



XaaSIO

XaaSIO Virt-v2v Migration Runbook (Sample) v1.0



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1. Overview

This runbook describes a sample, repeatable method to migrate VMware virtual machines to upstream OpenStack (KVM) using a virt-v2v based conversion approach. The migration is executed in controlled waves with pre-checks, validation, acceptance gates, and rollback readiness.

Approach: wave-based migration (Pilot -> Non-critical -> Core production).

Method: virt-v2v conversion, image/volume import to OpenStack, VM launch, validation, and cutover.

Goal: predictable migration with minimal downtime and standardized Day-2 operations.

1.1 Scope

In-scope: VMware VM discovery inputs, conversion, image/volume import, network mapping, validation, cutover, rollback steps, and stabilization.

Out-of-scope (example): application modernization/refactoring, major network re-architecture beyond mapping, and bespoke appliance migration unless explicitly planned.

1.2 Roles & Responsibilities

Role	Responsibilities
Customer VMware Admin	Provide vCenter access/exports, approve maintenance windows, validate VMware-side prerequisites.
Customer Network/Security	Approve network mappings, firewall/LB changes, validate segmentation requirements.
Customer App Owner	Perform application validation and sign-off per wave.
XaaSIO SA Team	Run migration factory, execute conversions, import to OpenStack, guide validation, and produce evidence.
XaaSIO Ops/Platform	Provide OpenStack landing zone readiness, quotas, flavors, images, observability, and Day-2 runbooks.

2. Prerequisites & Inputs

2.1 Access & Accounts

- vCenter read-only access (preferred) or inventory exports (VM list, networks, datastores, templates).
- OpenStack project/tenant with quotas, network(s), and security groups created for the wave.

- Keycloak/SSO access model finalized (AD/LDAP, SSO provider, MFA requirement) for admin/operator access.

2.2 Data Required for Each VM

- VM name, OS type/version, vCPU/RAM, disk layout (size, thin/thick), NIC count, VLAN/segment mapping, and criticality.
- Special notes: static IPs, attached ISOs, snapshots, encryption, VMware tools status, and app dependency notes.

2.3 Tooling (Sample)

- Migration worker (Linux) with virt-v2v tooling (libguestfs).
- Connectivity to vCenter/ESXi and OpenStack endpoints (APIs, Glance, Cinder, Neutron).
- Optional: nbdkit, qemu-img, openstackclient, and secure credential handling (vault).
- Note: Package names and exact commands vary by distribution. This is a sample runbook and should be adapted to customer standards.

3. Wave Planning & Gates

3.1 Wave Definitions

Wave	Typical Workloads	Gate Criteria
Pilot	Low-risk, representative apps	Conversion success + baseline performance + validation sign-off
Non-critical	Bulk migration of low/medium impact	Operational readiness + change windows + rollback tested
Core production	High-impact, regulated, mission critical	Full evidence pack + CAB approvals + DR readiness

3.2 Pre-Wave Go/No-Go Checklist (Sample)

- OpenStack landing zone ready: networks, router/NAT (if needed), security groups, flavors, images policy.
- Observability ready: monitoring agents/log forwarding approach confirmed.
- Backup/DR approach confirmed for migrated workloads.
- Change window approved and stakeholder contacts on-call.
- Rollback plan confirmed (VMware source remains intact until acceptance).

4. Operating Model Shift: Pets vs Cattle (OpenStack)

OpenStack is typically operated using a 'cattle' model: standardized, replaceable instances built from golden images and flavors. This reduces drift and enables repeatable Day-2 operations.

4.1 Flavor-Based Operations

- Define an approved flavor catalog (vCPU/RAM/disk, plus performance flavors with extra specs).
- Use host aggregates/availability zones to enforce placement policies (e.g., performance hosts).
- Prefer rebuild/replace patterns for major changes; keep state in persistent volumes where possible.

4.2 Sample Flavor Catalog (Illustrative)

Flavor	vCPU	RAM	Disk	Notes
m1. small	2	4 GB	20 GB	General purpose
m1. medium	4	8 GB	40 GB	General purpose
m1. large	8	16 GB	80 GB	General purpose
perf.8c-32g	8	32 GB	80 GB	CPU pinning/hugepages (example)

5. Standard Migration Procedure (Per VM)

5.1 VMware-Side Pre-Checks

- Ensure VM has no active snapshots (or document and remove as per policy).
- Confirm disk free space and filesystem health (guest).
- Confirm application owner has documented validation steps.
- Record current network settings (IP, gateway, DNS) and NIC mapping.
- If using static IP, confirm IP reservation plan in target network.

5.2 Prepare Target OpenStack Resources

- Confirm tenant/project quotas and required networks exist for the wave.
- Confirm security groups (ingress/egress) aligned to application ports.
- Select target flavor from catalog and confirm boot volume policy (ephemeral vs Cinder boot).
- Confirm image naming and versioning scheme for converted artifacts.

5.3 Convert VM with virt-v2v (Sample Flow)

The conversion step extracts the VMware VM and produces a KVM-compatible disk, applying required guest changes (drivers, bootloader adjustments) based on OS.

- **Sample (illustrative) commands - adapt to your environment:**

- 1) Export/Access VM disks (via vCenter/ESXi access)

- 2) Run virt-v2v to convert into a local qcow2/raw output

```
virt-v2v -i vpx -ic vpx://VCENTER/Datacenter -ip <file> <VM_NAME> \  
-o local -os /var/lib/migration/output -of qcow2
```

- 3) Validate output with qemu-img info

```
qemu-img info /var/lib/migration/output/<VM_NAME>.qcow2
```

- Windows: ensure virtio drivers plan (inject drivers or use driver ISO policy).
- Linux: verify initramfs and network naming changes (predictable interface names).
- Record conversion logs and checksums for evidence and troubleshooting.

5.4 Import to OpenStack (Image or Volume Boot)

Option A (common): Upload converted disk to Glance as an image, then boot an instance.

Option B: Create a Cinder volume from the image and boot from volume (recommended for stateful workloads).

- **Sample OpenStack CLI (illustrative):**

```
openstack image create <VM_NAME>-v1 --disk-format qcow2 --container-format bare \  
--file /var/lib/migration/output/<VM_NAME>.qcow2 --private
```

Boot from image

```
openstack server create --flavor <FLAVOR> --image <VM_NAME>-v1 --network <NET> \  
<VM_NAME>
```

Or boot from volume

```
openstack volume create --image <VM_NAME>-v1 --size <GB> <VM_NAME>-boot \  
openstack server create --flavor <FLAVOR> --volume <VM_NAME>-boot --network <NET> \  
<VM_NAME>
```

- Apply security groups and fixed IP policies before power-on validation.
- Attach additional data volumes if required (mapped from VMware disks).

5.5 Network Mapping & Cutover Preparation

- Map VMware port groups/segments to OpenStack networks/subnets (VLAN/overlay mapping).
- Validate routing, NAT, and firewall policies for application ports.
- Prepare DNS changes (A/AAAA records), load balancer pool changes, or NAT VIP switch-over plan.
- If required, schedule a short cutover window to switch traffic to the migrated VM.

5.6 Validation (Functional + Non-Functional)

Validation Area	Checks (Examples)
Boot & Console	Instance boots cleanly; console access; no fsck errors; correct hostname/time
Network	IP/DNS/gateway correct; required ports reachable; east-west dependencies validated
Application	App owner test cases pass; service endpoints respond; batch jobs verified
Performance	Baseline CPU/RAM/IO within expected range; no major latency regressions
Observability	Monitoring agent/log forwarding active; dashboards and alerts visible

5.7 Acceptance Gate

- Application owner sign-off recorded for the VM/wave.
- Incident-free burn-in period (as agreed) completed for production workloads.
- Rollback window defined; VMware source remains intact until acceptance completes.

6. Cutover Procedure (Sample)

- Freeze changes on VMware VM (application maintenance mode if required).
- Final sync steps (if any) and confirm last-known-good state.
- Power off VMware VM (or isolate network) at cutover start.
- Enable OpenStack VM network access; apply final security group rules.
- Update DNS/LB/NAT/VIP to point to OpenStack VM.
- Run quick validation and declare cutover complete.

6.1 Rollback Procedure (Sample)

- If severe issue occurs, revert DNS/LB/NAT/VIP back to VMware endpoints.
- Power on VMware VM and validate service restoration.
- Isolate or shut down OpenStack VM to prevent split-brain.
- Capture logs/evidence and open remediation actions before retry.

7. Post-Migration Stabilization (Day-2 Readiness)

- Confirm backups, patching cadence, and vulnerability scanning integration.
- Finalize monitoring alerts and dashboards; tune thresholds based on baseline.
- Update CMDB/inventory records and ownership.
- Document runbooks: resize by flavor, rebuild from golden image, volume operations, and incident response steps.
- Conduct KT session and handover to operations teams.

8. Troubleshooting Guide (Common Issues)

Symptom	Likely Cause	Recommended Action
VM boots but no network	NIC naming/driver mismatch; wrong network mapping	Verify interface names, cloud-init config, Neutron port binding, and security groups
Windows blue screen / drivers	virtio drivers missing or storage controller mismatch	Inject virtio drivers; validate boot mode; re-run conversion with correct settings
High IO latency	Storage backend policy mismatch; flavor/host placement	Validate Ceph/Cinder policy, host aggregates, volume type, and performance flavor
App works locally but not externally	Firewall/LB/VIP not updated	Validate L4/L7 rules, LB pool, DNS propagation, and routing/NAT

9. Evidence & Reporting (Optional for Regulated Environments)

- Per VM: conversion logs, checksum, image/volume IDs, instance ID, network/SG config snapshot.
- Validation results signed by app owner, including timestamps.
- Change tickets and CAB approvals (if applicable).
- Rollback test record for pilot wave.

9.1 Appendix A: Checklists (Templates)

A.1 Per-VM Checklist (Sample)

- VM snapshots: none / documented
- NIC mapping confirmed; IP plan confirmed
- Target flavor selected from catalog
- Security groups approved
- Conversion complete; output verified
- Imported to OpenStack (image/volume)
- Validation completed; sign-off captured
- Cutover executed; monitoring enabled
- Rollback plan ready; VMware retained until acceptance

9.2 Appendix B: Sample Command Reference

- **virt-v2v**: convert from vCenter (illustrative)

```
virt-v2v -i vpx -ic vpx://VCENTER/Datacenter -ip <file> <VM_NAME> -o local -os <OUTDIR> -of  
qcow2
```

```
qemu-img: inspect
```

```
qemu-img info <disk. qcow2>
```

- **OpenStack**: image upload (illustrative)

```
openstack image create <NAME> --disk-format qcow2 --container-format bare --file  
<disk. qcow2> --private
```



VIRT-V2V MIGRATION RUNBOOK (SAMPLE)

Execute predictable VMware to OpenStack migrations with wave-based validation and rollback readiness.

Book a demo at <https://xaasio.com/contact/>

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