

Exit Plan dari VMware Strategi Migrasi ke OpenStack w/ vjailbreak

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Why an **Exit Plan** is Crucial?

The Challenge

- **Broadcom Acquisition (Late 2023)** fundamentally changed VMware's licensing model
- **Significant Cost Increases** affecting IT budgets across organizations
- Increased vendor dependency risk and **reduced flexibility**
- Strategic shift forcing IT practitioners to reconsider infrastructure choices

The Opportunity

- Migration to open-source private cloud platforms
- Reduced licensing costs and vendor lock-in
- Greater flexibility and infrastructure control
- Strategic timing for seamless transition planning


openstack.
Enterprise-grade
Cloud
Platform


PROXMOX
Open Source
Virtualization
Platform

 **MicroStack**
Lightweight
OpenStack
Distribution

OpenStack as Strategic Alternative

Embracing open-source infrastructure for enhanced flexibility, cost efficiency, and enterprise-grade reliability



Flexibility

Complete control over your infrastructure.

Customize each cloud service component to match your specific requirements and business needs.

FULL CONTROL



Cost-Effective

Eliminate expensive licensing fees and reduce **TCO**

with predictable, transparent pricing models that scale with your business.

NO LICENSE FEE

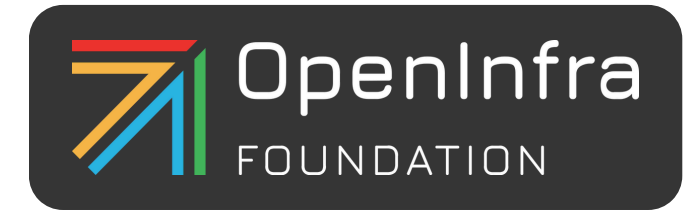


Enterprise Grade

Proven reliability with numerous enterprise distributions.

Battle-tested in production environments across global organizations.

PRODUCTION READY



Community

Backed by a vibrant global ecosystem of developers, vendors,

and enterprises continuously driving innovation and best practices.

GLOBAL ECOSYSTEM

Migration Journey

Embracing open-source infrastructure for enhanced flexibility, cost efficiency, and enterprise-grade reliability

PLAN

Assessment App & VMs

Inventory discovery & dependency mapping

Gather Platform Info

VMware/OpenStack credentials and configurations

Success Metrics

KPIs, acceptance criteria & Migration Timeline

IMPLEMENT

Integrate Platforms

Connect OpenStack, VMware, and migration tools

Understand Mappings

Resource mapping and workflow configuration

Configure Migration Types

Define conversion and migration patterns

PILOTING

Test / PoC

Execute proof of concept migrations

Finalize Test VMs

Select representative workloads for testing

Gather Feedback

Collect performance & issues data. Refine migration procedures

SCALE 1-X

Execute Migration Plans

Follow defined timeline and phases

Migrate Production

Move live applications and VMs

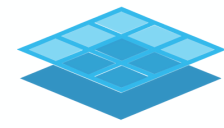
Optimize & Monitor

Track performance, costs, & user satisfaction. Post-migration Validation

Success Metrics

Migration success rate >95%, Performance parity or improvement, Zero data loss, Downtime within agreed SLA, Cost reduction achievement.

Migration Tools



vJailbreak

Open-source tool for seamless migration by handling disk conversion & driver injection. Known for its **GUI & Kubernetes-based** execution.

Type: **Agentless**

Interface: **GUI & CLI**

Execution: **Runs on Kubernetes at destination**

Dependencies: **Python 3.6+, OpenStack APIs, VMware vSphere APIs, VDDK**



MigrateKit

Open-source, CLI-focused tool for automation and scripting. Uses Docker for execution & offers optional commercial support via [Vexxhost](#).

Type: **Agentless**

Interface: **CLI**

Execution: **Runs in Container at destination**

Dependencies: **Docker Container, OpenStack APIs, VMware vSphere APIs, VDDK**



ZConverter Cloud

Enterprise-grade solution supporting **any-to-any cloud migration** with advanced features like live migration for zero-downtime cutovers.

Type: **Agent-based**

Interface: **GUI**

Execution: **Requires agent on source VM**

Dependencies: **ZConverter appliance, vCenter access**

vinchin

Vinchin provides agentless backup, disaster recovery, and **seamless V2V migration** for virtual infrastructures.

Type: **Agentless**

Interface: **GUI**

Execution: **Requires agent on source VM**

Dependencies: **Vinchin Backup Server appliance, OpenStack APIs, VMware vSphere APIs**

Tool Selection Matrix

Tool	Strategy Fit	Interface	Agent Model	Key Dependencies	Best Applications
vJailbreak	Lift & Shift	GUI	Agentless	VDDK, Kubernetes, OpenStack APIs	Web servers, databases, business apps
MigrateKit	Lift & Shift	CLI	Agentless	VDDK, Docker, OpenStack APIs	Enterprise apps, automated workflows
ZConverter	Hybrid, Backup-Driven	GUI/CLI	Agent-based	ZConverter appliance, VM agents	Multi-hypervisor, complex networking
Vinchin	Hybrid, Backup-Driven	GUI/CLI	Agent-based	Vinchin agents, backup repository	Mission-critical, data-sensitive

Quick Selection Guide

- Need GUI + Easy Setup**
vJailbreak (runs on Kubernetes)
- CLI + Enterprise Support**
MigrateKit (with Vexxhost support)
- Multi-source Migration**
ZConverter (supports multiple hypervisors)
- High-risk Systems**
Vinchin, ZConverter (backup-driven approach)
- Cloud-native Goals**
Heat templates, Terraform (rebuild)

Decision Matrix

- Simple + Fast**
Jailbreak for web apps, file servers
- Enterprise + Automated**
MigrateKit for large-scale deployments
- Complex + Multi-source**
ZConverter for mixed environments
- Critical + Protected**
Vinchin for mission-critical systems
- Modern + Optimized**
Custom development for cloud-native

Migration Strategies & Workload Analysis

Matching the Approach to the Application

LIFT & SHIFT (REHOST)

Migrating as a VM as-is, without redesigning its architecture. This is the fastest approach with minimal changes

Example Workloads :

- Web Servers (Apache HTTP Server, Nginx, IIS)
- Application Servers (Tomcat, JBoss, WebLogic)
- File Servers (Windows File Server, Samba, NFS)
- Development/Test (CI/CD environments, staging servers)
- Business/Internal (CMS, legacy applications, etc)

Recommended Tools

vJailbreak, MigrateKit, ZConverter, Vinchin

Implementation

VM discovery → Network mapping → Storage conversion → Metadata preservation

RE-PLATFORM (REBUILD)

Completely rewriting applications for OpenStack native features maximizes platform benefits but requires the most effort.

Example Workloads :

- Cloud-Native Apps (Microservices, containerized apps)
- Data Analytics (Hadoop, Spark, Elasticsearch clusters)
- High-Performance (HPC apps, GPU workloads)
- Scalable Services (LB web services, API gateways)
- Modern Databases (MongoDB, Cassandra, Redis clusters)

Recommended Tools

CI/CD (Jenkins, GitLab), Docker, Kubernetes (Magnum), Ansible

Implementation

App modernization → Microservices adoption → Auto-scaling → Security hardening

HYBRID APPROACH

Combining strategies. For example, 'lift & shift' a legacy database, while rebuilding its front-end as a modern, containerized application.

Example Workloads :

- ERP Systems (SAP/Oracle with a legacy DB but a new web portal)
- Financial Apps (Core banking backends (lift & shift) with new mobile front-ends (rebuild))
- Large Websites (CMS backend (lift & shift) with a decoupled, scalable front-end)

Recommended Tools

A combination of all tools, tailored to each component.

Implementation

Workload categorization → Selective migration → Progressive optimization

Advanced Migration Implementation Details

Matching the Approach to the Application

LIFT & SHIFT (REHOST)

Detailed Execution Process

Pre-Migration

VM inventory, dependency mapping, performance baseline establishment

Conversion Phase

VMDK to QCOW2 conversion, driver injection, metadata extraction

Network Setup

Security group creation, floating IP allocation, router configuration

Validation

Boot testing, application functionality, performance verification

Cutover

DNS updates, load balancer changes, traffic redirection

RE-PLATFORM (REBUILD)

Cloud-Native Transformation

Architecture Review

Microservices decomposition, container strategy, API design

Infrastructure as Code

Heat templates, Ansible playbooks, Terraform modules

Auto-scaling Setup

Heat auto-scaling groups, monitoring integration, scaling policies

Security Enhancement

KeyManager integration, network policies, RBAC implementation

Cutover

DNS updates, load balancer changes, traffic redirection

HYBRID APPROACH

Best of Both

Workload Classification

Stateless for lift-and-shift, stateful for optimization

Phased Migration

Non-critical first, mission-critical with re-platform/rebuild

Data Synchronization

Real-time replication, ETL processes, backup/restore

Security Enhancement

KeyManager integration, network policies, RBAC implementation

Cutover

Blue-green deployment, canary releases, feature flags

vJailbreak Deep Dive



Released in early 2024, vJailbreak is an **open-source migration tool** developed by **Platform9** to facilitate the seamless migration of VMs from VMware vSphere to OpenStack. It simplifies the transition by providing a **user-friendly graphical interface** and automating the otherwise complex processes of VM conversion and workload migration.

Key Features & Benefits:

- Agentless migration (no software installation on source VMs)
- Kubernetes-based deployment for scalability
- Web-based GUI for easy operation
- VDDK integration for direct VMware access
- Minimal downtime during migration
- Automated format conversion (VMDK to QCOW2/RAW)
- Enterprise Scale (Proven with 40,000+ VM migrations)

Technical Specifications:

Python 3.6+

Kubernetes 1.18+

OpenStack Ussuri+

vSphere 6.7+

VDDK 7.0+

Docker Runtime

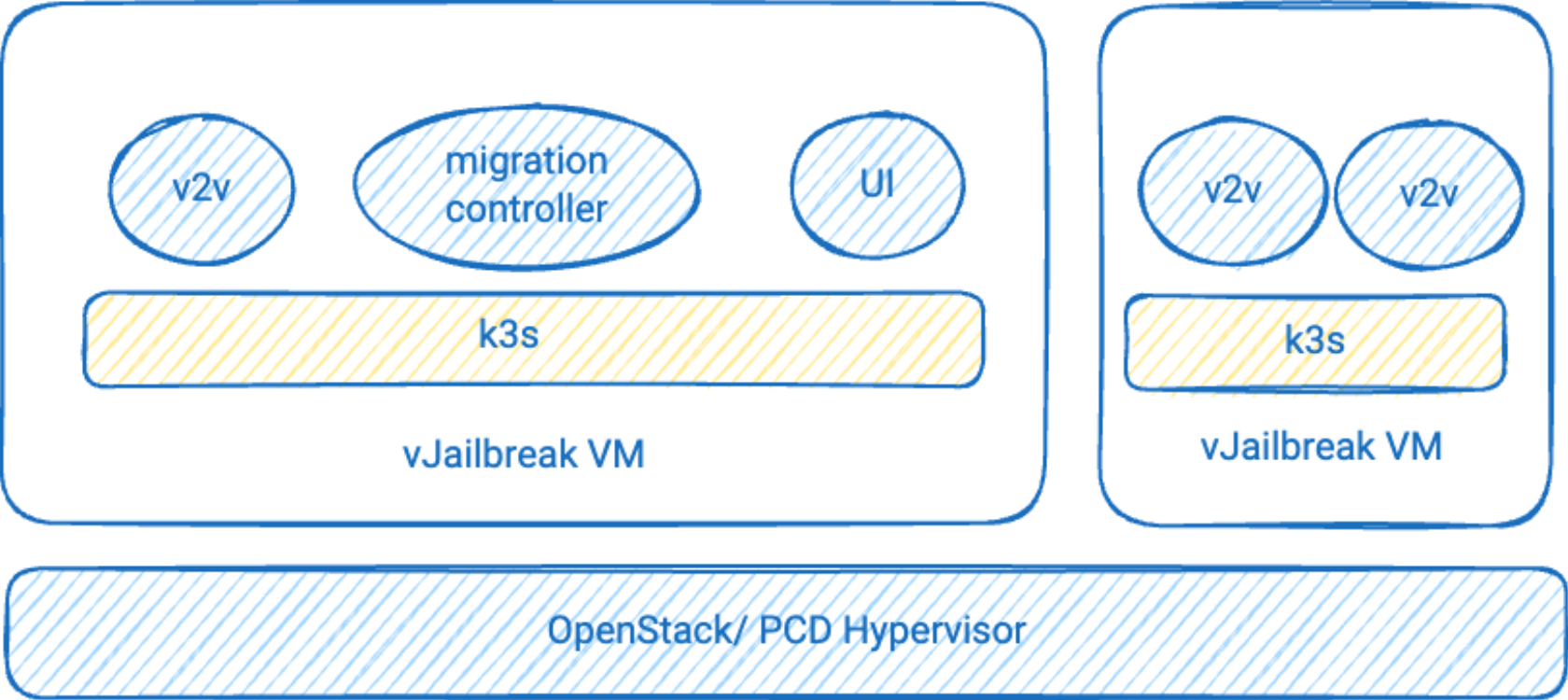
Supported Formats: **VMDK to QCOW2/RAW conversion**

Network Requirements: **API connectivity between VMware and OpenStack**

Resource Requirements: **8GB RAM, 4 vCPUs, 100GB+ Disk minimum for migration service**

OS Base: **Ubuntu 22.04 LTS with custom image (k3s)**

vJailbreak Architecture



Core Component :

- **v2v-helper** :executing migration process as a pod
- **v2v-cli**: Optional command-line interface tool (not required)
- **UI**: User-friendly graphical interface for migration management
- **migration-controller**: Kubernetes controller scheduling migration tasks
- **k3s**: Lightweight Kubernetes distribution for container orchestration

VM Deployment Architecture

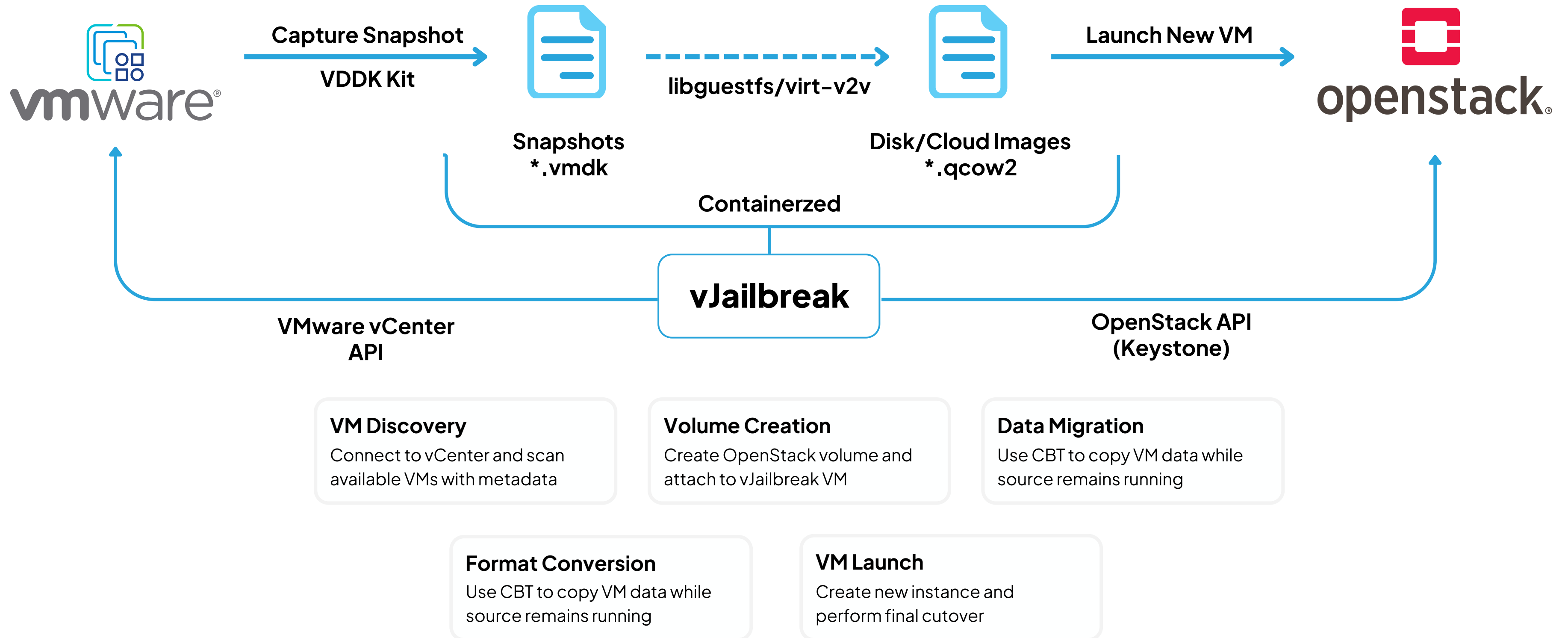
vJailbreak is deployed as a virtual machine in the target OpenStack environment. It uses a lightweight k3s Kubernetes cluster to manage its components and can be scaled by deploying additional VMs to handle concurrent migrations.

For high-throughput scenarios, the vJailbreak VM can be scaled out by deploying additional vJailbreak VMs in the target OpenStack environment to handle multiple migration tasks concurrently.

```
root@vjailbreak:~# kubectl get pods -n migration-system -o wide
NAME                                READY STATUS IP             NODE
migration-controller-manager-6d457f8477-bfcg7 1/1 Running 172.16.0.92 vjailbreak
migration-vpwned-sdk-5c9bc4655d-5zj54        1/1 Running 10.42.0.76 vjailbreak
vjailbreak-ui-64f494bb87-vd6wz               1/1 Running 10.42.0.75 vjailbreak
```

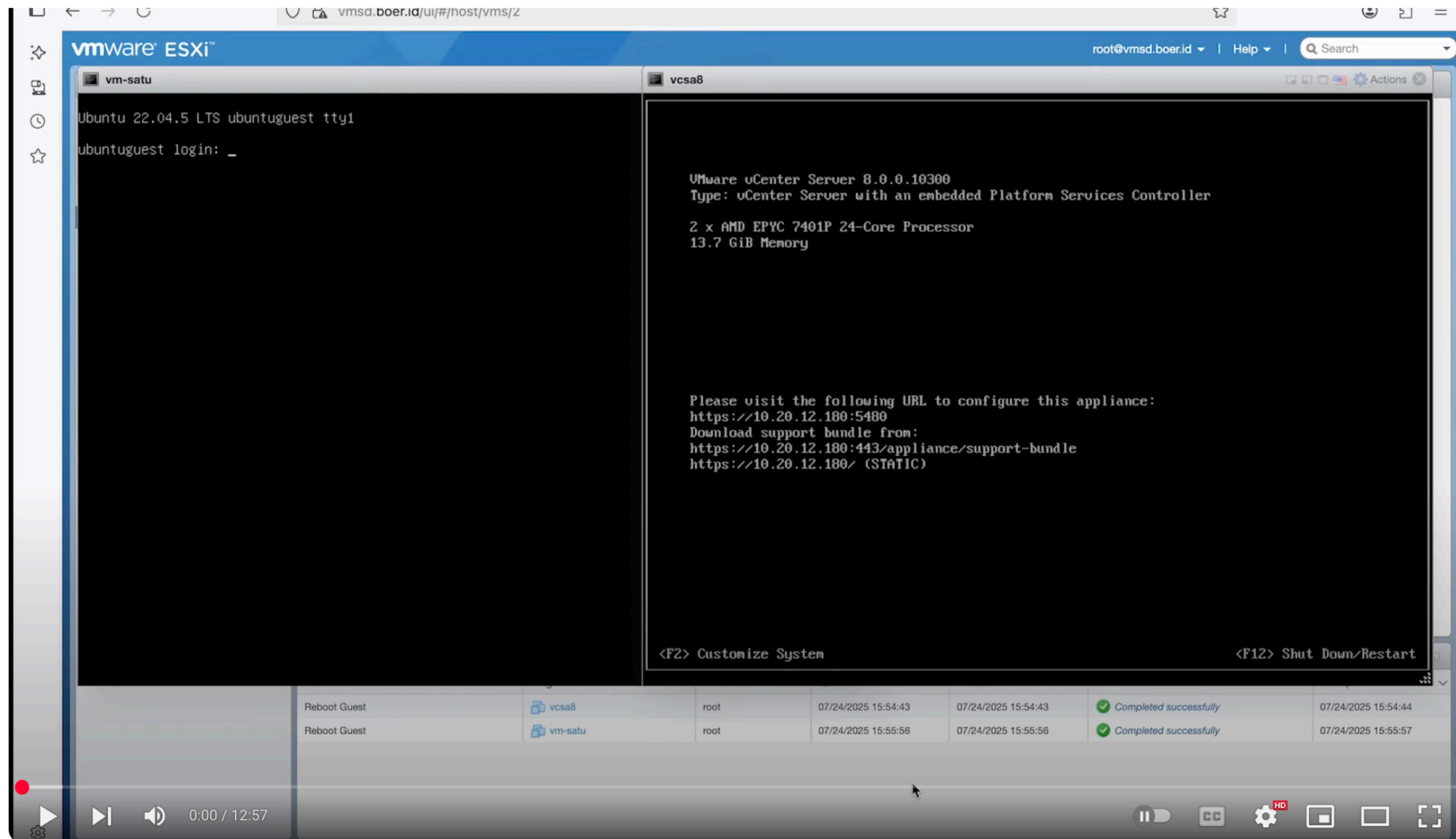
```
root@vjailbreak:~# crictl images | grep vjailbreak
IMAGE                                TAG      IMAGE ID  SIZE
quay.io/platform9/vjailbreak-controller v0.1.15  cb4b40f5971f8  37.1MB
quay.io/platform9/vjailbreak-ui        v0.1.15  72b2cfd9d9ad8  6.88MB
quay.io/platform9/vjailbreak-v2v-helper v0.1.15  dc928c40769d7  1.16GB
quay.io/platform9/vjailbreak-vpwned    v0.1.15  870e61f8ae1d8  26.3MB
quay.io/platform9/vjailbreak           alpine   034d7219f2c78  5.6MB
```

vJailbreak Migration Workflow



This architecture enables live migration with minimal downtime by leveraging Changed Block Tracking during the data copy phase, while the containerized conversion process ensures consistent and reliable format transformation from VMware VMDK to OpenStack-compatible QCOW2 format.

DEMO RECORD



vJailbreak Migration



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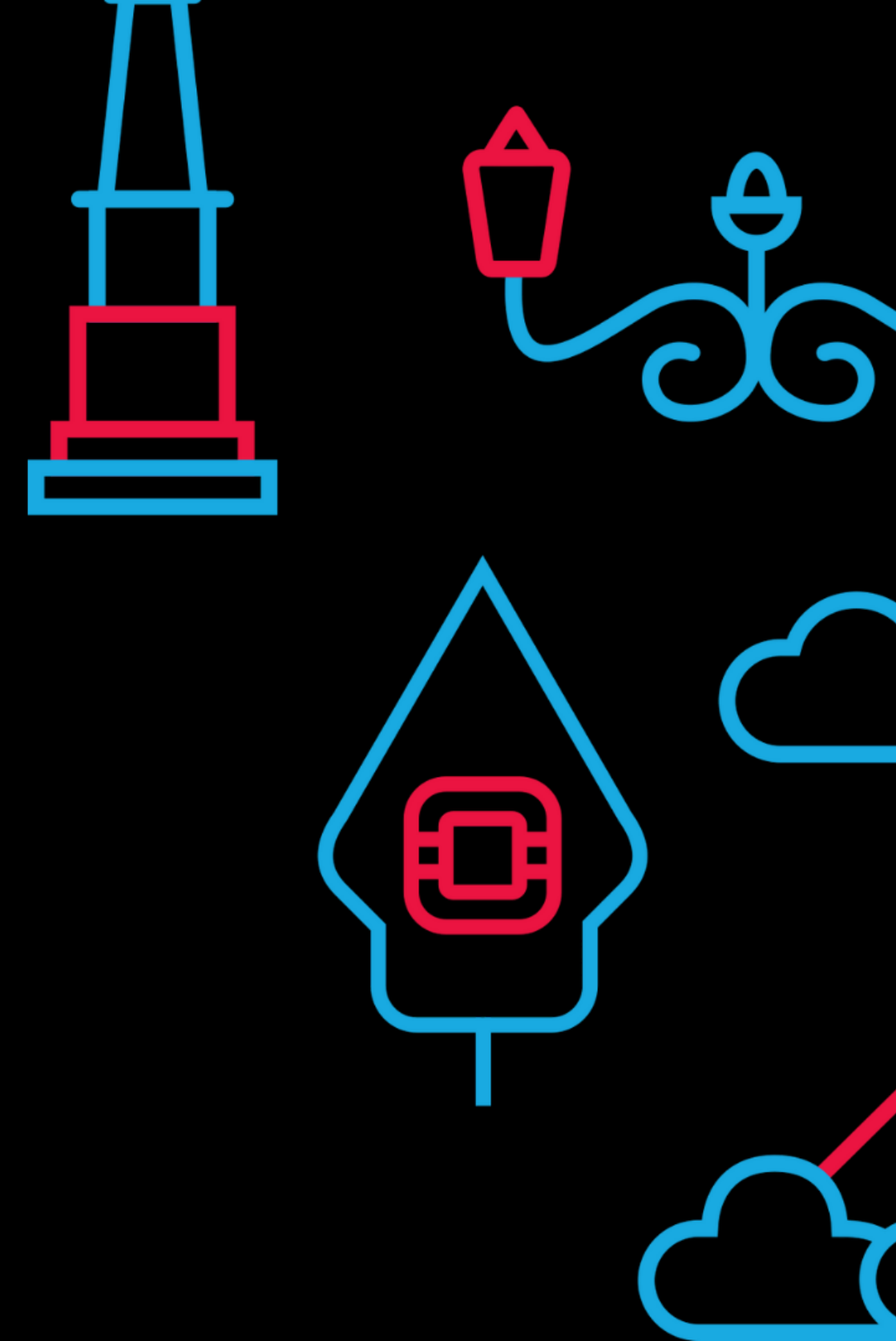
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<https://youtu.be/j23Ldz-hBB8?si=DwZZSa4cjcSYzcZ7>

THANK YOU



Yogyakarta, 19 July 2025



EasyStack
open cloud computing



datacomm

flexi

WOWRACK



boer
technology

NASHTAGROUP

nevacloud



OPEN GRAFANA

START MIGRATION

MIGRATIONS AGENTS CREDENTIALS

Credentials

+ ADD VMWARE CREDENTIALS

+ ADD OPENSTACK CREDENTIALS

🔄 🔍 Search by Name or T...

<input type="checkbox"/>	Name ↑	Type	Status	Actions
<input type="checkbox"/>	openstack	OpenStack	Succeeded	
<input type="checkbox"/>	vmware	VMware	Succeeded	

v1.1.10



OPEN GRAFANA

START MIGRATION

MIGRATIONS AGENTS CREDENTIALS

Agents

+ SCALE UP

− SCALE DOWN

🔄 🔍 Search by Name, Stat...

<input type="checkbox"/>	Name	Phase	Role	Age ↓	IP Address	Active Migrations	Actions
<input type="checkbox"/>	vjailbreak-master	Ready	Master	8 minutes	172.16.0.237	-	⊖



Migrations

DELETE SELECTED (1)

Search by Name, Stat...

<input checked="" type="checkbox"/>	Name	Status ↑	Progress	Actions
<input checked="" type="checkbox"/>	migration-vm-satu	ConvertingDisk	STEP 6/9: ConvertingDisk - Migrating VM from VMware to OpenStack	



Migrations

DELETE SELECTED (1)

Search by Name, Stat...

<input checked="" type="checkbox"/>	Name	Status ↑	Progress	Actions
<input checked="" type="checkbox"/>	migration-vm-satu	Succeeded	<div><div></div>Succeeded - Migrating VM from VMware to OpenStack</div>	<div></div>


```
[root@vjailbreak:~# kubectl get pods -A
```

NAMESPACE	NAME	READY	STATUS	RESTARTS	AGE
kube-system	coredns-ccb96694c-5skfq	1/1	Running	0	28m
kube-system	local-path-provisioner-5cf85fd84d-kpfd4	1/1	Running	0	28m
kube-system	metrics-server-5985cbc9d7-48qt8	1/1	Running	0	28m
kube-system	svclb-grafana-be9fbf51-jhbw	1/1	Running	0	26m
kube-system	svclb-nginx-ingress-nginx-controller-717a11b3-j9wt6	2/2	Running	0	27m
kube-system	svclb-prometheus-k8s-c217da20-n7p97	2/2	Running	0	26m
kube-system	sync-daemon-4t9hj	1/1	Running	0	26m
migration-system	migration-controller-manager-86764dfbbd-rggjt	1/1	Running	0	26m
migration-system	v2v-helper-vm-satu-bxz85	1/1	Running	0	4m31s
migration-system	vjailbreak-ui-64bb5c4b84-kx64d	1/1	Running	0	26m
monitoring	alertmanager-main-0	2/2	Running	0	26m
monitoring	blackbox-exporter-86745676c9-gkz5s	3/3	Running	0	26m
monitoring	grafana-7fd5f67d9c-j72kn	1/1	Running	0	26m
monitoring	kube-state-metrics-54876944d7-g6rcz	3/3	Running	0	26m
monitoring	node-exporter-r648z	2/2	Running	0	26m
monitoring	prometheus-adapter-784f566c54-8t29m	1/1	Running	0	26m
monitoring	prometheus-adapter-784f566c54-jkcpz	1/1	Running	0	26m
monitoring	prometheus-k8s-0	2/2	Running	0	26m
monitoring	prometheus-operator-df65dcd6c-89dmw	2/2	Running	0	26m
nginx-ingress	nginx-ingress-nginx-controller-56c45557bc-7xznx	1/1	Running	0	27m

```
root@vjailbreak:~# █
```



```
[root@vjailbreak:~# kubectll logs -f v2v-helper-vm-satu-bxz85 -n migration-system
2025/07/19 06:45:18 Running in pod
2025/07/19 06:45:19 Connected to vCenter: 10.20.12.180
2025/07/19 06:45:19 Connected to OpenStack
2025/07/19 06:45:19 VCenter Thumbprint: 41:08:a2:d1:10:fc:a1:8f:42:b5:30:7d:79:59:b5:d3:12:d9:a5:6b
2025/07/19 06:45:19 Creating volumes in OpenStack
Volume created successfully %s available
2025/07/19 06:45:25 Volumes created successfully
2025/07/19 06:45:25 CBT Enabled: false
2025/07/19 06:45:25 CBT is not enabled. Enabling CBT
2025/07/19 06:45:27 Creating temporary snapshot of the source VM
2025/07/19 06:45:28 Snapshot created successfully
Snapshot deleted successfully
2025/07/19 06:45:28 CBT enabled successfully
2025/07/19 06:45:28 Starting NBD server
2025/07/19 06:45:29 Copying disk 0, Completed: 0%
2025/07/19 06:45:29 Executing nbdkit --exit-with-parent --readonly --foreground --unix=/tmp/nbdkit-2747780008/nbdkit.sock --pidfile=/tmp/nbdkit-2747780008/nbdkit.pid --verbose -D vddk.datapath=0 -D nbdkit.bac
kend.datapath=0 vddk libdir=/home/fedora/vmware-vix-disklib-distrib server=10.20.12.180 user=Administrator@vcvm.boer.id password=[REDACTED] thumbprint=41:08:a2:d1:10:fc:a1:8f:42:b5:30:7d:79:59:b5:d3:12:d9:a5:
6b compression=fastlz config=/home/fedora/vddk.conf transports=file:nbdssl:nbd vm=moref=vm-15 snapshot=snapshot-22 [datastore=nfs] jammy-server-cloudimg-amd64/jammy-server-cloudimg-amd64.vmdk
2025/07/19 06:45:31 Attaching volumes to VM
2025/07/19 06:45:33 Waiting for volume attachment
2025/07/19 06:45:38 /usr/sbin/nbdcopy --progress=3 --target-is-zero nbd+unix:///socket=/tmp/nbdkit-2747780008/nbdkit.sock /dev/vdb
2025/07/19 06:45:39 Copying disk 0, Completed: 0%
2025/07/19 06:45:39 Copying disk 0, Completed: 0%
2025/07/19 06:45:41 Copying disk 0, Completed: 1%
2025/07/19 06:45:44 Copying disk 0, Completed: 2%
2025/07/19 06:45:47 Copying disk 0, Completed: 3%
2025/07/19 06:45:50 Copying disk 0, Completed: 5%
2025/07/19 06:45:52 Copying disk 0, Completed: 6%
2025/07/19 06:45:55 Copying disk 0, Completed: 7%
2025/07/19 06:48:34 Copying disk 0, Completed: 98%
2025/07/19 06:48:36 Copying disk 0, Completed: 100%
2025/07/19 06:48:36 Disk 0 copied successfully: /dev/vdb
2025/07/19 06:48:38 Disk 0: Blocks have Changed.
2025/07/19 06:48:38 Restarting NBD server
2025/07/19 06:48:38 Executing nbdkit --exit-with-parent --readonly --foreground --unix=/tmp/nbdkit-2623822665/nbdkit.sock --pidfile=/tmp/nbdkit-2623822665/nbdkit.pid --verbose -D vddk.datapath=0 -D nbdkit.bac
kend.datapath=0 vddk libdir=/home/fedora/vmware-vix-disklib-distrib server=10.20.12.180 user=Administrator@vcvm.boer.id password=[REDACTED] thumbprint=41:08:a2:d1:10:fc:a1:8f:42:b5:30:7d:79:59:b5:d3:12:d9:a5:
6b compression=fastlz config=/home/fedora/vddk.conf transports=file:nbdssl:nbd vm=moref=vm-15 snapshot=snapshot-22 [datastore=nfs] jammy-server-cloudimg-amd64/jammy-server-cloudimg-amd64.vmdk
2025/07/19 06:48:40 Copying changed blocks
2025/07/19 06:48:42 Progress: 4.00%
2025/07/19 06:48:42 Progress: 52.00%
2025/07/19 06:48:42 Progress: 56.00%
2025/07/19 06:48:42 Progress: 60.00%
2025/07/19 06:48:42 Progress: 72.00%
```



```
2025/07/19 06:48:44 Finished copying changed blocks
2025/07/19 06:48:46 Disk 0: No changed blocks found. Skipping copy
2025/07/19 06:48:46 Shutting down source VM and performing final copy
2025/07/19 06:48:46 Waiting for Cutover conditions to be met
2025/07/19 06:48:46 Label: yes
2025/07/19 06:48:46 Cutover conditions met
2025/07/19 06:48:49 Disk 0: No changed blocks found. Skipping copy
2025/07/19 06:48:55 Volume Hard disk 1 detached from VM
2025/07/19 06:48:56 Stopping NBD server
2025/07/19 06:48:56 Deleting migration snapshot
2025/07/19 06:48:56 Converting disk
2025/07/19 06:48:56 Attaching volumes to VM
2025/07/19 06:48:57 Waiting for volume attachment
2025/07/19 06:49:02 XML file created successfully: libxml.xml
2025/07/19 06:49:02 Executing /usr/sbin/guestfish --ro -a /dev/vdb -i ls /boot
2025/07/19 06:49:32 Output from 'ls /boot' - 'system.map-5.15.0-143-generic
config-5.15.0-143-generic
efi
grub
initrd.img
initrd.img-5.15.0-143-generic
initrd.img.old
vmlinuz
vmlinuz-5.15.0-143-generic
vmlinuz.old'
2025/07/19 06:49:32 Executing /usr/sbin/guestfish --ro -a /dev/vdb -i cat /etc/os-release
OS detected by guestfish: %s pretty_name="ubuntu 22.04.5 lts"
name="ubuntu"
version_id="22.04"
version="22.04.5 lts (jammy jellyfish)"
version_codename=jammy
id=ubuntu
id_like=debian
home_url="https://www.ubuntu.com/"
support_url="https://help.ubuntu.com/"
bug_report_url="https://bugs.launchpad.net/ubuntu/"
privacy_policy_url="https://www.ubuntu.com/legal/terms-and-policies/privacy-policy"
ubuntu_codename=jammy
2025/07/19 06:49:56 OS compatibility check passed
2025/07/19 06:49:56 Setting up boot volume as: Hard disk 1
2025/07/19 06:49:56 Executing /usr/sbin/virt-v2v-in-place --firstboot /home/fedora/scripts/user_firstboot.sh -i disk /dev/vdb
[ 0.0] Setting up the source: -i disk /dev/vdb
[ 1.1] Opening the source
[ 34.1] Detecting if this guest uses BIOS or UEFI to boot
```



```
virt-v2v-in-place: This guest has virtio drivers installed.
[ 248.7] Setting a random seed
[ 249.0] Installing firstboot script: /home/fedora/scripts/user_firstboot.sh
[ 249.8] SELinux relabelling
[ 250.5] Mapping filesystem data to avoid copying unused and blank areas
[ 261.2] Closing the overlay
[ 261.7] Assigning disks to buses
[ 261.7] Checking if the guest needs BIOS or UEFI to boot
[ 261.7] Finishing off
2025/07/19 06:54:18 Adding wildcard netplan
2025/07/19 06:54:18 Created local netplan file
2025/07/19 06:54:18 Uploading netplan file to disk
2025/07/19 06:54:18 Executing /usr/sbin/guestfish --rw -a /dev/vdb -i upload /home/fedora/99-wildcard.network /etc/systemd/network/99-wildcard.network
2025/07/19 06:54:41 Wildcard netplan added successfully
2025/07/19 06:54:47 Volume Hard disk 1 detached from VM
2025/07/19 06:54:48 Successfully converted disk
2025/07/19 06:54:48 Creating target instance
2025/07/19 06:54:49 Port with MAC address 00:50:56:81:b4:23 does not exist, creating new port
2025/07/19 06:54:49 Trying with same IP address: 10.20.12.112
2025/07/19 06:54:49 Could Not Use IP: 10.20.12.112, using DHCP to create Port
2025/07/19 06:54:50 Port created with ID: fa6e6674-47d0-42af-b28b-9cd6c1fd8896
2025/07/19 06:54:50 Port created successfully: MAC:00:50:56:81:b4:23 IP:172.16.0.188
2025/07/19 06:55:03 Server created with ID: 5e3e7f96-3782-4a1f-b9f1-400f66f7ea98
2025/07/19 06:55:03 Attaching Additional Disks
2025/07/19 06:55:03 Waiting for VM to become active: 1/15 retries
2025/07/19 06:55:03 VM created successfully: ID: 5e3e7f96-3782-4a1f-b9f1-400f66f7ea98
2025/07/19 06:55:03 Skipping Health Checks
2025/07/19 06:55:04 Migration completed successfully
root@vjailbreak:~#
root@vjailbreak:~# █
```