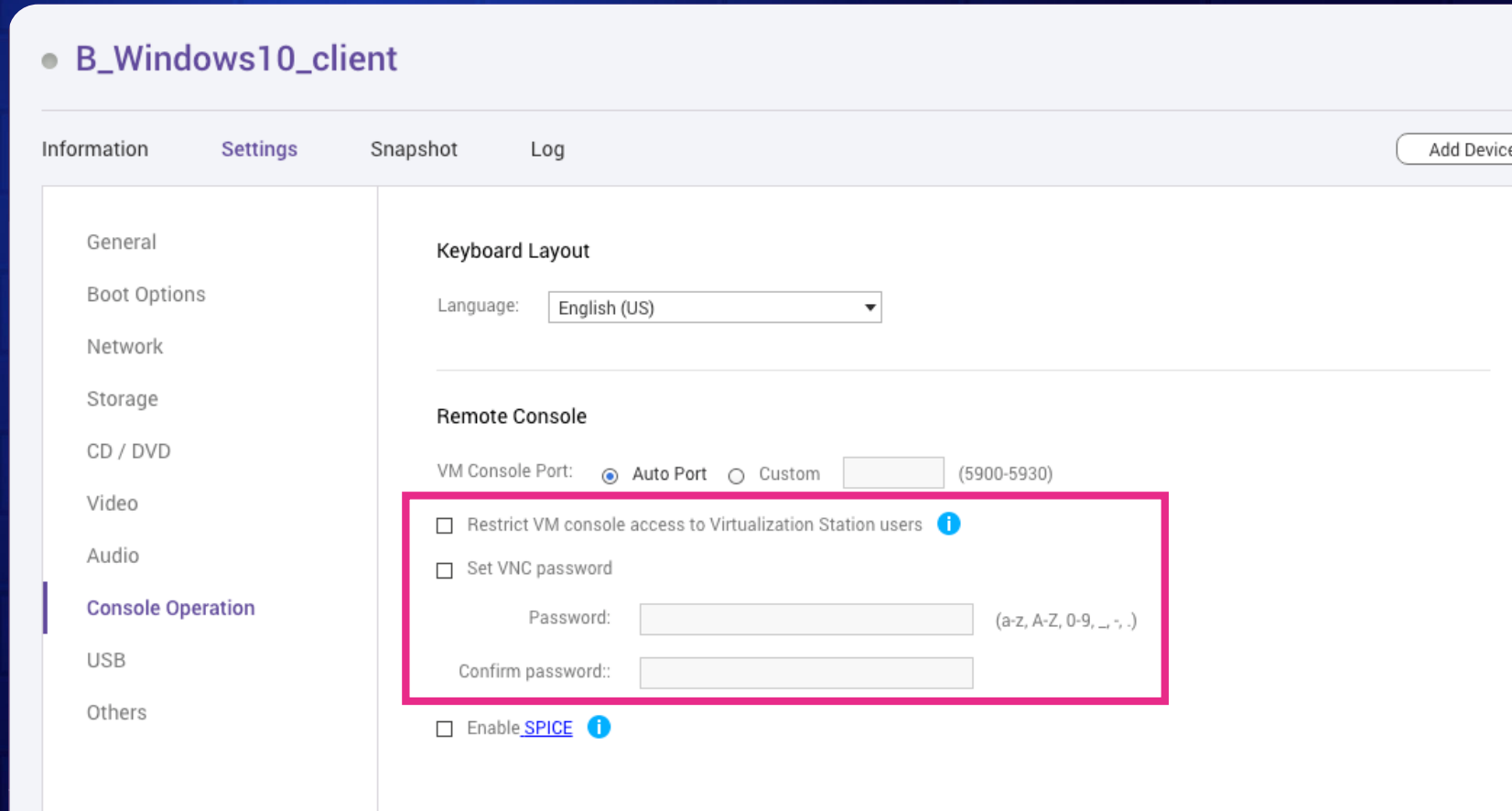
Mode	Performance	Security
WriteBack	High	Low
ForceWriteback	High	Low
WriteThrough	Low	High
None	High (write)	Low

Hint: We suggest installing UPS (Uninterruptible Power Supply) to avoid unexpected power failure and provide the better security of WriteBack/ ForceWriteback.

Settings – VM console

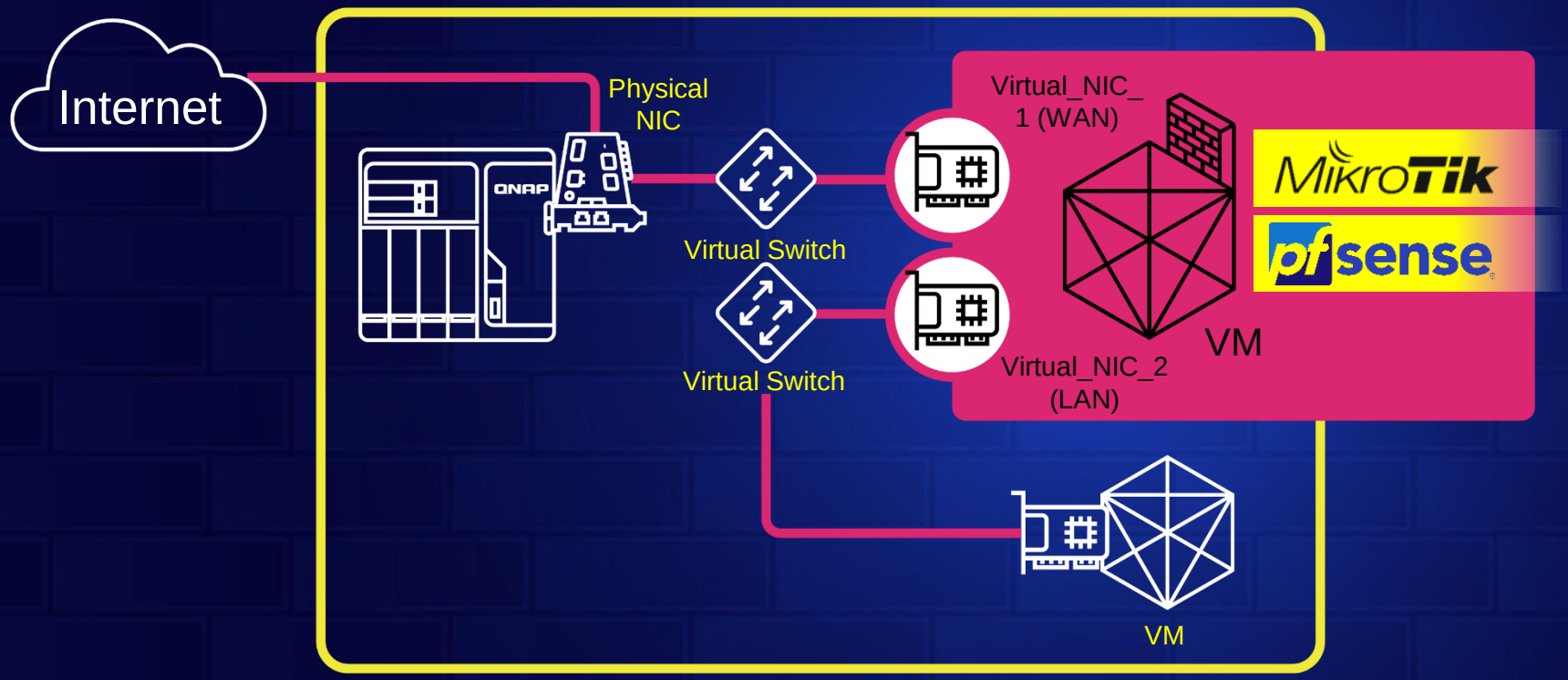
Virtualization Station provides a VNC server for VMs, but restrict VM console access to Virtualization Station users.

- Setup VNC password
- Enable “Restrict VM console..”



Applications – Virtual Router

Running a virtual router such as RouterOS, pfSense® to provide firewall rules.



vNIC 1:

WAN interface, all the traffic throughout virtual router first.

vNIC 2:

LAN interface, applying network settings of virtual router via Virtual Switch.

Hint：pfSense® can be deployed from the VM Marketplace of Virtualization Station.

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Virtualization Station 3

Your Best Choice!