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Shape Blue

Migrating 1000s of VMs from VMware to CloudStack

Lucian Burlacu @ CloudStack Collaboration Conference 2025

#whoami

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PMC and Committer @ Apache CloudStack project

Sysadmin & DataCentre Ops
Passionate about free software, IT sovereignty & autonomy

Cloud Architect @ ShapeBlue

May 2022 – Broadcom agrees to buy VMWare

November 2023 – Purchase finalised

ShapeBlue architecture department

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“A thousand VM conversions begin with a single *importVm* API call.” - Benjamin Franklin (probably)

Not so quick though!..

OpenSource is there to help, but it’s not always straightforward.

There’s stuff to evaluate:

Cultural change, VMWare → OpenSource

Is there the will and stamina required?

Do you have the necessary skill?

Do you need to do any hiring, training, get new certifications?

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And then there's this other stuff to consider:
- NSX
- VSAN
- etc

Great tech, but also great vendor lock-in.

However the news is good:
- Once you have set your mind to it, you can get out of even very large, very locked-in setups.
- There are alternatives to most VMWare features/components or you could simply go for an alernative one that gets you a similar and satisfactory result.
- It can be OK not to find 100% like-for-like equivalents.

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VMWare to CloudStack+KVM tech:

Vsphere → virt-v2v → libvirt/KVM
VMFS → OCFS2, GFS2, CLVM
open-vm-tools → qemu-guest-agent
VSAN → CEPH, Linstor, Storpool, Powerflex
dVS → OVS, Linux bridges
Veeam, Commvault etc → Same, Veeam, Commvault, DELL - they have taken notice + built-in NAS B&R plugin + (incremental) volume snapshots.
Aria/vRealize – Terraform, Ansible, shell, Zabbix, Nagios etc.

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The thousand migrations journey is done in 3 stages.

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1. Assesment & Inventory

- Audit existing VMs (OS, size, usage, dependencies).
- Identify unsupported or tricky configurations (encrypted disks, direct attached storage etc)
- Classify VMs by criticality and resources (specs, networks etc).

2. Planning

- Select hardware for CloudStack and KVM.
- Choose conversion method (UI, automatic, semi-automatic, custom).
- Setup adequate networking and storage in CloudStack.
- Backup all VMware VMs, for good measure.

3. Just do it!

Of course, start with a pilot migration!
- Select 1-2 non-critical VMs.
- Convert and import into CloudStack.
- Validate boot, connectivity and service performance.
- Prepare service offerings that can accommodate the imported VMs.
- Coordinate source VM state, they would need to be powered off in a certain sequence – or not, depending on requirements.

Notes & gotchas

- Some VMs can’t be converted or not practical to be converted. Find another way, eg backup/restore, replication and so on.

BSD VMs, machines with encrypted disks, direct attached storage etc.

Our customers have had various approaches.
Customer A went for an agent-based backup/restore.
Customer B reinstalled the VM based on infra as code.

Notes & gotchas

- CloudStack does its best to preserve MAC addresses across the conversion, but Windows and sometimes Linux will bring up a different interface or will reset to DHCP. Research and test, there are ways around it and can be done programmatically.

Solutions customers opted for so far:
C A - lock interface name to mac addr in udev/systemd
C B - switch to DHCP

Notes & gotchas

Not all virt-v2v apps are equal.

EL9 version is much better than the Ubuntu 24.04.

Ways around it if on Ubuntu:
1. install from source or custom repo
2. install an EL9 cluster and use that
3. will surprise you

Notes & gotchas

```
cat << "EOF" > /usr/bin/virt-v2v
#!/bin/bash
ssh root@el9-host /usr/bin/virt-v2v “$@”
EOF
```

Actual customer approach.

Notes & gotchas

- You can run many conversions in parallel and on various hosts, thus enabling you to migrate a lot of VMs quite quckly.

Anecdotal example:

- you could perform 5-6 concurrent migrations per hypervisor. If you have 5 hypervisors and an average migration takes 3h (medium/large VMs), then you could be moving around 200 VMs in 24h.

Credits

- The Apache Software Foundation
- Richard WM Jones & RedHat for virt-v2v!
https://rwmj.wordpress.com/
- ShapeBlue
- Broadcom :-)