GENERAL

aws storage gateway vm import export

Published: September 19, 2026 | Index ID: #-

Introduction

In today's hybrid cloud landscape, organizations are constantly juggling workloads between on premises data centers and the cloud. One of the most common challenges is moving virtual machines (VMs) seamlessly from local infrastructure to Amazon Web Services (AWS) while preserving performance, configuration, and data integrity. AWS Storage Gateway, combined with the VM Import/Export service, offers a robust, scalable, and cost effective solution for this migration. This article explores how to leverage AWS Storage Gateway for VM import/export, walks through setup and best practices, and highlights real world scenarios that illustrate its value.

What Is AWS Storage Gateway?

AWS Storage Gateway is a hybrid cloud storage service that bridges on premises environments with Amazon S3, Glacier, and other AWS storage services. It offers three gateway types: **File Gateway**, **Volume Gateway**, and **Tape Gateway**. Each type serves different use cases—file sharing, block storage, and backup, respectively. By deploying a lightweight gateway appliance in your data center, you can access AWS storage as if it were local, enabling low latency operations, data caching, and automatic replication to the cloud.

Key Features of AWS Storage Gateway

- Hybrid architecture that keeps frequently accessed data on premises while archiving cold data to the cloud.
- Transparent integration with existing backup, storage, and virtualization tools.
- Automatic data encryption at rest and in transit.
- Support for multiple protocols: SMB, NFS, iSCSI, and more.
- Scalable to petabytes of data with minimal administrative overhead.

VM Import/Export Overview

The VM Import/Export feature allows you to import virtual machine images from your local environment into Amazon Elastic Compute Cloud (EC2) and export them back to your on premises infrastructure. Supported formats include **VMDK, VHD, VHDX, and OVA** . This capability is essential for:

- Cloud migration projects.
- Disaster recovery setups.
- Hybrid cloud development and testing.
- Compliance and audit scenarios requiring local data residency.

Why Use VM Import/Export?

Rather than re building VMs from scratch, VM Import/Export preserves your existing operating system, applications, and configurations. This reduces migration time, minimizes downtime, and ensures consistency across environments. Moreover, the service supports both **import** (local to AWS) and **export**(AWS to local) flows, giving you full control over your virtual assets.

How AWS Storage Gateway Facilitates VM Import/Export

While VM Import/Export can work directly with Amazon S3, integrating AWS Storage Gateway simplifies the process by providing a local interface for uploading and downloading VM images. The gateway can act as an **iSCSI target** or **SMB/NFS share**, allowing backup software, virtualization platforms, or even manual file copy tools to interact with the gateway as if it were a local disk. This reduces the need for complex network configurations and leverages the gateway's caching to accelerate data transfer.

Typical Workflow

1. Prepare the VM image on-premises.
2. Upload the image to the Storage Gateway (via iSCSI, SMB, or S3).
3. Invoke the VM Import/Export API to import the image into EC2.
4. Validate the imported instance in AWS.
5. When needed, export the instance back to the gateway for on-premises use.

Setting Up AWS Storage Gateway for VM Import/Export

Below is a step by step guide to deploying and configuring a Storage Gateway appliance for VM import/export operations.

Prerequisites

- Active AWS account with necessary IAM permissions for Storage Gateway, EC2, and S3.
- At least one Amazon S3 bucket for temporary storage of VM images.
- On premises network with sufficient bandwidth (preferably 1 /Gbps or higher).
- Virtualization host capable of running the Storage Gateway appliance (VMware ESXi, Hyper V, or KVM).

Installation Steps

1. Download the Gateway Appliance: Log in to the AWS Management Console, navigate to Storage Gateway, and download the appliance ISO.
2. Deploy the Appliance: Create a new VM in your hypervisor, attach the ISO, and configure the VM with at least 4 /GB RAM and 2 CPU cores.
3. Network Configuration: Assign a static IP address and ensure the gateway can reach the AWS endpoints for your region.
4. Activate the Gateway: Launch the VM, open the gateway web console, and provide the AWS credentials or use an IAM role if running on an EC2 instance.
5. Choose Gateway Type: For VM import/export, select Volume Gateway (Cached) to benefit from local caching and quick access.

Configuration

- Attach a Local Disk to the gateway for caching. This disk should be fast (SSD) and at least 50 /GB.
- Configure S3 Bucket in the gateway settings. This bucket will temporarily store the VM image during import/export.
- Set IAM Policies that grant the gateway permission to read/write to the S3 bucket and to call VM Import/Export actions.
- Enable Encryption for data at rest using AWS KMS keys.

Using VM Import/Export with Storage Gateway

Once the gateway is operational, you can start importing VMs into AWS.

Creating a VM Import Task

1. Export the VM Image from your hypervisor in a supported format (e.g., VMDK).
2. Upload the Image to the Storage Gateway. If using Volume Gateway, you can mount the gateway as an iSCSI target and copy the file directly.
3. Invoke the Import API via the AWS CLI or SDK:\naws ec2 import-image --description "My VM" --disk-containers file://containers.json\nThe containers.json file points to the S3 URI of the uploaded image.
4. Monitor the Import status using:\naws ec2 describe-import-image-tasks --image-id ami-xxxxxx

Monitoring and Managing Tasks

The import/export process can take several hours depending on image size and network speed. Use CloudWatch metrics to track **VolumeGatewayNetworkBytesIn** and **VolumeGatewayNetworkBytesOut** for performance insights. You can also enable **Gateway Event Notifications** to receive SNS alerts on task completion or failure.

Common Issues and Troubleshooting

- File Size Limits: Ensure the gateway's local cache is large enough to hold the entire VM image. If not, consider increasing the cache size or splitting the image.
- Network Latency: High latency can slow the upload. Use dedicated links or VPNs with low latency to AWS endpoints.
- IAM Permission Errors: Verify that the IAM role attached to the gateway has ec2:ImportImage and s3:GetObject permissions.
- Encryption Mismatch: If the image is encrypted, ensure the KMS key is accessible from the gateway.

Best Practices for VM Import/Export with Storage Gateway

- Use Cached Volume Gateway for frequent migrations to leverage local caching and reduce upload times.
- Compress Images before upload. AWS supports gzip and zip formats to reduce bandwidth.
- Schedule Migrations during off peak hours to avoid network congestion.
- Automate with Scripts using the AWS CLI or SDK to streamline repetitive import/export tasks.
- Validate Post Import by running automated tests or health checks on the EC2 instance to confirm application functionality.

Security Considerations

Security is paramount when moving VMs between environments. The following measures help safeguard data:

- Encrypt Data in Transit using TLS for all gateway communications.
- Encrypt Data at Rest on the gateway cache with AWS KMS keys.
- Apply Least Privilege IAM Policies to restrict gateway access to only the necessary S3 bucket and EC2 actions.
- Enable Multi-Factor Authentication (MFA) for IAM users initiating import/export operations.
- Use VPC Endpoints to keep traffic within the AWS network, reducing exposure to the public internet.

Cost Management

While the Storage Gateway itself is free, you incur charges for:

- Amazon S3 storage used during the transfer.
- Data transfer out of AWS (if you export back to on premises).
- EC2 instance usage for the imported VM.
- Optional: CloudWatch metrics and logs.

To control costs, monitor S3 storage usage, delete temporary objects after import, and use lifecycle policies to

move unused data to Glacier.

Alternative Solutions and Comparison

- AWS Server Migration Service (SMS): Ideal for large-scale migrations but requires a VPN or Direct Connect connection.
- Third-Party Tools like CloudEndure or Zerto provide continuous replication but come with licensing fees.
- Manual Copy via S3: Straight upload to S3 and manual import, but lacks the gateway's caching and protocol flexibility.

Compared to these options, AWS Storage Gateway + VM Import/Export offers a lightweight, protocol agnostic, and cost efficient pathway for most VM migrations.

Real-World Use Cases

Case Study 1: Small Business Cloud Migration

ABC Corp. had 50 legacy VMs on a VMware ESXi host. By deploying a Volume Gateway, they uploaded the VMDK files over a 1 Gbps link, imported them into EC2, and achieved a 90% reduction in on premises storage costs within three months.

Case Study 2: Disaster Recovery for Healthcare Provider

HealthPlus needed a reliable backup of patient data. Using the Tape Gateway, they archived daily VM snapshots to Glacier, then used VM Import/Export to spin up recovery instances in a separate AWS region during an outage, restoring services in under two hours.

Case Study 3: Development Sandbox Replication

TechLabs replicated a production environment to a sandbox by exporting the production VM to the gateway, importing it into a separate AWS account, and running automated tests. This process took less than 12 hours and maintained environment parity.

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