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# Preparing VMware systems for OpenStack migration

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FishOS® by Sardina Systems. Fully automated cloud solutions for enterprises based on OpenStack, Kubernetes, and Ceph.

# Presentation Flow

1. Considerations for Replacing VMware
2. Key Migration Planning Points
3. Test Migration to Ensure a Smooth Transition
4. Automated Migration from VMware to OpenStack
5. Financial Cloud Migration Case Study: FIF Group

# 1.
# Getting started

Is it complicated?
Why or why not.

# general migration considerations

migration from VMware to OpenStack

- significant shift
- technically and operationally
- organizationally

# general migration considerations

human factor

human factor

human factor

… this is a theme that we will see running through entire migration projects

# general migration considerations

in a way, VMware migration project is similar to many other projects

a large part of it is the human aspect

especially when/if the system has been there for a long time

# general migration considerations

the situation could be more challenging if not everyone within the organization is onboard and would embrace the change

# key differences

VMware allows flexible VM definition at the point of creation

OpenStack operates with predefined flavors (similar to AWS, GCP, Azure, Oracle Cloud)

# key differences

VMware deployments often have integrated backup solutions (e.g., Veeam)

OpenStack requires additional planning for backups.

# key differences

VMware is a hypervisor-based system managed through a single console

OpenStack requires Linux-based hypervisors (AlmaLinux, Debian, Ubuntu, etc.)

… likely higher Linux administration expertise is needed for OpenStack deployment

# key differences

VMware Cloud Foundation (VCF) provides self-serviced/ cloud operations model, but not all VMware sites use VCF

OpenStack has strong self-serviced/cloud operations model

# 2.

# Structuring process

# planning: history

VMware has been around for a long time

… and some VMs have been around for a long time

# planning: history

the client may want to continue using the tools that they have been using in VMware

they have paid for the tools, and may want to maximize their investment

# planning: history

there may be a lot of knowledge, organizational behavior/ habit, and …

a lot of “i-don’t-know-why-but-i-have-always-done-it-this-way” tied with the VMware system

a lot of vested interests in potentially different directions!

… and they are not necessarily all unreasonable

# planning: history

an anecdote …

Windows 98, anyone?

# planning: looking ahead

as part of the project, there would be implementation of a new system

fear of new systems: must be taken into account too

# planning: network architecture

need to decide whether VMs will retain the same IPs
or be assigned new ones

additional network infrastructure setup is required,
if the same IPs will be kept

# planning: storage solution

can and will existing storage system be reused?

integration via iscsi, fiber channe, nvme-of, or as simple nas?

# planning: downtime

determine the order and time for transferring VMs

are the application owners onboard with this?

# planning: downtime

application owner not confident that the application will come back up, even if it is just a simple reboot?!

… yes, this is 2025!

# planning: data transfer

if the client could clean up unnecessary data before migration, it would help to reduce downtime and speed up the migration process

# planning: data transfer

10Gbps network will at best transfer 1.25GB per sec

which translates to 1.25 x 60 x 60 = 4500 GB per hour

… this may seem obvious, but don't be surprised if a customer may expect it to be quicker!

# planning: minimal or no downtime?

downtime could be minimized by taking an incremental transfer approach

reliant on VMware's NBD client library

trade-off: 100% certainty of data integrity (which would mean shutting down a VM) vs pursuing possibly shorter downtime

# planning: minimal or no downtime?

recommend: shut down VMs, migrate the VM by reading out the VM's disk (ie: get a copy of the VM's disk)

perform transformation step on the copy of the disk, original VM is not touched!

# planning: no room for OpenStack nonsense

long deployment period is not in the interest of the client

the client needs to live with the system after that, and will need ops tools

# planning: no room for OpenStack nonsense

migration process could be consulting driven, or it could be product driven

but product driven does not mean that it cannot come with services and assistance

# planning: no room for OpenStack nonsense

the system will eventually undergo upgrades

how will it be done? with a product/tool? with more consulting?

# 3.

# Ensuring migration

# test migration

create test VMs with the same images used in production

trigger migration (including transformation step in between), and check that they operate as expected in OpenStack

# test migration

the test migration would provide more realistic data transfer time

understand performance impact on network and hardware

# estimating migration time

to read the VM's disk from VMware, it would be subject to  the throughout of:

connection between the VMware system and the storage backend

connection between the VMware system and the migration worker node

… this may seem obvious to some, not necessarily to all!

# estimating migration time

to write the VM's disk to OpenStack, it would be subject to the throughput of:

connection between the OpenStack system and the storage backend

connection between the OpenStack system and the migration worker node

… this may seem obvious to some, not necessarily to all!

# estimating migration time

and VM size, thus amount of data to be written

… this may also seem obvious to some, not necessarily to all!

# compatibility

Windows VMs would need additional steps (eg: installing VirtIO drivers), as OpenStack does not support Windows out of the box

# compatibility

virtio-win driver packaging scripts in various formats (VFD, ISO, RPM)

important for ensuring compatibility and optimal performance of VMs on the new platform

https://github.com/virtio-win/virtio-win-pkg-scripts/blob/master/README.md

# commonly encountered trouble

downtime: the VM to be migrated is recommended to be shut down

the length of time that the VM would be down would depend on the VM's size and network performance

# commonly encountered trouble

highly available applications (that cannot afford downtime), using load balancers would not need to go through migration process

instead, new VMs can be provisioned in the OpenStack system, and the load balancer can route traffic to the new VMs

# commonly encountered trouble

potential trouble during migration: network failure, driver problems, or specific VM configurations that prevent it from starting on OpenStack

network failure: can retry the migration process again

other cases (eg: VM configuration dependent): manual resolution

# migration success

monitored from the infrastructure side (ie: whether the VM boots), but the content inside the VM isn’t checked

the client must verify the VM’s data and application functionality

# migration success

the migration service only ensures the VM starts, leaving internal validation to the client

if question arises, check against the original VM which has been left intact

# backup and disaster recovery

clients are responsible for backups

the original VM remains untouched during migration

it would only need to be powered off before commencing migration

client’s other expectations?

# site recovery

change in operating model: Operator vs Service Consumer

Operator is responsible for full system operation

recovery as an Operator means full site recovery

# resource adjustments

disk resize: perhaps simpler matter

but … cpu and memory hot-add?

# resource optimization?

what's the equivalent to VMware's DRS to optimally pack VMs, allocate resources

… this is not meant to be a product pitch, but if you are interested, talk to me. our company name is "Sardina Systems" for a reason

# 4.

# VMware to OpenStack: Execution

# system build: lego building blocks

off-the-shelf hardware building blocks: all packed into one (hyper-converged) or not

factory-deployment option or 2-weeks deployment

ceph storage option

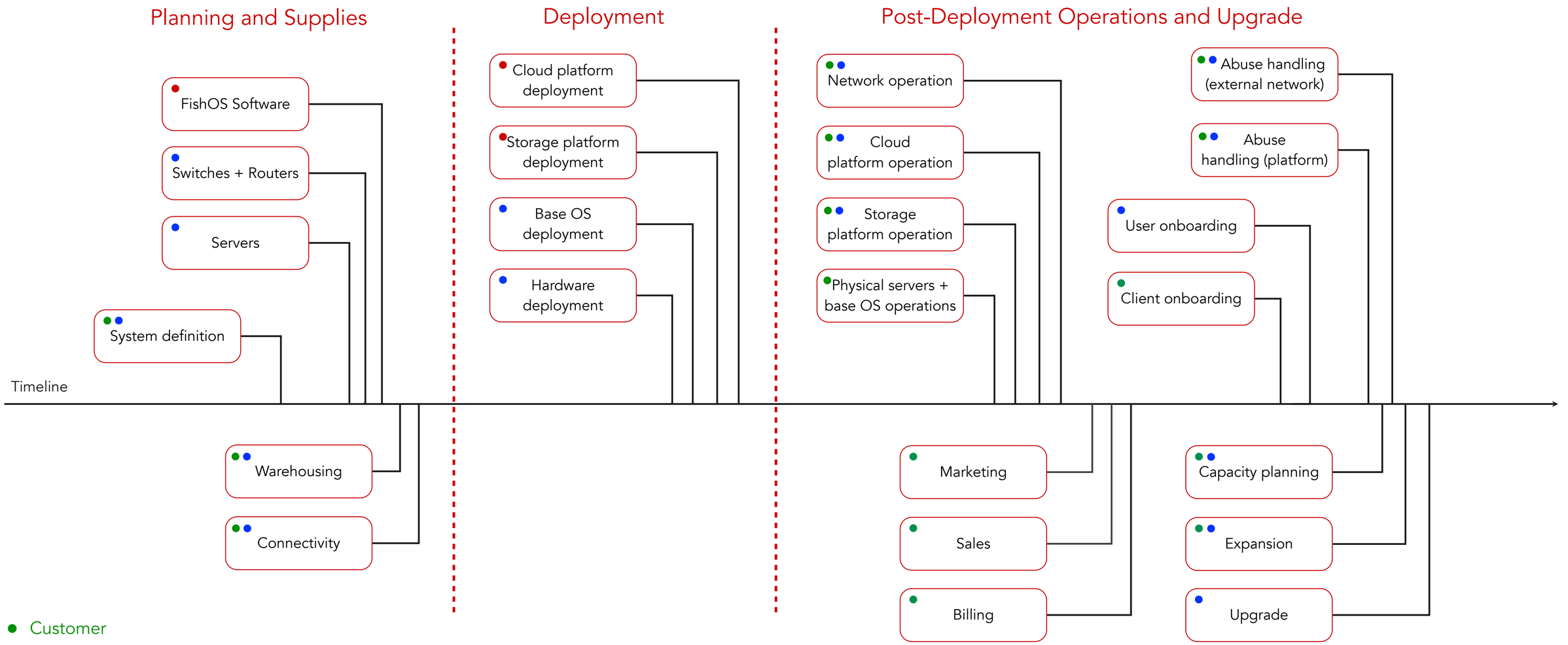
# migration solution

FishOS Move It

automates full migration process, can be selective, can be all-in-1-go

… this is a presentation about VMware migration, but anyone also interested in Hyper-V?

# well traveled path from concept to production

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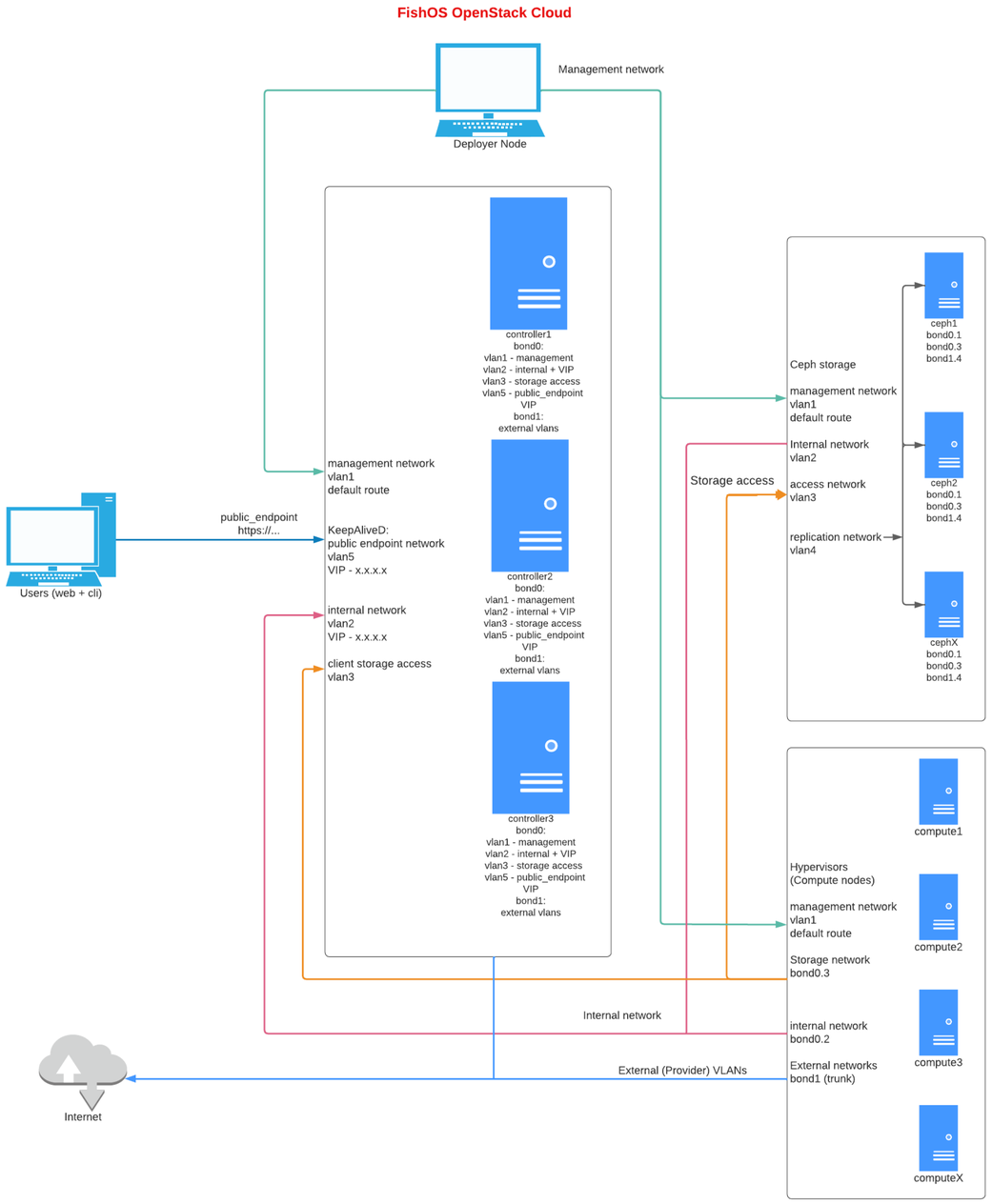


# CI and HCI configuration

**FishOS system can be divided into 5 functions:**

1. Controller
2. Storage
3. Compute
4. Balancer
5. Deployer

As for the number of nodes, while it is technically feasible to run all the functions (1), (2), (3), (4) on as few as 1 node, our recommendation is to run:

- Controllers: 3 nodes
- Storage: 3 nodes (or 5 nodes, if Erasure Coding is used)
- Compute: 2 to 4 nodes as a starting point, as needed (the quantity is not limited)

Highly flexible to accommodate other configurations.

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# 5.

# Case Study

Market-proven in large scale environments

# Case Study

FIFGROUP

member of ASTRA

## Overview

PT Federal International Finance

**Industry:** Finance

**About:**

- leading financial services provider in Indonesia and part of ASTRA Financial Services
- Established in 1989, providing leasing, factoring, and consumer financing services.
- cloud for high-performance computing, secure data processing, and real-time transaction management.

## Problems to solve:

- Sought a VMware alternative with lower costs and minimal staff retraining to enable a smooth and rapid transition to the new cloud.
- Needed high flexibility to support the existing hardware and software setup, along with versatile integration options such as containers, multi-tenancy, and API support, etc.

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# Case Study

FIFGROUP

member of ASTRA

## Solution: FishOS Move It to transition to FishOS

- To tailor a cost-effective system with all critical features included within a single license, enabling a smooth transition from VMware to FishOS.
- The automated migration via FishOS Move It appliance successfully completed
- The new OpenStack-based solution is designed to provide an optimized environment for FIFGROUP's workload and software product development.

## Results and benefits:

- Full system migration, including testing, in just 4 days (an average time 2 hours per 300GB VM).
- Included platform support with an onboarding program for customer personnel.
- Elastic pay-as-you-grow-economics
- Lower license price by XX%

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# Quick Summary

## Consideration

- The **human factor** and **years in a single environment** are the biggest challenges in the decision to migrate.
- Lower resistance to change by **analyzing and explaining** the differences between the existing and future system to **tailor OpenStack** to customer needs.

## Preparation and Migration

- Decide whether **VMs will retain the same IPs** or be assigned new ones — **keeping the same IPs** requires **additional network setup**.
- **Downtime is unavoidable** without a proper **backup strategy**.
- **Cleaning up unnecessary data** before migration helps **reduce downtime** and speeds up the process.
- Downtime can be minimized using an **incremental transfer approach** based on VMware's **NBD client library**.
- **Shut down VMs**, copy the **VM's disk**, and perform transformation steps on the **copied disk** — the **original VM remains unchanged**.

# Quick Summary

## Preparation and Migration

- **Test VMs** to simulate the migration process.
- Ensure a **stable connection** between VMware, the **storage backend**, and the **migration worker node**.
- **Windows VMs require extra steps**, such as installing **VirtIO drivers**.
- Regardless of the hypervisor, **drivers must be installed** to ensure **compatibility with KVM in OpenStack**.
- **Virtio-win driver packaging scripts** (VFD, ISO, RPM) are **ensuring compatibility and optimal performance**.
- For **highly available applications**, use **load balancers** to avoid migration downtime — **provision new VMs in OpenStack** and route traffic to them.

## Evaluation

- **Infrastructure providers verify** that new VMs are up and running, while customers check **data integrity inside the VMs**.
- If issues arise, compare with the **original VM**, which remains untouched.

encounters

Windows 98

# encounters

“it has to be just like VMware, just cheaper”

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Follow us!

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