**Red Hat OpenShift Virtualization Migration Report**

**Customer: Large European Bank (Scenario 1)**

**Objective**

Migrate VMware-based infrastructure to Red Hat OpenShift Virtualization (OpenShift Virt) with minimal downtime, reduced subscription costs, and a secure, supportable target architecture. Include storage and networking transition (from NSX), database migration guidance (SAP HANA, MS SQL), and ROI analysis.

**1) Current Environment Summary (from image.png)**

* Data centers: 2 physical DCs
  + Naboo (Primary Prod)
  + Coruscant (DR/Dev)
* vSphere Foundation: versions 6.5 → 8.0; single vCenter
* Hypervisors: 254 total
  + 55% in Naboo, 45% in Coruscant
  + Dell is preferred server/storage vendor
* Network
  + Cisco as preferred vendor; CLOS leaf-spine
  + 4×10Gbps per host; 2× mgmt/OOB, 2× data plane
  + 1× FC HBA/host to Cisco MDS
* Storage
  + Dell PowerMax (Tier 1) ~400 TB
  + Dell PowerFlex (Tier 2) ~800 TB
  + Local storage (Tier 3) RAID-5 SAS ~900 TB
* Workloads: ~18,000 VMs
  + OS mix: 70% Windows; 25% Linux; 5% Other
  + Windows: 2003 (10%), 2016 (50%), 2019 (30%), 2022 (10%)
  + Linux: RHEL 7 (45%), RHEL 8 (30%), Ubuntu Server (25%)
  + Other: Solaris variants (80%), OpenServer (20%)
* Other considerations
  + No NSX currently in use (important: “No NSX in use” in the image; still include a path if NSX exists in pockets)
  + No new hardware for migration; re-use hosts
  + Customer wants OpenShift Virtualization on bare metal, no container workloads in scope initially
  + Compliance requirements significant
  + In-scope apps include Oracle RAC, Red Hat OpenShift AI, Active Directory

**2) Target Architecture Overview**

* Landing zone: OpenShift 4.x clusters with OpenShift Virtualization
  + Separate clusters per failure domain and environment (Prod, Non-Prod, DR)
  + RHACM for multi-cluster governance and GitOps automation
  + OpenShift Data Foundation (ODF) or Dell CSI integration for storage
  + OpenShift GitOps (Argo CD), ACS for security, ACM Policies
* Hardware
  + Recommission selected ESXi hosts into OpenShift bare-metal workers via IPI/Agent-based install; host pools segmented by CPU generation for performance consistency
  + Multiple availability zones across racks/DCs; no-SPOF design
* Networking
  + CNI: OVN-Kubernetes
  + Multus for secondary networks (SR-IOV where needed)
  + Microsegmentation via:
    - Native OVN-K policy + Namespace/NetworkPolicy standards
    - Optional: Advanced microsegmentation partners (Tigera/Calico Enterprise) if zero-trust per-VM flows required
  + North–South via Cisco fabric L3; Ingress/Egress controllers per environment
* DR/BCP
  + Stretched/mirrored storage options per tier; VM DR via ODF DR, snapshots, and app-consistent backups
  + RHACM policies for placement and cluster failover procedures

**3) Migration Approach and Downtime Strategy**

* Method: v2v using OpenShift Virtualization’s Migration Toolkit for Virtualization (MTV) from vSphere to KubeVirt
* Waves:
  1. Foundation (pilot on Non-Prod): validate networking, storage classes, Windows/Linux guest tools, drivers, quiesced backups
  2. Expand: bulk migration factory with runbooks, change windows, and parallel squads
* Minimal downtime patterns
  1. Pre-copy disks with iterative sync, schedule short cutover window
  2. For Windows: enable QEMU guest agent, virtio drivers; coordinate AD/DNS time sync
  3. For Linux: cloud-init/virtio drivers; validate udev rules and NIC renaming
  4. Databases and stateful apps: use replication-first then cutover to minimize downtime
* Out-of-scope/Legacy
  1. Solaris/OpenServer remain on legacy or alternative platforms; evaluate retirement or specialized migration

**4) Storage Transition Plan**

* Tiers and mapping
  + Tier 1 (PowerMax): map to ODF with NVMe/TCP or FC via CSI, or use Dell CSI (PowerMax) directly for RWX/RWO PVs
  + Tier 2 (PowerFlex): Dell CSI PowerFlex for block and files; or ingest to ODF for standardization
  + Tier 3 (Local RAID SAS): Aggregate via ODF on local disks for cost-optimized capacity; leverage erasure coding for efficiency
* Data migration options
  + For VM disks: MTV handles image conversion; for app data:
    - Storage-level replication (PowerMax SRDF/Metro, PowerFlex replication) then reattach PVs
    - App-level replication (SQL AlwaysOn, HANA System Replication) recommended for near-zero downtime
    - Rsync/robocopy for non-critical
* Backup/Restore
  + Use OADP/Velero with CSI snapshots; integrate Dell PowerProtect or Cohesity/Rubrik where present
* Performance validation
  + I/O baselines on vSphere vs OpenShift PVs
  + Test multi-queue virtio-scsi, CPU pinning/hugepages for low-latency DB VMs

**5) Networking Transition (including NSX considerations)**

* Since NSX is not currently in use: simplify by:
  + Replicating VLAN segments via Cisco fabric into OpenShift node LAGs
  + Implement Namespace and NetworkPolicy for segmentation; audit with ACS
* If any pockets of NSX exist:
  + Replace NSX microsegmentation with OVN-K policies; for advanced features, add Tigera/Calico Enterprise
  + Replace NSX load balancing with OpenShift Ingress/HAProxy or F5/Cisco ADC
* L2/L3
  + Keep CLOS leaf-spine; advertise cluster networks via BGP/ECMP as needed
* Day-2 ops
  + Flow logs via OVN/KubeVirt to SIEM
  + Multus networks for database and backup VLANs; SR-IOV for ultra-low-latency needs

**6) Database Migration Recommendations**

* SAP HANA
  + Current status: HANA certification for KubeVirt-based VMs is limited; recommended path is dedicated RHEL bare metal or RHEL KVM hosts alongside OpenShift
  + Use SAP HANA System Replication to a new RHEL cluster; orchestrate cutover with near-zero downtime
  + Keep storage on certified Tier-1 arrays (PowerMax) with high IOPS, NUMA pinning, hugepages
* Microsoft SQL Server
  + Options:
    - VM-to-VM migration via MTV, then enable AlwaysOn AG between old and new for near-zero downtime cutover
    - Consider containerized SQL on RHEL UBI where supported, but VM-first is lower risk
  + Ensure Windows virtio drivers, paravirtual SCSI, and time sync; validate backup chain post-migration
* Oracle RAC
  + RAC requires multi-NIC and low-latency shared storage; recommend retain on RHEL bare metal or KVM cluster initially
  + If moved to OpenShift Virt, plan SR-IOV networking and shared storage semantics (careful validation required)

**7) Subscription Costing and Savings**

Note: Use your Red Hat account team for precise quotes. Below is a planning model to frame expectations.

* Assumptions
  + 18,000 VMs; average 6–8 vCPU, 16–32 GB RAM
  + 254 hosts; typical dual-socket, 32–64 cores per host
* VMware spend pressure is the driver. With OpenShift Virt:
  + You license OpenShift by cores for the cluster, not per-VM
  + OpenShift Virt is included in OpenShift Platform (no separate hypervisor license); Windows guests still require OS licensing
* Example planning model (illustrative only)
  + OpenShift Platform, 3 years, core-based: consolidate VMware hypervisor + vCenter + add container platform capability
  + If you only need virtualization: OpenShift Virtualization on OpenShift reduces the need for separate virtualization licenses
* Expected reduction
  + Many customers see 30–50% TCO reduction versus VMware-only stacks when factoring:
    - Eliminated hypervisor licensing
    - Consolidated management tooling (ACM/ACS/GitOps)
    - Hardware reuse and better density
    - Future modernization potential on same platform

Please refer to the ChatLLM Teams billing FAQs and Red Hat/partner quotes for exact pricing. For ChatLLM/DeepAgent pricing info, see the ChatLLM help center pages shared below in links section.

**8) ROI Analysis (3-Year Horizon, Illustrative)**

* Inputs
  + Avoided hypervisor licenses and support: large driver
  + OpenShift subscription costs (platform incl. Virt)
  + Migration services (year 1–2)
  + Operational efficiency gains (unified platform, automation)
* Example outcome (illustrative)
  + Year 0–1: Investment in platform build and migration factory
  + Year 2: Majority of VMware retired; annual run-rate savings realized
  + Year 3: Cumulative positive ROI with 25–40% net savings vs staying on VMware, plus strategic upside from future containerization
* Additional benefits
  + Vendor flexibility, open ecosystem
  + Security posture improvements (ACS, policy-driven)
  + Faster provisioning and Day-2 automation

**9) Phased Timeline**

* Months 0–2: Assessment and Foundation
  + Build first OpenShift clusters (Non-Prod); configure ODF/CSI; network and security baselines
  + Pilot migrations: 200–400 VMs across Windows and RHEL/Ubuntu
* Months 3–9: Migration Factory
  + Stand up multiple squads; scale to 1,000–2,000 VMs/month depending on change windows
* Months 9–18: Bulk Migration
  + Prioritize compliant workloads; track exceptions (legacy OS)
* Months 18–24: Finalization and Decommission
  + Retire vSphere clusters; redeploy residual hosts to OpenShift

**10) Risks and Mitigations**

* Legacy OS (Windows 2003, Solaris/OpenServer)
  + Not supported on OpenShift Virt; retire, isolate, or specialized hosting
* Performance-sensitive DBs
  + Use RHEL bare metal or validated KVM landing zone first; migrate to Virt only after POCs meet SLOs
* Compliance
  + Map controls to ACS/ACM policies; continuous scans; signed images and golden VM templates
* Change windows
  + Use iterative disk copy and replication-first cutovers; automation to compress downtime

**11) Next Steps**

* Run a PoV: 50–100 VMs across OS mix; include one MS SQL cluster with AlwaysOn
* Confirm storage strategy: ODF vs Dell CSI mix per tier
* Finalize subscription quote and migration services SOW
* Build Migration Factory playbooks and run the first two waves