HyperSDK

Hyper-V to KVM Migration

Automate the complete migration path from Microsoft Hyper-V to KVM/libvirt — including VM discovery, VHD/VHDX export, format conversion, and VirtIO driver injection for Windows guests.

PowerShell/WinRM — VHD/VHDX Export — VirtIO Injection — Batch Migration

Hyper-V Integration

Connecting to Hyper-V hosts via PowerShell remoting and WinRM from a Linux migration server.

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PowerShell / WinRM

HyperSDK communicates with Hyper-V hosts using the WinRM protocol. PowerShell cmdlets (Get-VM, Export-VM, Copy-Item) are executed remotely via the Go WinRM library — no agent installation required on the Hyper-V host.

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Local & Remote Hosts

Works with standalone Hyper-V servers, Windows Server with Hyper-V role, and Hyper-V Server (free edition). Supports both local execution on the Hyper-V host and remote management from a Linux migration server.

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Go WinRM Library

Pure Go WinRM client with NTLM and Kerberos authentication. No dependency on Python's pywinrm or Ruby's WinRM gem. Handles large command outputs and binary file transfers natively.

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Authentication Options

NTLM (username/password), Kerberos (domain-joined), and certificate-based authentication. Supports both HTTP (port 5985) and HTTPS (port 5986) transport.

Connection Architecture

PowerShell Cmdlets

VM Discovery & Export

Discover Hyper-V VMs and export their disks with progress tracking.

Get-VM Discovery

Enumerates all VMs on the Hyper-V host using Get-VM. Returns name, state, CPU count, memory (static and dynamic), generation, uptime, and checkpoint status — mapped to HyperSDK's VMInfo.

Export-VM

Full VM export using Hyper-V's native Export-VM cmdlet. Creates a complete export package including configuration, snapshots, and virtual hard disks in their current format.

VHD/VHDX Copy with Progress

Direct VHD/VHDX file copy via WinRM or SMB with real-time progress tracking. Supports both fixed and dynamically expanding disks. Progress callbacks report bytes, percentage, and throughput.

VM Metadata

Captures generation (Gen1/Gen2), secure boot status, integration services, network adapters (virtual switch bindings), and attached ISO images for complete migration planning.

Property	PowerShell Command	VMInfo Field
Name	$vm.Name	Name
State	$vm.State	PowerState
CPU Count	$vm.ProcessorCount	CPUs

Memory	$vm.MemoryAssigned	MemoryMB
Disk Path	Get-VHD -VMId $vm.Id	Disks[]
Network	Get-VMNetworkAdapter	Networks[]

Export Options

Choose between full VM export and VHD-only copy based on your migration needs.

Full VM Export

Export-VM creates a complete package: VM configuration XML, all virtual hard disks, snapshots/checkpoints, and saved state files. Best for archival or re-import into another Hyper-V host.

VHD-Only Export

Copy only the VHD/VHDX disk files — skip configuration and snapshots. Faster and more space-efficient when the target is KVM (Hyper-V config is not reusable on KVM anyway).

Compression

Optional gzip/zstd compression during transfer to reduce network bandwidth. Dynamically expanding VHDX files are compacted before export to reclaim unused space.

Metadata Preservation

HyperSDK generates a migration manifest (JSON) with source VM details, disk mappings, network config, and conversion instructions — ensuring nothing is lost in translation.

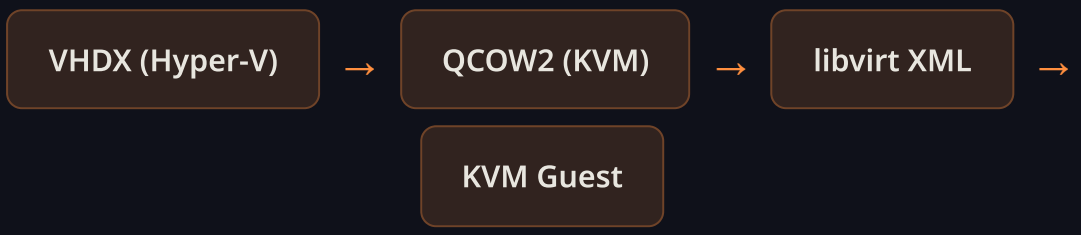
Feature	Full VM Export	VHD-Only
VM Configuration	Included	Skipped
Virtual Disks	Included	Included
Snapshots	Included	Skipped

Export Speed	Slower	Faster
Disk Space	Higher	Lower
KVM Migration	Overkill	Recommended

Conversion Path

VHDX to QCOW2 conversion with VirtIO driver injection for Windows guests.

Conversion Pipeline



VHDX to QCOW2

HyperSDK's native Go converter reads VHDX format (including log replay for crash-consistent state) and writes optimized QCOW2 with optional compression. Handles both fixed and dynamic VHDX.

VirtIO Driver Injection

Windows guests require VirtIO drivers for disk and network after migration from Hyper-V. HyperSDK can mount the QCOW2 image and inject VirtIO drivers from the Red Hat ISO, enabling boot on KVM.

libvirt Domain XML

Auto-generates libvirt domain XML from the source VM's configuration. Maps CPU count, memory, disk bus (VirtIO), network (VirtIO-net), and display (Spice/VNC) settings.

Guest OS Adjustments

Linux guests: update /etc/fstab UUIDs, regenerate initramfs with VirtIO modules. Windows guests: inject VirtIO drivers, update boot configuration, remove Hyper-V integration services.

Gen1

BIOS Boot (SeaBIOS)

Gen2

UEFI Boot (OVMF)

VirtIO

Disk + Network Drivers

Enterprise Considerations

Security, scalability, and operational best practices for Hyper-V migrations at scale.

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WinRM HTTPS

Always use WinRM over HTTPS (port 5986) in production. Configure TLS certificates on the Hyper-V host and verify the server certificate thumbprint in HyperSDK's provider configuration.

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Credential Security

Store Hyper-V credentials in HyperSDK's secret manager or HashiCorp Vault. Use dedicated service accounts with minimum required permissions (Hyper-V Administrators group, not Domain Admin).

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Batch Migration

Migrate VMs in planned waves using HyperSDK's schedule system. Configure concurrent export limits per Hyper-V host to avoid saturating storage I/O or network bandwidth.

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Monitoring & Reporting

Real-time dashboard shows migration progress per VM. Webhook notifications on completion or failure. Post-migration report includes timing, data transferred, and validation status.

Migration Checklist

1. **Pre-Migration**

   Enable WinRM HTTPS, create service account, inventory VMs, estimate storage needs, verify network bandwidth.

2 **Pilot Phase**

Migrate 1-2 test VMs (Linux + Windows). Validate boot, network, application functionality on KVM.

3 **Production Waves**

Schedule migration waves during maintenance windows. Run 5-10 concurrent exports per Hyper-V host.

4 **Cutover & Cleanup**

Redirect traffic to KVM guests, verify SLAs, then decommission Hyper-V VMs and reclaim licenses.

Escape Hyper-V Licensing Costs

HyperSDK automates every step of Hyper-V to KVM migration — from PowerShell discovery to VirtIO injection. Start your pilot today.