

Ncore Software VM Manager

Create and manage Linux and Windows virtual machines

Getting Started Guide

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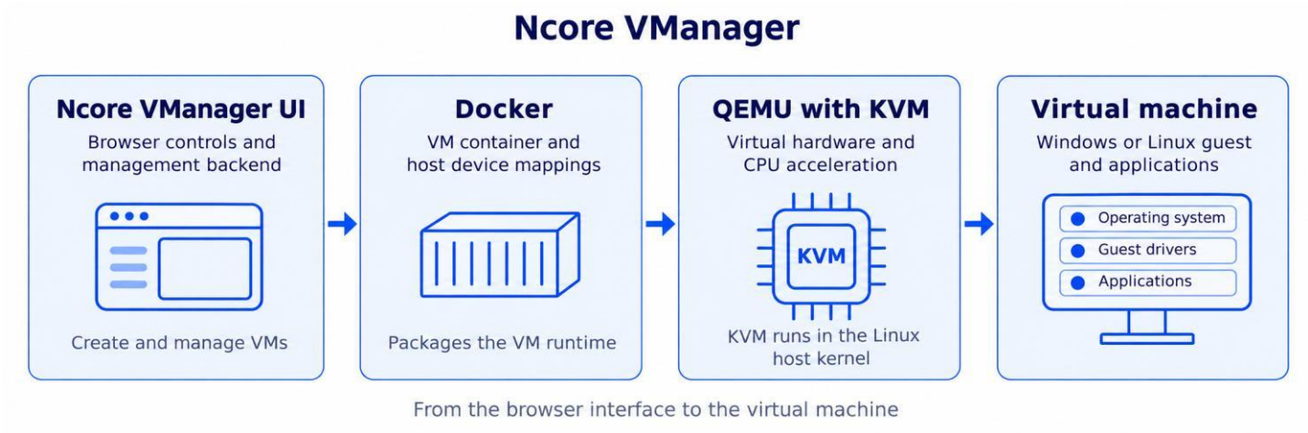
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Welcome to Ncore VM Manager

Ncore VM Manager is a high-performance software platform for building and managing Linux and Windows Virtual Machines through a modern web Ui interface. Supported workflows include virtual machine provisioning, resource management, file-backed and Ceph RBD storage integration, bridged networking, GPU passthrough, backup scheduling, recovery operations, and more. This guide explains the features, configuration options, and operational procedures required to manage virtual machine workloads using Ncore VM Manager.

From the interface to the guest VM



From the browser interface to the virtual machine

Hardware and software requirements

Category	Requirements
Host hardware	For evaluation, start with an x86-64 host with 12 CPU cores, 20 GB RAM, and 250 GB of SSD storage. Enable Intel VT-x or AMD-V in firmware. Size production hosts for the guests, disk workloads, and backup retention.
Host software	Use a 64-bit Linux host with KVM enabled and /dev/kvm available. Install Docker Engine with Docker Compose support. Use an administrator account with permission to manage Docker and configure host resources.
Networking and browser	Allow access to the management interface on TCP 6089 by default. Use a current version of Microsoft Edge, Google Chrome, or Mozilla Firefox. Use an allowed host bridge for LAN access.
Optional storage	For Ceph RBD, provide reachable monitors and an authorized Ceph client. For Vhost storage, provide the configured Linux target or a compatible Unix socket accessible to the VM runtime.
Optional passthrough and recovery	Enable IOMMU for PCI passthrough and use eligible hardware. For backup and replication, configure the recovery service and allocate separate capacity for recovery points. Verify peer connectivity for replication.

Getting Started

Download file: wget https://ncoreblobstore.blob.core.windows.net/ncore-vm-manager/deploy-vm-manager.sh

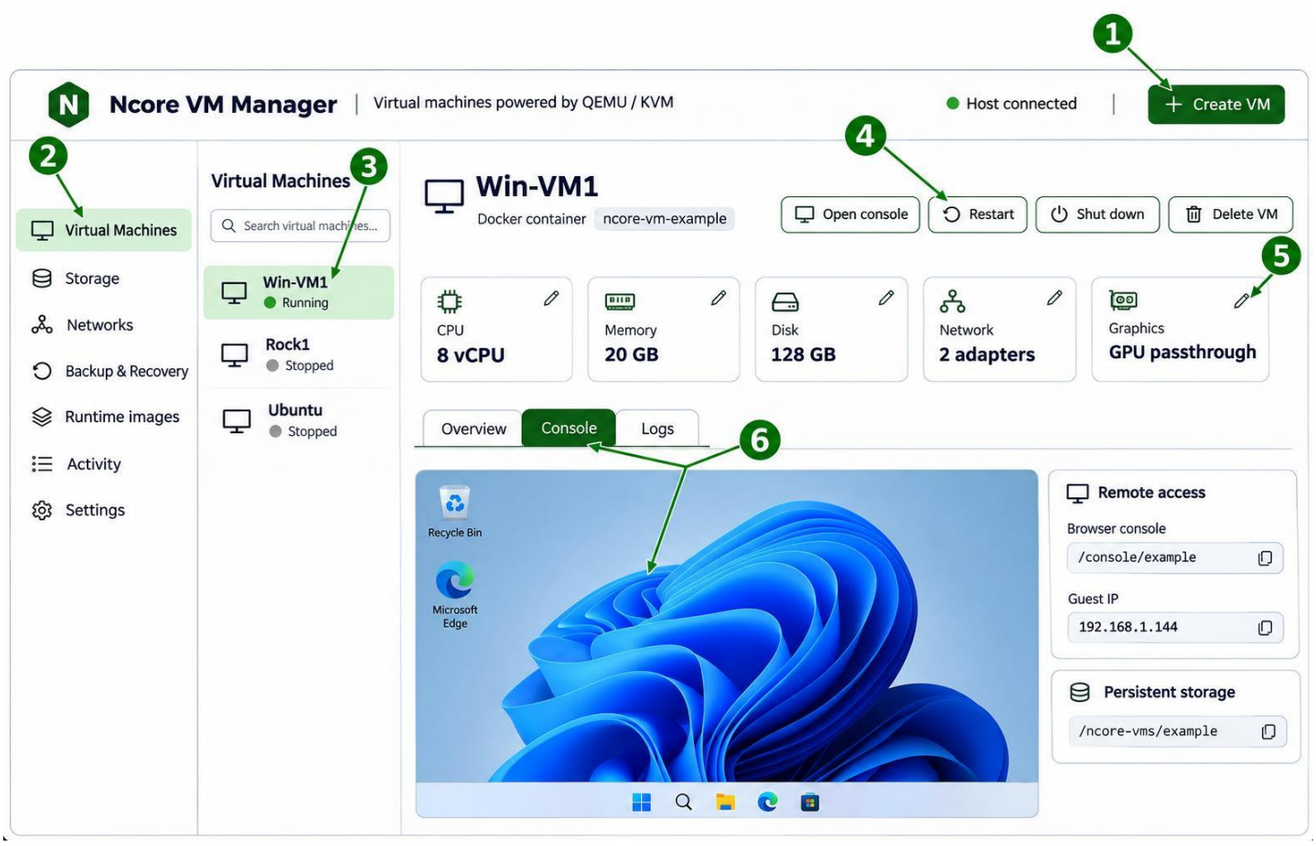
```
Run on linux host: bash ./deploy-vm-manager.sh
```

2. Open Ncore VM Manager Browse to http://192.168.10.4:6089. Replace the example IP with your VM Manager host address. The URL will open the following page below [**username**: admin, **password**: admin].

3. Go to settings →License to obtain trial license from Ncore software, see page 18 for illustrated steps.

4. **After Activation go Settings →General** to define VM storage location and other paths before creating VMs, see page 14

Main screen overview



Illustrated main screen. Numbered markers identify the controls below; the deployed layout may differ slightly.

1 Create VM Start the creation dialog for a Windows or Linux guest.

2 Navigation Open Storage, Networks, Backup & Recovery, runtime images, Activity or Settings.

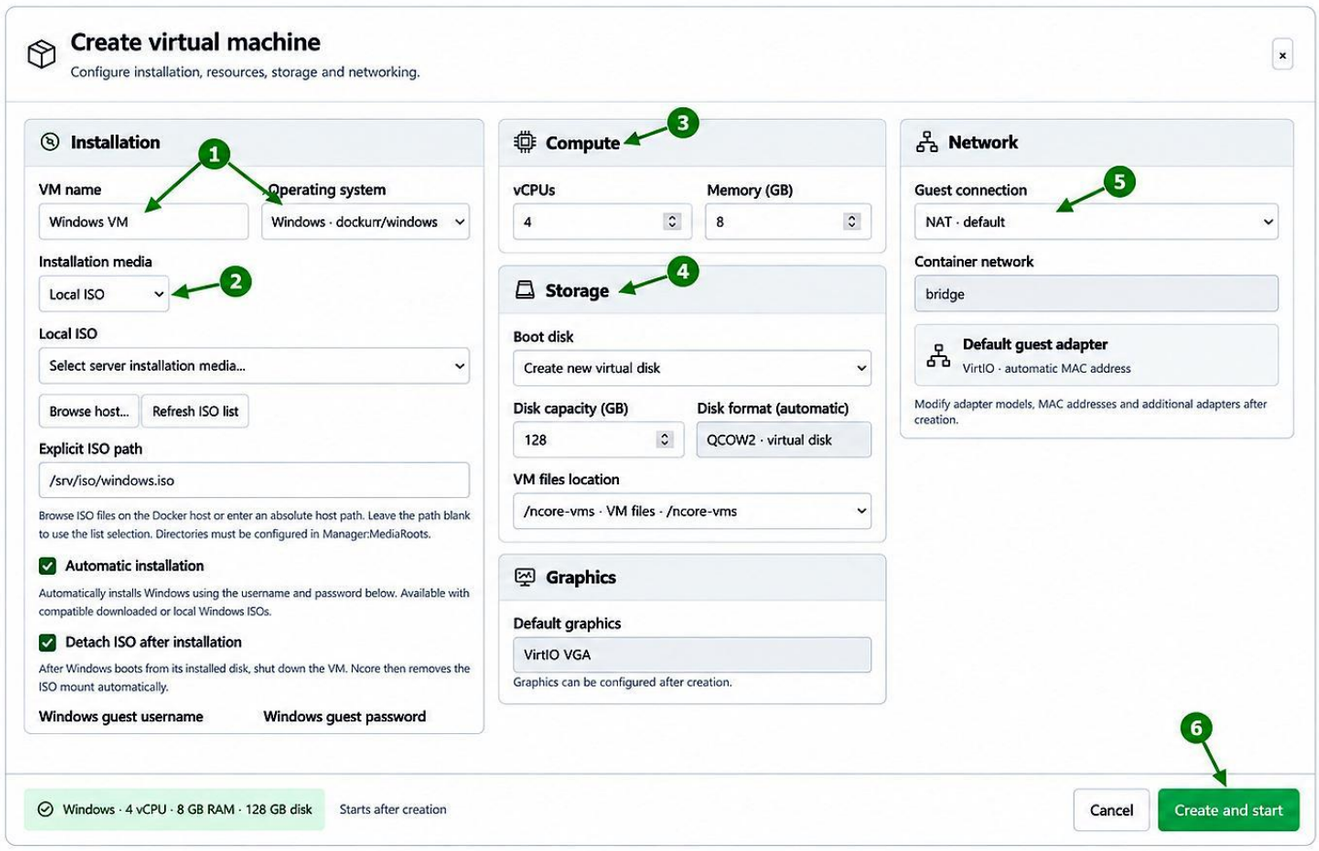
3 VM list Search and select a VM. Running or stopped reflects container state, not guest installation readiness.

4 VM actions Open the console, start or restart, shut down, or delete the selected VM.

5 Hardware cards Review CPU, RAM, disk, network and graphics. Use a pencil to edit hardware while stopped.

6 Guest access Switch Overview, Console and Logs. The browser console shows virtual display output; RDP uses the guest IP.

Create a Virtual Machine

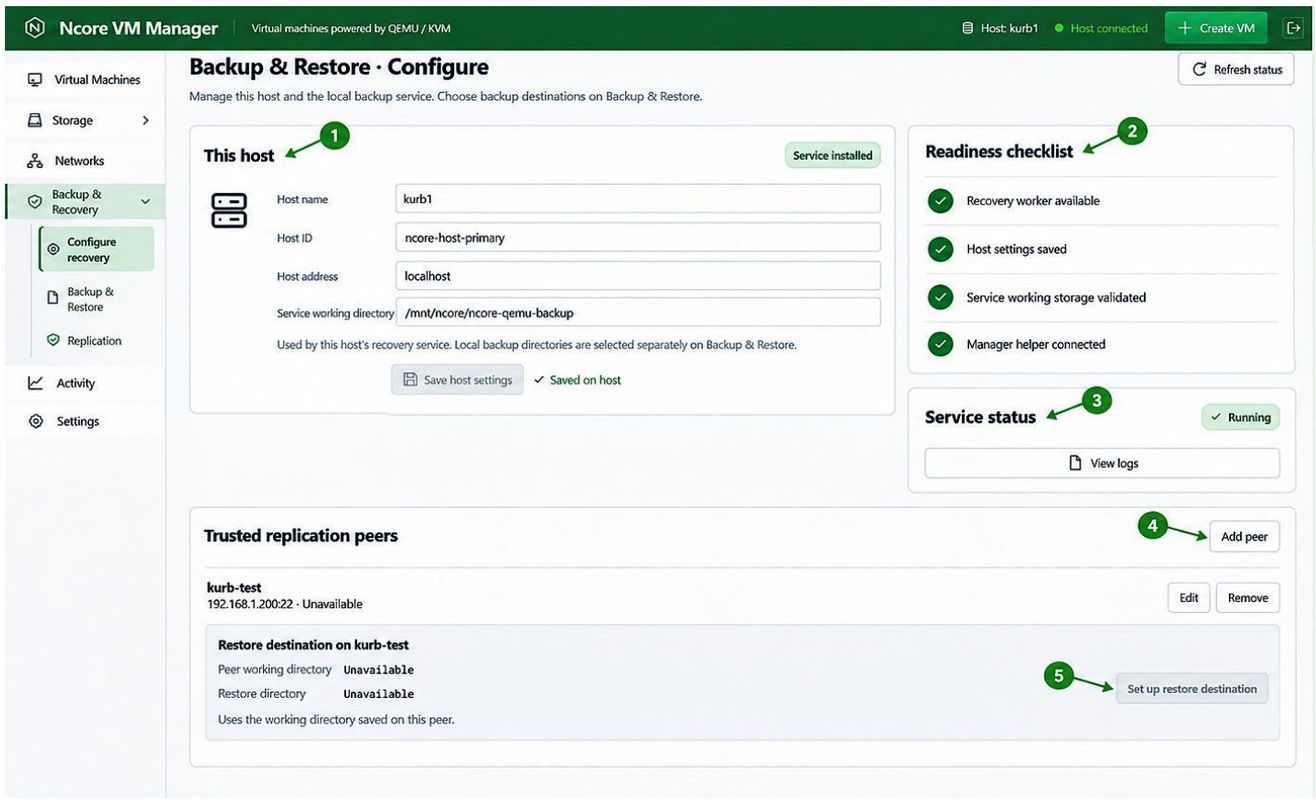


1. **Name the VM** — Enter a name and choose the operating system.
2. **Installation media** — Select a source and browse to a host ISO if needed.
3. **Compute** — Set the vCPU count and memory.
4. **Storage** — Choose the boot disk, capacity, and VM files location.
5. **Networking** — Select the guest connection.
6. **Create and start** — Review the summary and start the VM.

Configure Recovery

The **Configure recovery** page lets you save the host's recovery settings, verify that the recovery service is ready and running, and manage trusted replication peers. Use it to set the service working directory and configure where restored VMs are stored on a reachable peer. Choose local backup destinations separately on **Backup & Restore**.

This page must be configured before initiating backups, restores, or replication.

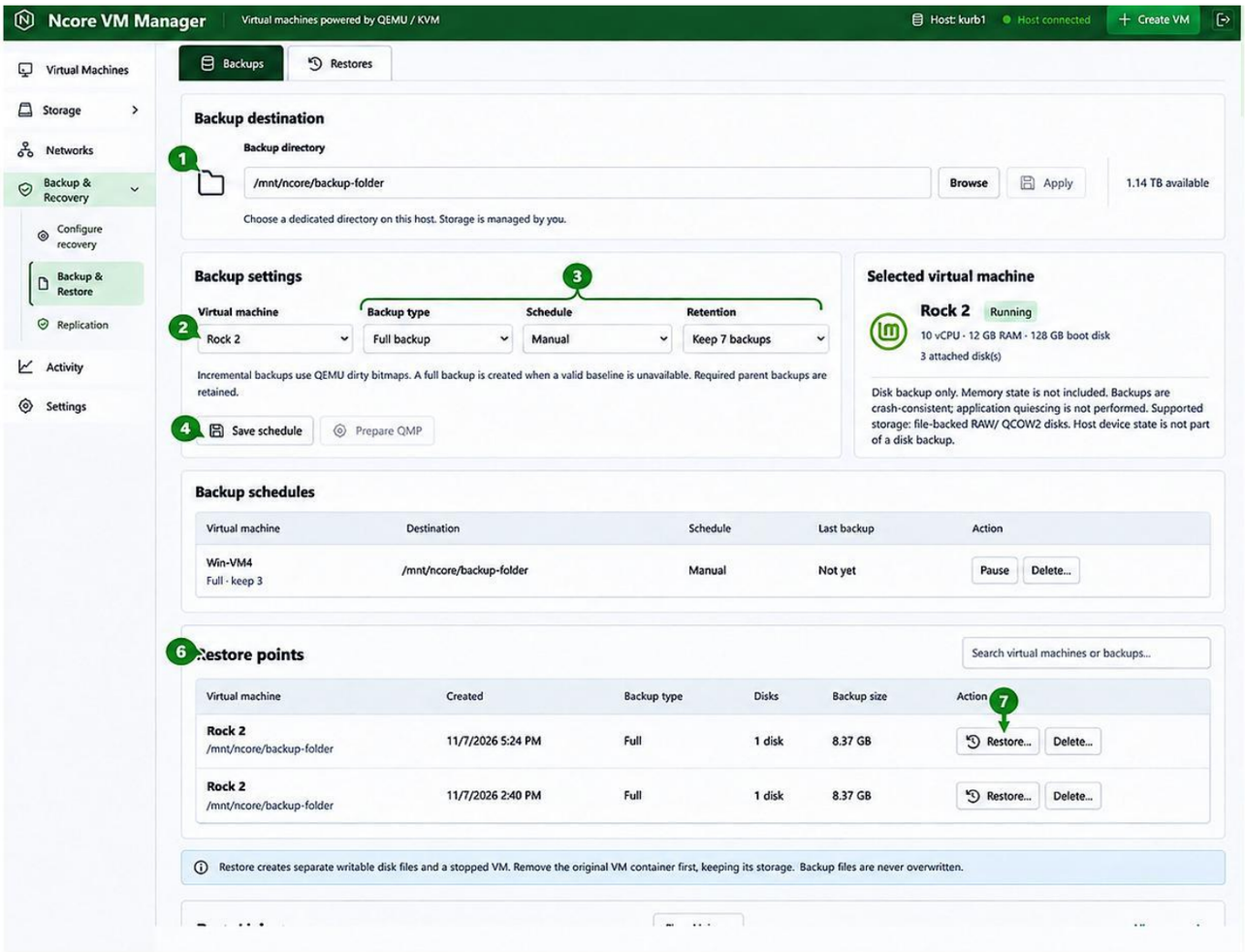


1. **Host settings** — Review the host identity and working directory, then save.
2. **Readiness** — Check all four items and use Refresh status to recheck.
3. **Service status** — Confirm the service is running. Use View logs if needed.
4. **Trusted peers** — Use Add peer to register a remote host.
5. **Restore destination** — Set up the restore destination when the peer is reachable.

Backup and restore a virtual machine

Use Backup & Restore to configure VM backups and recover from a completed restore point.

This feature supports the default VM disk type, qcow2. Support for other block devices will be in future releases.

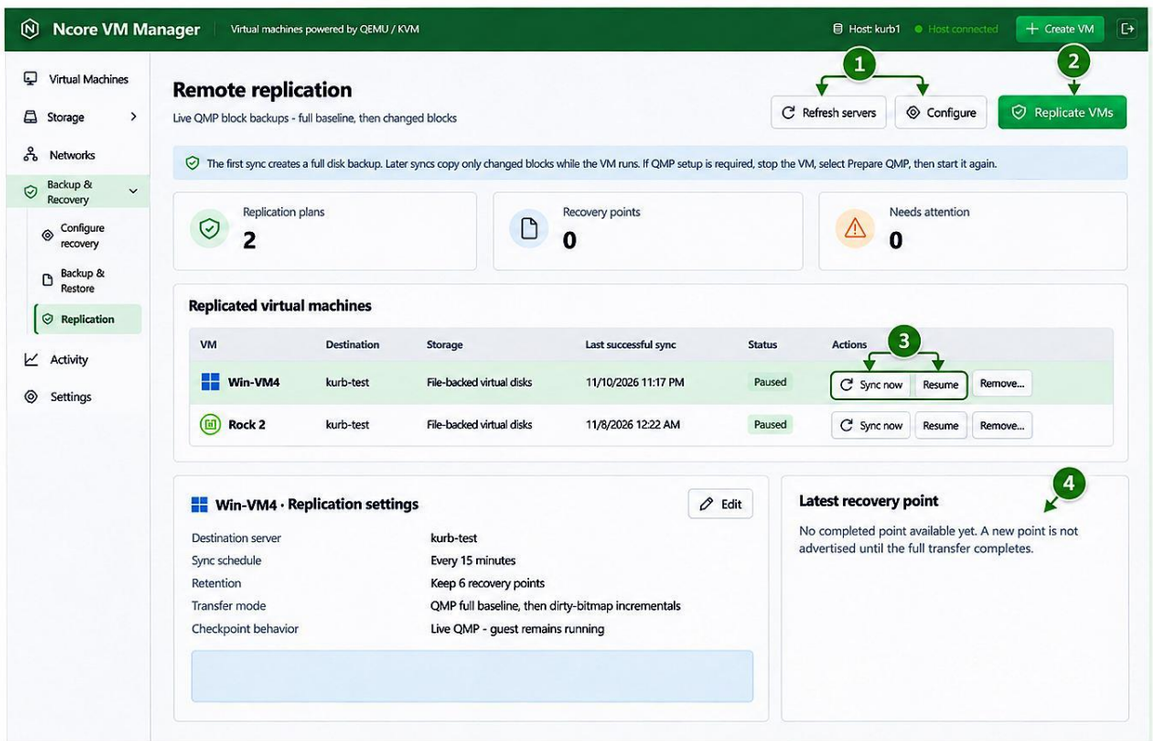


1. **Destination** — Choose a directory with enough free space and apply it.
2. **Virtual machine** — Select the VM to back up.
3. **Backup policy** — Choose the backup type, schedule, and retention.
4. **Save schedule** — Save your settings. Prepare QMP if prompted.
5. **Start backup** — Trigger manual backups separately. Timed backups run on schedule.
6. **Verify completion** — Check Restore points for a new entry.
7. **Restore a VM** — Select Restore on the desired row and confirm. The VM is created stopped.

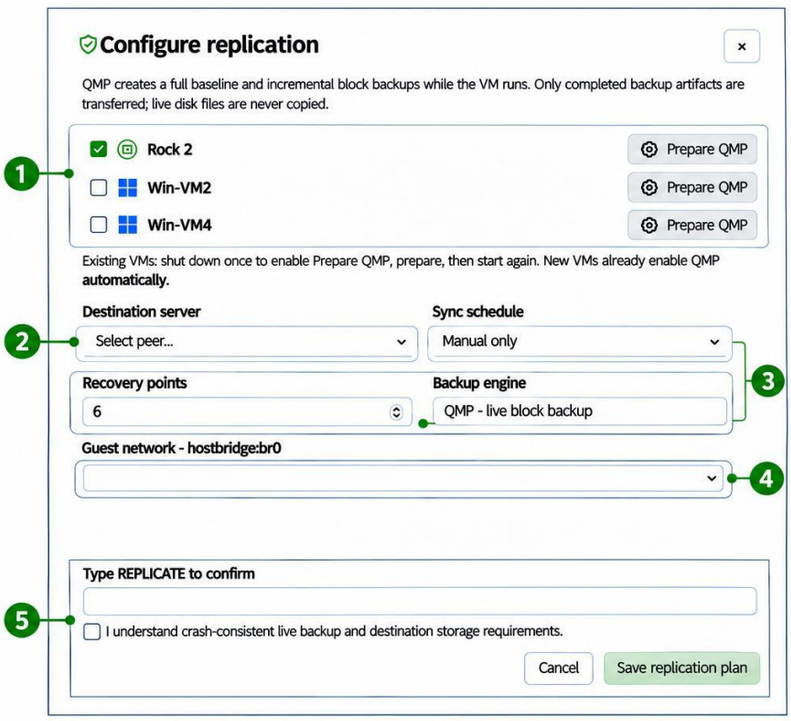
Replicate a virtual machine

The Replication feature copies a virtual machine's data from its source host to a remote Ncore VM Manager host. If the source host becomes unavailable, you can use the replicated data to recover the VM on the remote host and start it there after confirming that the source VM is offline.

This feature supports the default VM disk type, qcow2. Support for other block devices will be in future releases.



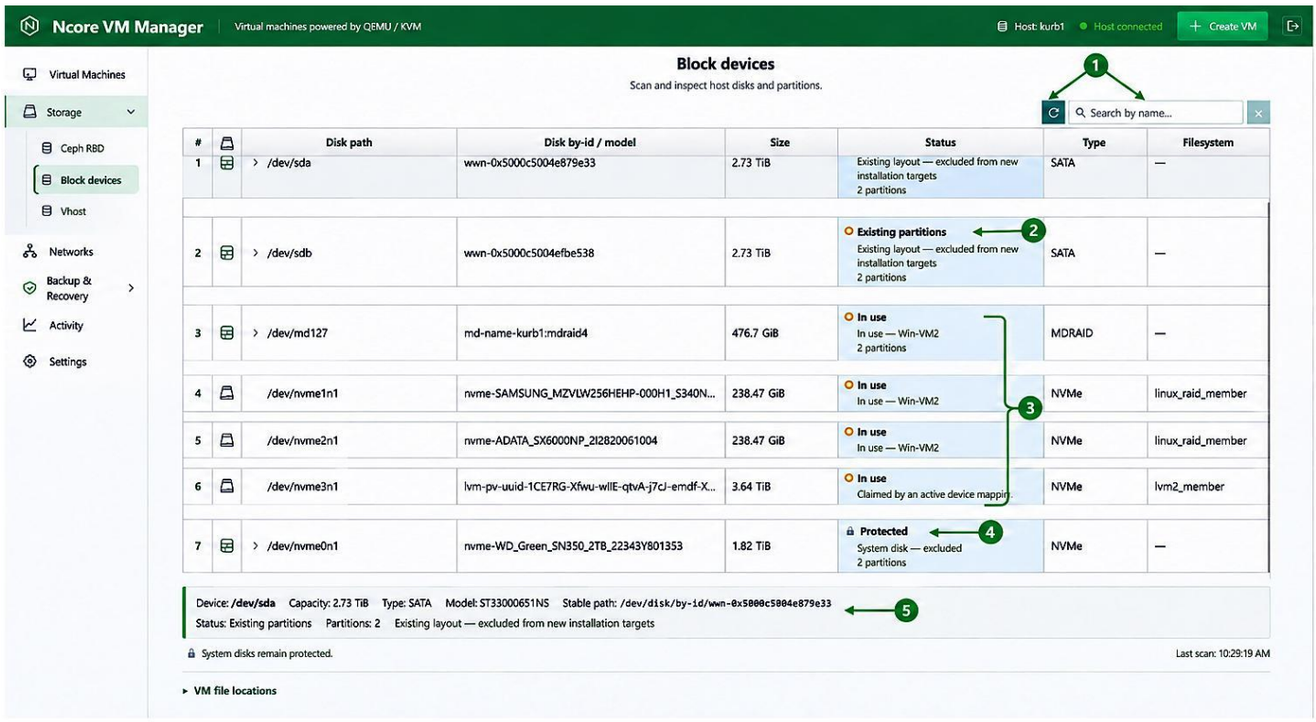
1. **Destination server** — Use Configure to manage peers and Refresh servers to reload the list.
2. **Create a plan** — Select Replicate VMs and complete the dialog.
3. **Run a sync** — Use Sync now for an immediate transfer or Resume for a paused plan.
4. **Recovery point** — Check Latest recovery point after the transfer completes.



1. **Select VMs** — If QMP setup is needed, shut down the VM, prepare QMP, then start it again.
2. **Destination server** — Choose the peer that receives the recovery points.
3. **Sync and retention** — Choose a schedule and how many points to keep.
4. **Guest network** — Choose Local NAT or an allowed host bridge.
5. **Confirm and save** — Type REPLICATE, check the acknowledgment, and save the plan.

Storage – Add a disk block device

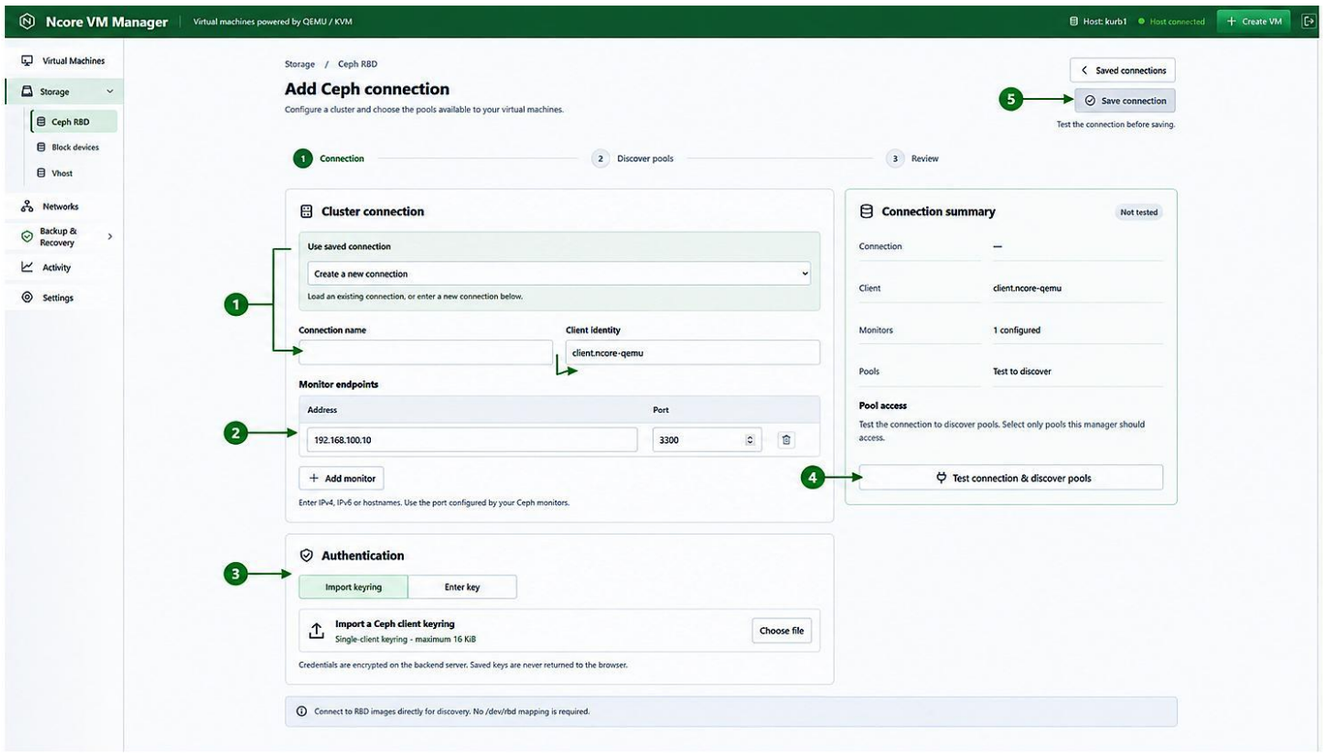
As an optional feature, Ncore VM Manager supports all block devices, including Ceph and virtual host block devices. Use the following UI workflows to view or add your storage backend. Ncore automatically scans all block devices attached to the host servicing the VM Manager. This page is for informational purposes only; the administrator must validate the availability of these disks.



1. **Scan and inspect** — Refresh, search by name, or expand a disk to see partitions.
2. **Existing partitions** — An existing layout excludes the disk from new installation targets.
3. **In use** — A VM or active mapping claims the device or its backing disks.
4. **Protected** — The system disk is excluded from assignment.
5. **Device identity** — Check capacity, model, stable path, and status. Validate availability on the host.
6. **VM storage access** — Use an eligible unused disk for installation. An unclaimed partitioned disk may be attached where supported.

Storage – Add a Ceph RBD (Rados Block Device)

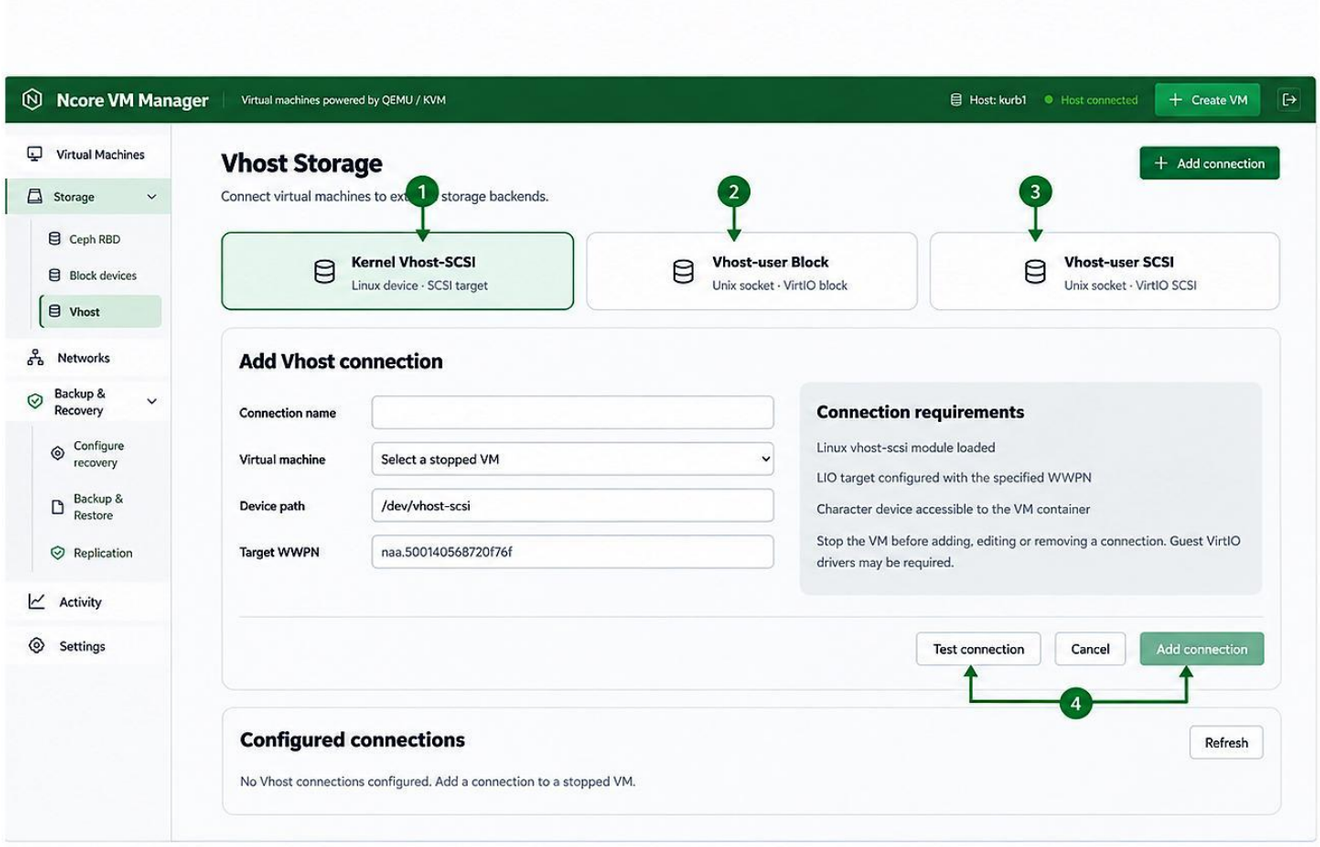
As an optional feature, Ncore VM Manager supports Ceph RADOS Block Devices. Use the following UI workflow to connect to any Ceph cluster and attach exported RBDs to a new or existing VM.



1. **Connection** — Enter a name and Ceph client identity, or load a saved connection.
2. **Monitors** — Enter monitor addresses and ports.
3. **Credentials** — Import a single-client keyring or enter the client key.
4. **Test and select pools** — Test the connection and choose the pools to expose.
5. **Review and save** — Review the connection and selected pools, then save.

Storage – Add a virtual host (vhost) block device

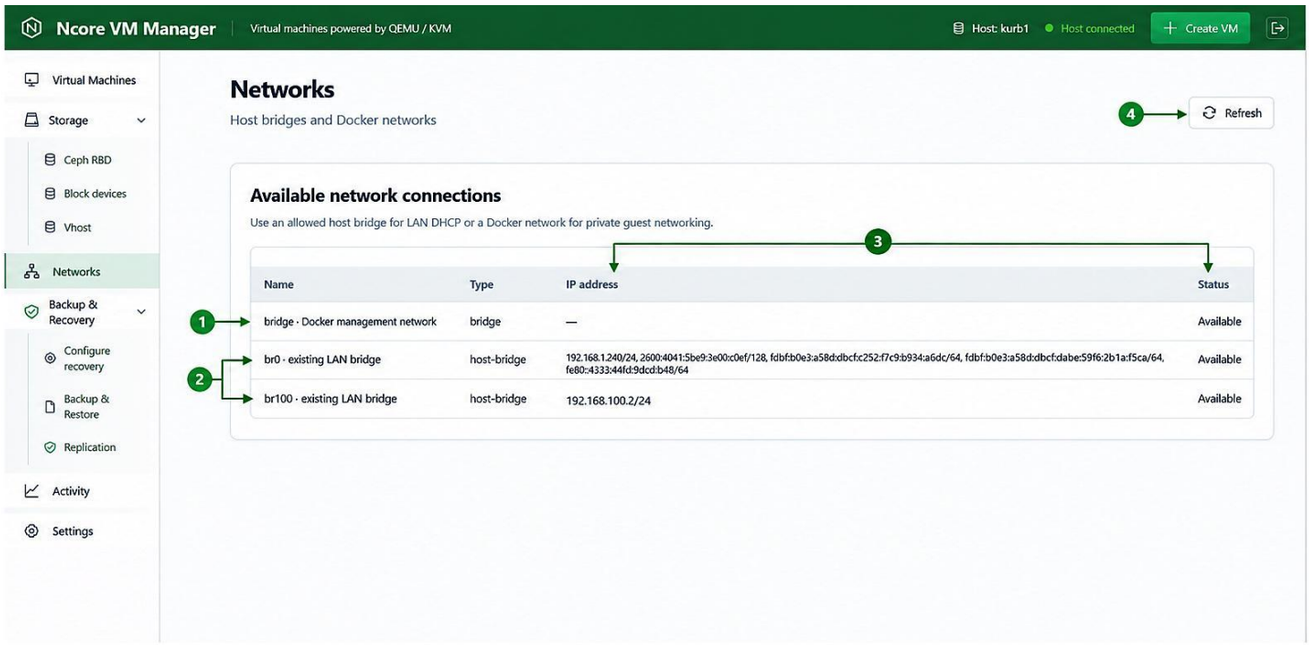
As an optional feature, Ncore VM Manager supports virtual host block devices, allowing VMs to attach directly to local storage via LIO (Linux IO target).This mode achieves native performance, with higher throughput and lower latency than traditional VirtIO block devices.



1. **Kernel Vhost-SCSI** — Connect to an LIO target using its WWPN. Kernel I/O can reduce QEMU overhead.
2. **Vhost-user Block** — Expose a VirtIO block disk over a Unix socket. Shared queues can reduce I/O overhead.
3. **Vhost-user SCSI** — Expose one or more LUNs through a VirtIO SCSI controller.
4. **Test and attach** — Select a stopped VM, enter the backend details, then test and add.

Networks

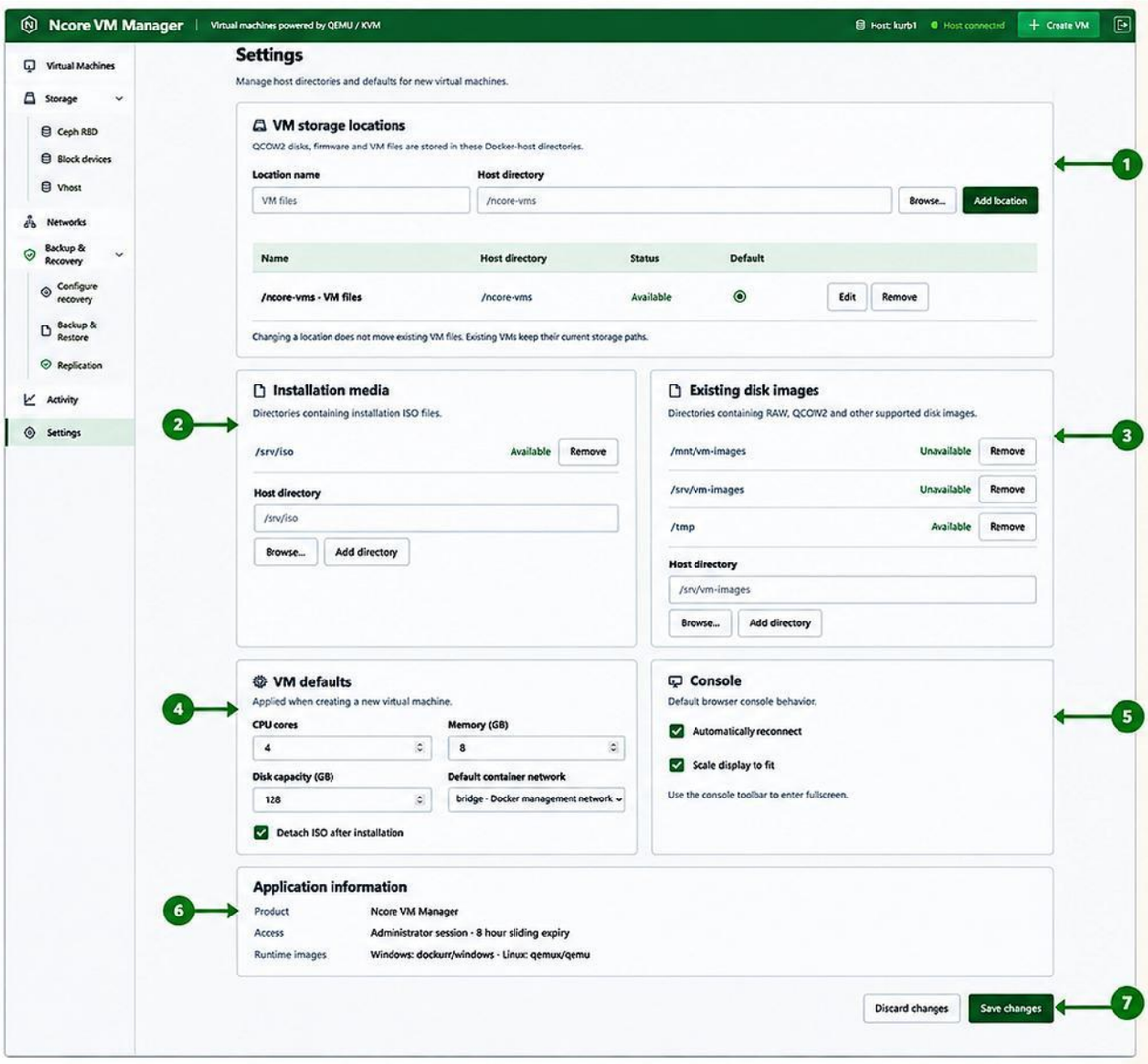
Ncore VM Manager will automatically scan the host that VM Manager resides on and report on available bridge network interfaces. All servers running VM Manager require at least one configured host bridge interface for VM networking outside the VM container.



1. **Docker bridge** — Use a Docker network for private guest networking.
2. **Host bridges** — Use an allowed bridge to connect a VM to the LAN.
3. **IP address and status** — Check host bridge addresses and whether the connection is listed for use.
4. **Refresh** — Reload the list after host network changes.

Settings

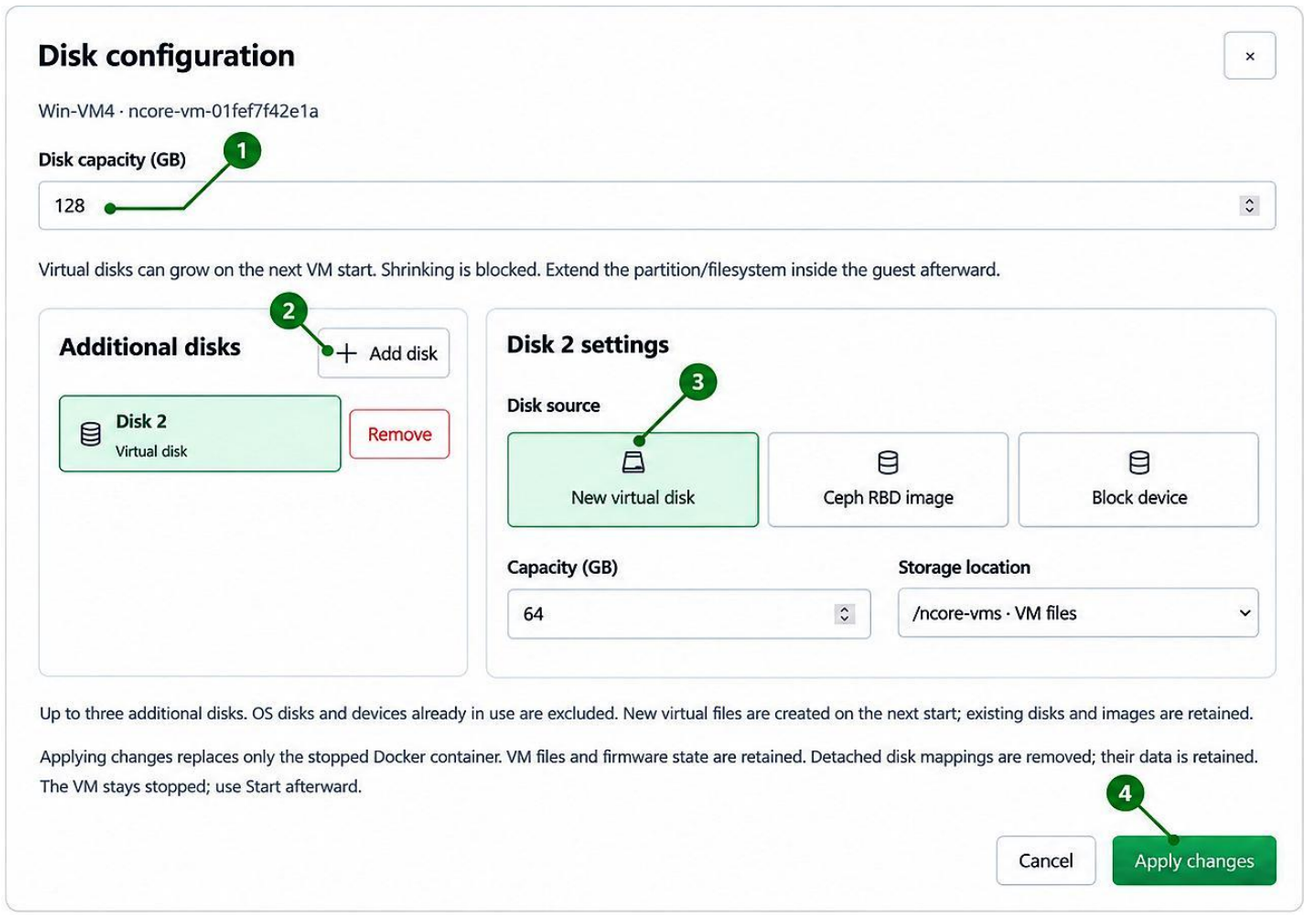
This is the primary configuration page allowing administrator to define directory locations for VM storage files, installation media, disk images, and VM defaults when creating new VMs. Administrators must configure this page before using VM Manager features.



1. **VM storage locations** — Choose where new VM files are stored. Existing paths are retained.
2. **Installation media** — Add host directories containing ISO files.
3. **Existing disk images** — Add RAW or QCOW2 image directories and check availability.
4. **VM defaults** — Set CPU, memory, disk capacity, networking, and ISO detachment.
5. **Console** — Set automatic reconnect and display scaling.
6. **Application information** — Review session expiry and runtime images.
7. **Save changes** — Apply or discard your changes.

Shortcuts

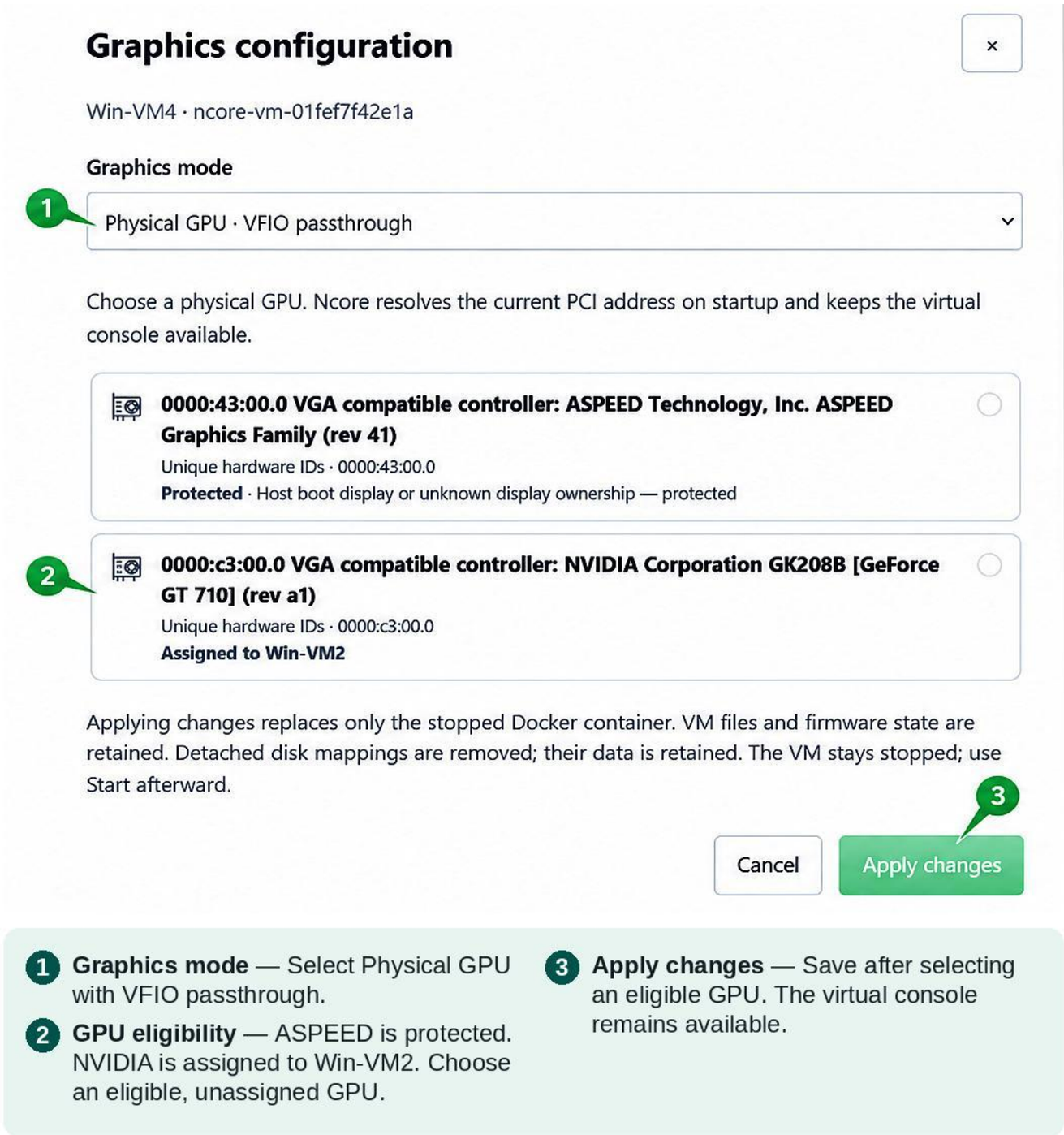
Add/remove disks:



1. **Boot disk capacity** — Increase the virtual disk, then extend the filesystem inside the guest.
2. **Add disk** — Add up to three additional disks.
3. **Disk source** — Choose a new virtual disk, Ceph RBD image, or block device.
4. **Apply changes** — Save and start the VM when ready.

Shortcuts

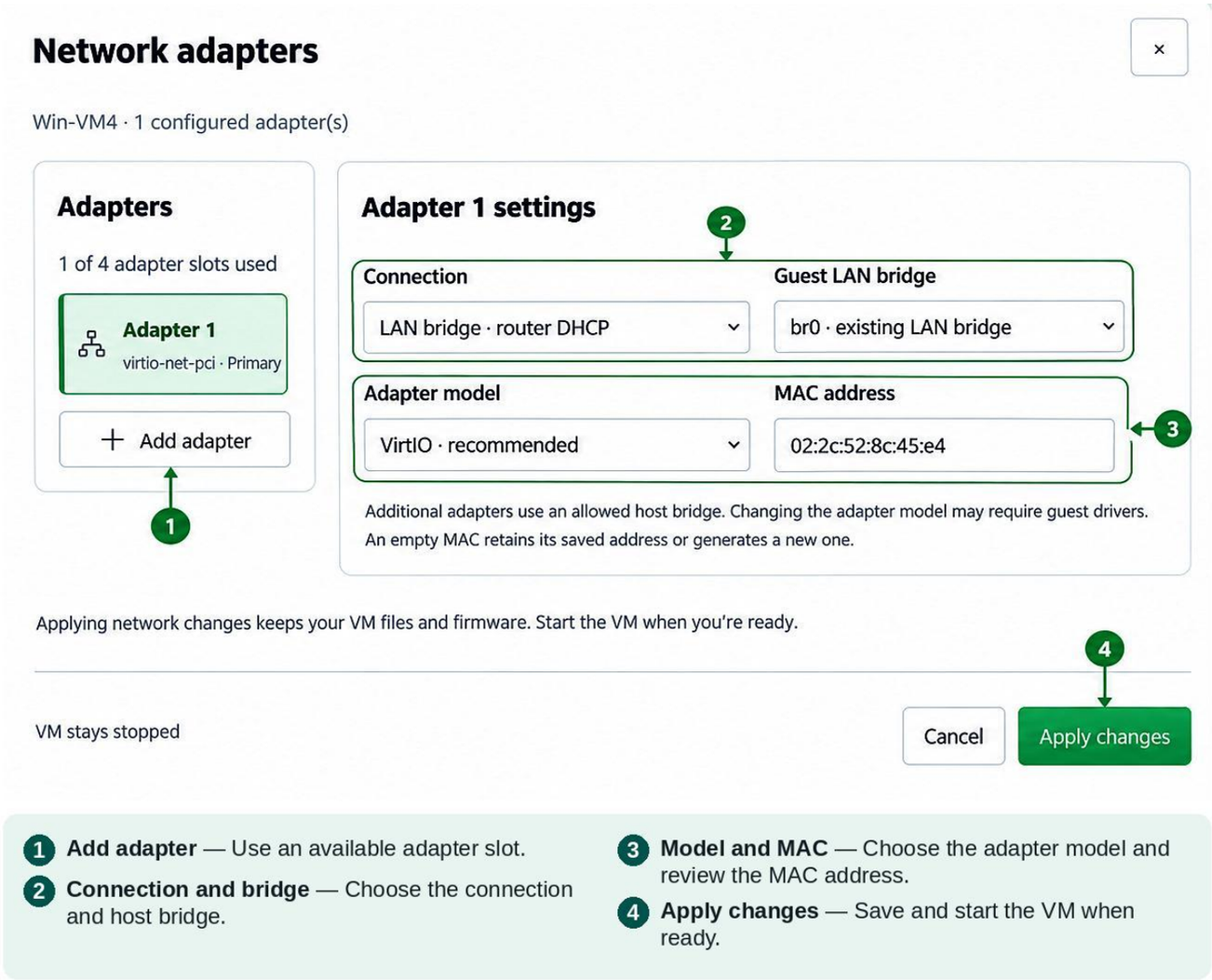
Add/remove GPU passthrough



1. **Graphics mode** — Select Physical GPU with VFIO passthrough.
2. **GPU eligibility** — ASPEED is protected. NVIDIA is assigned to Win-VM2. Choose an eligible, unassigned GPU.
3. **Apply changes** — Save after selecting an eligible GPU. The virtual console remains available.

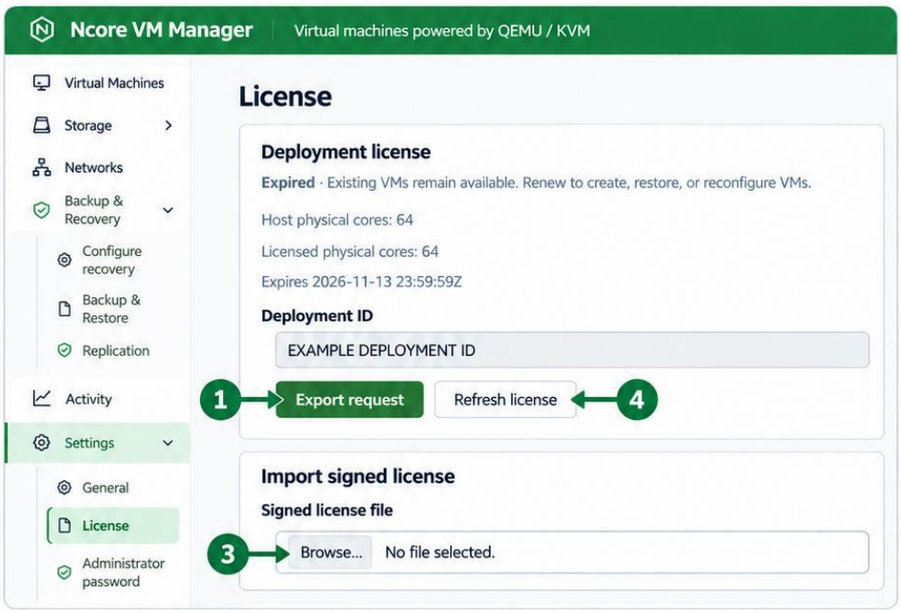
Shortcuts

Add/modify network adapters



1. **Add adapter** — Use an available adapter slot.
2. **Connection and bridge** — Choose the connection and host bridge.
3. **Model and MAC** — Choose the adapter model and review the MAC address.
4. **Apply changes** — Save and start the VM when ready.

Request and install an Ncore VM Manager license



1 Export the request

Open **Settings → License**, select **Export request**, and save the downloaded file.

2 Send the request

Email the exported request file to **support@ncoresoftware.com**.

3 Select the signed license

When you receive the signed license file, return to the same deployment's License page and select **Browse...** to choose it.

4 Import and verify

Select **Import license**, then select **Refresh license** to verify the updated status.

Ncore VM Manager Architecture FAQ

Does my VM run in a Docker container?

Docker runs the **QEMU process** for the VM. QEMU presents virtual hardware to the guest and uses KVM in the Linux host kernel for CPU acceleration. Windows or Linux boots inside that virtual hardware and runs its own kernel. The Docker container packages the VM runtime, while the guest runs as a full virtual machine.

Where are my virtual disks and VM files stored?

For file-backed VMs, Ncore stores virtual disks, firmware state, and other VM files in the host directory selected for the VM. You can configure these directories under **Settings → VM storage locations**. If you attach an existing Ceph RBD image, physical block device, or Vhost storage connection, data written to that disk stays on its backing storage.

Will my data be wiped if the server crashes?

A host crash interrupts running VMs, and their in-memory state is lost. Persistent disk data remains on the backing storage if it survives the crash. Writes that were still in flight may be lost, and the guest filesystem or applications may need to recover when the VM starts again. If the backing storage itself fails, recovery depends on having a usable backup or replica stored elsewhere.

What happens to my data if Docker restarts or the VM container is recreated?

VM disks and firmware state are stored outside the runtime container in persistent storage. Recreating the container can reuse those files when it points to the same storage. If a VM fails to start after maintenance, check that its original host directory is mounted or that its external storage is reachable.

Why use Docker if QEMU and KVM run the VM?

Docker gives Ncore a consistent way to package the QEMU runtime and its dependencies, pass through the host devices and storage paths a VM needs, and manage the runtime lifecycle. QEMU provides the virtual hardware, and KVM provides hardware-assisted CPU virtualization. Docker handles how the runtime is deployed and launched.

Can I change the default storage location after creating VMs?

Yes. The new default applies when you create a VM using that default. Existing VMs continue to use their current storage paths. Moving an existing virtual disk is a separate operation.

Does live replication automatically start a VM on another host if the source fails?

Recovery is operator-initiated. Live replication sends a full disk baseline to the recovery host, then copies changed blocks on later syncs while the source VM runs. If the source host fails, an operator selects a completed recovery point and confirms recovery. The recovered disk reflects that point in time. Differences since the last completed sync may be lost, and the VM starts without its previous RAM state.

Does a VM backup include every attached disk and the contents of RAM?

Ncore's live disk backups are **crash-consistent**. They capture supported file-backed disks, such as RAW and QCOW2, without saving RAM or quiescing guest applications. Verify which disks are listed in the completed restore point, especially if the VM also uses Ceph RBD, a physical block device, or Vhost storage. Plan protection for any attached disk outside the restore point.

What's the difference between backup and replication?

A **backup** creates a restore point in the directory you select under **Backup & Restore**. Use it to recover an earlier version of a VM after an accidental deletion, bad update, or disk corruption.

Replication transfers VM disk recovery points to a configured peer host. Use it when you want to recover and run the VM on another host if the source host becomes unavailable.

Do both support incremental copies?

Yes. With **Incremental backup** selected, Ncore creates a full backup when it needs a baseline, then captures changed disk blocks on later runs. Replication also starts with a full disk baseline and sends changed blocks on subsequent syncs. A replicated recovery point becomes available after its transfer completes.

Can replication replace backups?

Keep both if you need to recover from a host outage and also roll back to older versions of a VM. Accidental deletions and disk corruption can be copied during the next replication sync. Whether you can roll back depends on which recovery points you still retain. A backup stored on the same failed disk as the VM may also be lost, so keep a copy on separate storage if it needs to survive that failure.

Does the replica take over automatically?

Recovery is operator-initiated. On the recovery host, select a completed recovery point and confirm recovery before starting the VM. Disk changes made after that point and the source VM’s in-memory state are outside the recovery point.

Troubleshooting

VM does not start

Open Logs. On the host, run docker logs --tail 100 <vm-container>. A Running container does not establish that Windows or Linux finished booting.

RDP cannot connect

Verify the guest IP in the browser console. Enable Remote Desktop in a supported Windows edition and check its firewall. From a Windows client, run Test-Net Connection <guest-IP> -Port 3389.

VF missing or not ready

Refresh Networks. Check the PCI address, VF creation, driver preparation, IOMMU isolation and existing assignments. Install the NIC vendor’s VF driver inside the guest.

GPU boot failure or Code 43

Review QEMU logs and the current guest device error. An invalid interrupt pin 255 with ffff PCI reads and D3cold indicates inaccessible host hardware. Stop retries and plan host power/reset recovery; a full host restart interrupts other workloads.

Backup service unavailable

Open Backup & Recovery > Configure. Check the helper, recovery socket overlay, service status and View logs. Service working storage and backup destination are separate directories.

Backup rejected or restore blocked

Check storage support, free space, QMP readiness and active jobs. Native RBD and physical source disks are excluded. Restore only completed points; resolve target claims, size and identity failures.

New disk missing or size unchanged

Confirm the configuration was applied while stopped and start the guest. Check guest disk management; initialize only the intended new disk, or extend the existing partition/filesystem after growth.

When requesting support Provide the manager version, VM name, exact error, operation attempted and relevant logs. Remove passwords, keys and other credentials before sharing output.

Glossary

Block Device

A physical storage device or disk presented directly to a virtual machine, such as a hard drive, SSD, or NVMe device, rather than a file-backed virtual disk.

Bridge Network (LAN Bridge)

A network configuration that connects a virtual machine directly to the physical network, allowing the VM to obtain its own IP address and communicate like a physical system.

Ceph

An open-source distributed storage platform that provides object, file, and block storage services. Native Ceph RBD storage can be used directly by virtual machines.

Ceph Pool

A logical storage container within a Ceph cluster that stores RBD images or other Ceph data.

Ceph RBD (RADOS Block Device)

A block-storage technology within Ceph that presents storage as virtual disk images which can be attached directly to virtual machines.

Container

A lightweight isolated runtime environment. In Ncore VM Manager, virtual machines are hosted and managed through supporting Docker containers.

Dirty Bitmap

A QEMU feature that tracks which portions of a virtual disk have changed since the last backup, allowing efficient incremental backups

Full Backup

A backup containing all protected VM data needed to restore the selected virtual machine.

Guest Operating System (Guest OS)

The operating system running inside a virtual machine, such as Windows Server, Windows 11, Ubuntu, or SUSE Linux.

GPU Passthrough

A virtualization technique that assigns a physical graphics processor directly to a VM, allowing near-native graphics performance

Host

The physical server running Ncore VM Manager and providing compute, memory, storage, and networking resources to virtual machines

Incremental Backup

A backup containing only data changed since a previous backup point, reducing storage consumption and backup duration

IOMMU (Input-Output Memory Management Unit)

A hardware-assisted isolation technology required for secure PCI device passthrough, including SR-IOV virtual functions and physical GPUs.

MAC Address

A unique hardware identifier associated with a network adapter. Virtual adapters and SR-IOV devices each have their own MAC addresses.

Native RBD Storage

A VM disk connected directly to a Ceph RBD image instead of using a file-backed virtual disk.

Physical Disk Mapping

The assignment of a host disk directly to a virtual machine for exclusive VM access.

QEMU

QEMU (Quick Emulator) An open-source virtualization platform responsible for running and managing virtual machine execution. Certain backup and device features depend on QEMU functionality.

QMP (QEMU Machine Protocol)

A management interface used by QEMU for automation, monitoring, and backup coordination. Backup preparation may require QMP availability.

Recovery Point

A completed backup instance that can be selected and restored. A queued or running backup is not yet a valid recovery point.

Storage Backend

The underlying storage system hosting VM disks, such as Docker volumes, file-backed storage, Ceph RBD, or physical block devices.

Virtual Machine (VM)

A software-defined computer with virtualized CPU, memory, storage, network, and graphics resources capable of running an independent operating system.

VirtIO

A virtualization-optimized device standard providing high-performance virtual network, storage, and graphics adapters for guest operating systems.

File-Backed Virtual Disk

A virtual machine disk stored as a file (for example RAW or QCOW2) on a storage location managed by the host.