

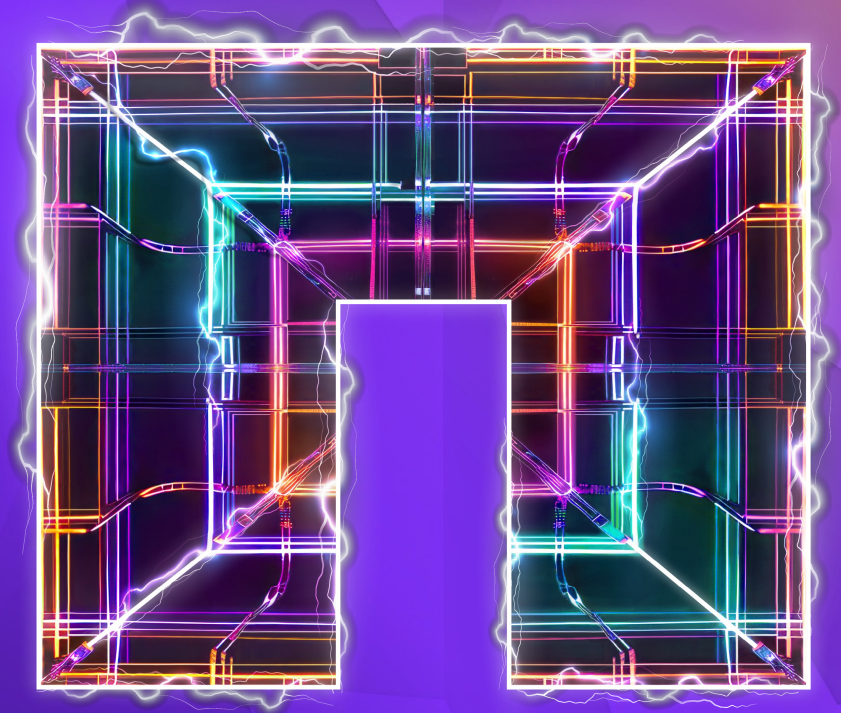
PROXMOX & NETAPP ONTAP

Integrationen, Migrationen und Erfahrungen

Andreas Engel

Consulting Solutions Architect Virtualization

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NetApp and Proxmox

Technical Alliance Partnership (TAP)

A strategic partnership to deliver integrated, reliable and future-ready virtualization solutions.



TAP
Technical Alliance
Partner



Joint Engineering

Close collaboration to build, validate and integrate solutions.



Better Customer Solutions

Optimized integration between Proxmox VE and NetApp ONTAP.



Accelerate Innovation

Joint development of features, management and data protection capabilities.



Long-Term Commitment

A strong foundation for future development and growing customer adoption.

VMware Alternatives: Customer Survey Results

NetApp Kompakt Survey | Germany | June 2, 2026



901

Registrations



731

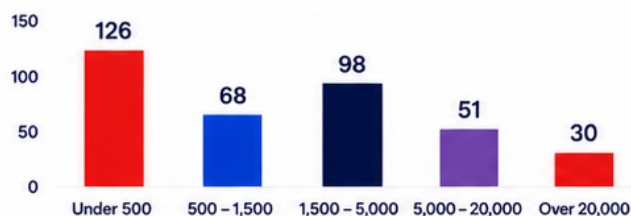
Participants



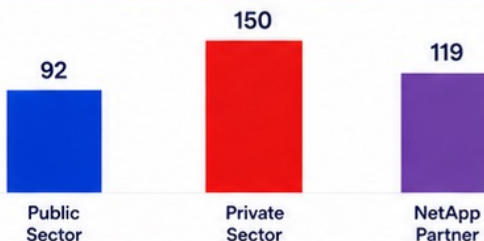
590

Peak Concurrent
Participants

Company Size (Employees)



Industry / Area of Activity



Strategic Direction



203

Planning a
Multi-Hypervisor Strategy



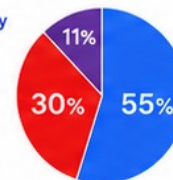
109

Planning a
Complete VMware Exit



40

Remaining
VMware-Only

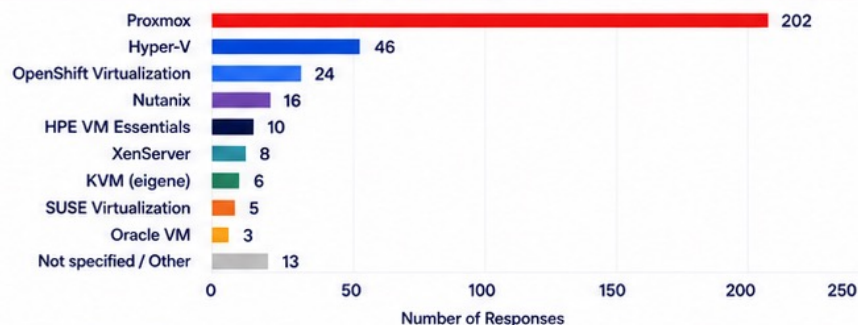


Multi-Hypervisor
Strategy (203)

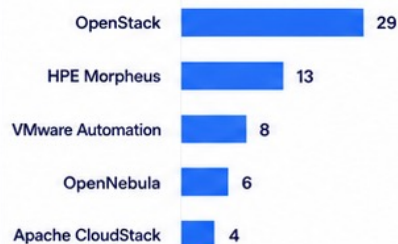
Complete VMware
Exit (109)

VMware-Only (40)

Primary VMware Alternative Under Evaluation (Number of Responses)



Multi-Hypervisor Orchestration – Current Interest (Number of Responses)



242
respondents currently
have no orchestration
plans.



Most organizations are currently
focused on migration and platform
selection.



Interest in orchestration platforms
(e.g., OpenNebula, Morpheus,
OpenStack, CloudStack) is expected
to increase once migration projects
are completed and multi-hypervisor
operations begin.



Survey conducted during NetApp Kompakt Germany on June 2, 2026.
Largest audience ever for a virtualization-focused NetApp session in Germany.

Why NetApp ONTAP for Proxmox VE?

Enterprise storage for a modern, flexible and cost-efficient virtualization platform.



Investment Protection

One storage platform.
Multiple hypervisors.



- Keep your storage investment
- Run Proxmox, VMware and more on the same platform
- Flexibility for future changes



Enterprise Storage

High availability,
scalability and performance.

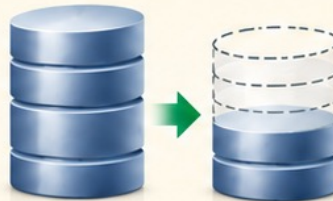


- Shared, resilient storage for Proxmox clusters
- Scales from small to large environments
- Proven enterprise platform



Storage Efficiency

Reduce storage footprint
and optimize TCO.



- Deduplication, compression and compaction
- Thin provisioning
- Store more VMs with less physical capacity



Data Protection & Disaster Recovery

Built-in capabilities for
reliable and secure operations.

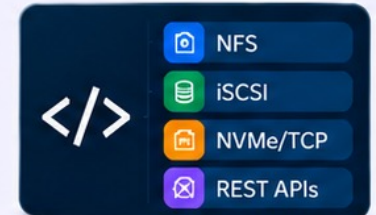


- Snapshots for fast recovery
- SnapMirror and SnapVault for replication and DR
- Cyber resilience with NetApp technologies



Flexibility & Automation

Open protocols and APIs
enable integration and innovation.



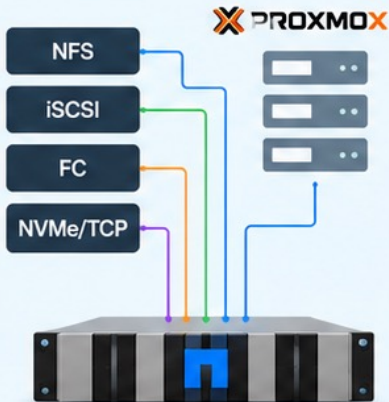
- Multiple storage protocols (NFS, iSCSI, NVMe/TCP)
- Open APIs for integration and automation
- Build customized solutions for your customers

ONTAP – Real Benefits for Proxmox Administrators

Practical advantages in daily operations – from storage access to migration.

1. Shared Storage – Your Protocol, Your Choice

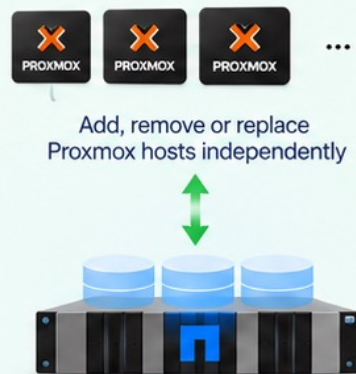
Connect Proxmox VE to ONTAP using standard storage protocols – from NFS to block storage.



Enterprise-grade shared storage with a simple and familiar setup.

2. Independent Compute & Storage

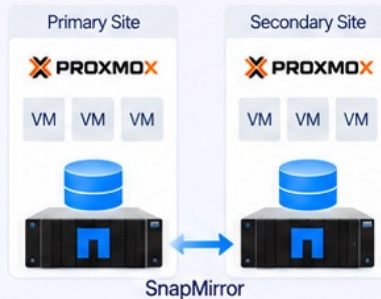
Scale compute and storage separately – exactly when you need it.



Scale storage capacity and performance independently

3. Snapshots, SnapMirror & Recovery

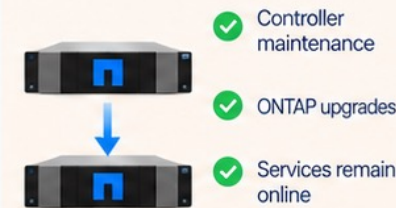
Protect your data with ONTAP data management – independent of your Proxmox cluster.



- ⌚ Fast, space-efficient snapshots
- ↔ Replicate to another site for DR
- 🔄 Recover VMs and data independently

4. Non-Disruptive Storage Operations

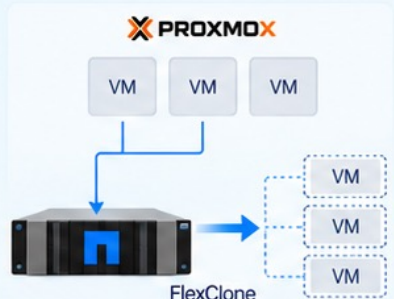
Maintain and upgrade your storage infrastructure with minimal impact on your Proxmox environment.



- 🔧 Perform controller maintenance and ONTAP upgrades with continued storage access.
- 🔲 Proxmox hosts and VMs remain connected to the same datastores.

5. VM Cloning at Storage Speed

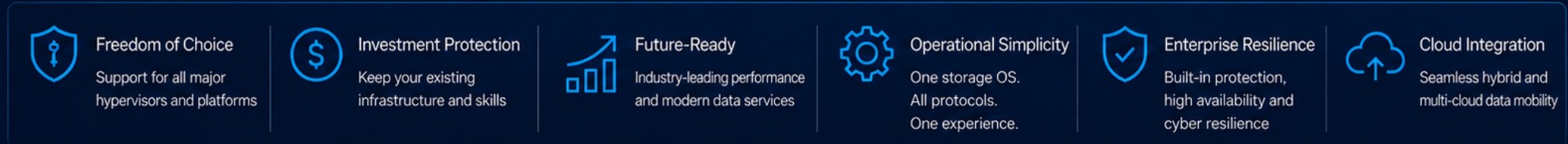
Create space-efficient VM copies using ONTAP FlexClone – without copying the entire dataset.



- ⚡ Instant, space-efficient clones
- 🗄 Ideal for test, development and staging environments
- ⚙ Use existing datasets without full data copies

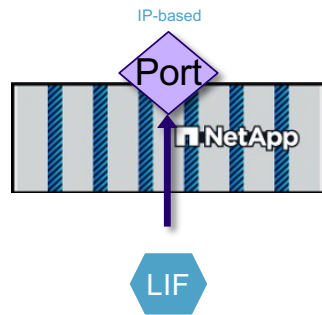
INVESTMENT PROTECTION

Wherever your virtualization goes.



NetApp ONTAP Logical Interfaces (LIFs)

Protocol-specific behavior and transport characteristics

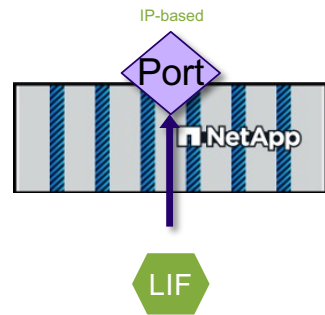


IP: 192.168.1.10
Netmask: 255.255.255.0

NAS LIF

IP-based interface for file protocols

Supports NFS and SMB/CIFS
Uses IP address and netmask
Resides on physical ports, VLANs, or ifgrps
Full LIF mobility supported (failover)

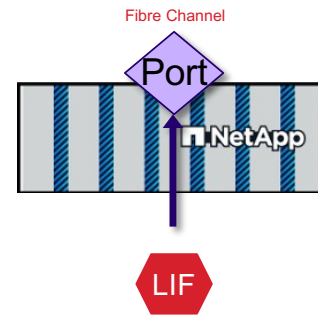


IP: 192.168.1.10
Netmask: 255.255.255.0
IQN: iqn.1992-01.com.example

iSCSI LIF

IP-based block storage over Ethernet

Supports iSCSI protocol
Uses IP address and netmask
Resides on physical ports, VLANs, or ifgrps
Static paths — resiliency via multipathing

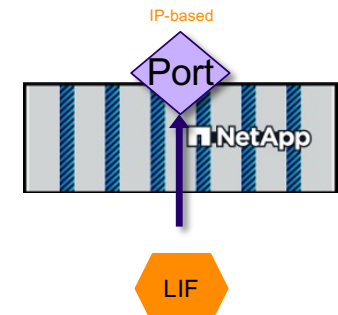


WWPN: 50:00:01:4a:22:af

FC / NVMe-FC LIF

FC-based interface for SAN traffic

Supports FCP and NVMe/FC
WWPN-based addressing
Bound to FC target adapters
No IP stack involved
Failover/mobility supported in modern ONTAP



IP: 192.168.1.10
Netmask: 255.255.255.0
NQN: nqn.2014-08.org.example

NVMe/TCP LIF

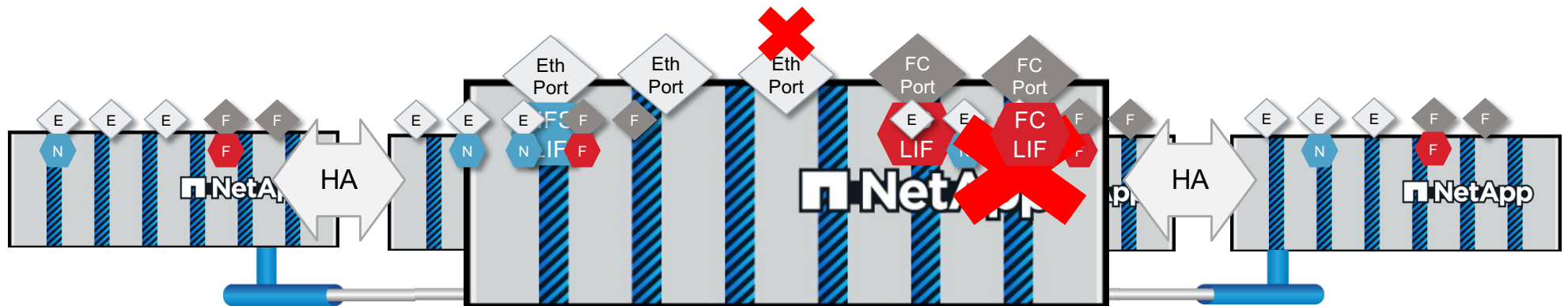
IP-based NVMe over Ethernet/TCP

Supports NVMe/TCP protocol
Uses IP address and netmask
Resides on physical ports, VLANs, or ifgrps
Similar model to other IP-based SAN LIFs

LIF behavior differs by transport type and protocol, while ONTAP provides a common logical interface model.

NetApp ONTAP Logical Interfaces (LIFs)

Protocol-specific behavior and transport characteristics

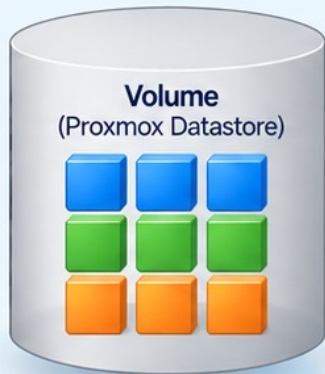


Snapshots and FlexClone with ONTAP

No data copy. Instant. Full performance.

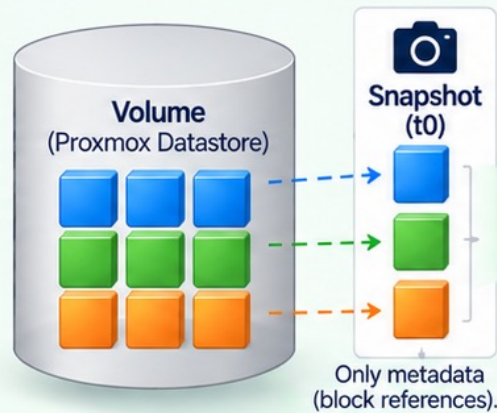
1. Live Volume

Data is written to blocks on ONTAP.



2. Snapshot

Only metadata is written (block references).



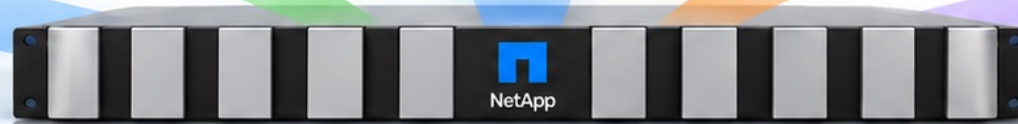
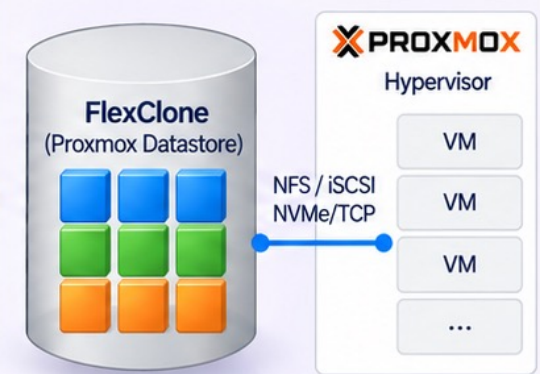
3. FlexClone from Snapshot

Instant clone – any size (100 MB – 100 TB).



4. Use in Proxmox

Mount the FlexClone as datastore. Full, native performance.



Proxmox Virtual Environment (VE) and NetApp

Now supported across Block and File



Enterprise apps
and file services

vm



Proxmox Virtual
Environment



NetApp® ONTAP®



Proxmox

The screenshot shows the NetApp Solutions documentation page. The left sidebar contains a search bar and a list of categories: NetApp Solutions Documentation, Artificial Intelligence, Modern Data Analytics, Public and Hybrid Cloud, Virtualization (expanded), and Proxmox Virtualization. Under Virtualization, the 'NetApp storage for Proxmox VE' link is highlighted. The main content area is titled 'Proxmox VE with ONTAP' and includes a date (03/28/2025), contributors, and options to suggest changes or download PDFs. The text describes how shared storage in Proxmox VE reduces time for VM live migration and makes for a better target for backups. It also mentions that Proxmox VE hosts need FC, Ethernet, or other supported interfaces. Below this, the 'High-level ONTAP Features' section lists common features: Scale out Cluster, Secure Authentication and RBAC support, and Zero trust multi admin support.



New solutions for **Proxmox** on NetApp Blocks (FC, iSCSI, NVMe/TCP) and NFS v4.1 environments including NetApp SnapMirror® active-sync



NEW – Officially supported on the NetApp IMT

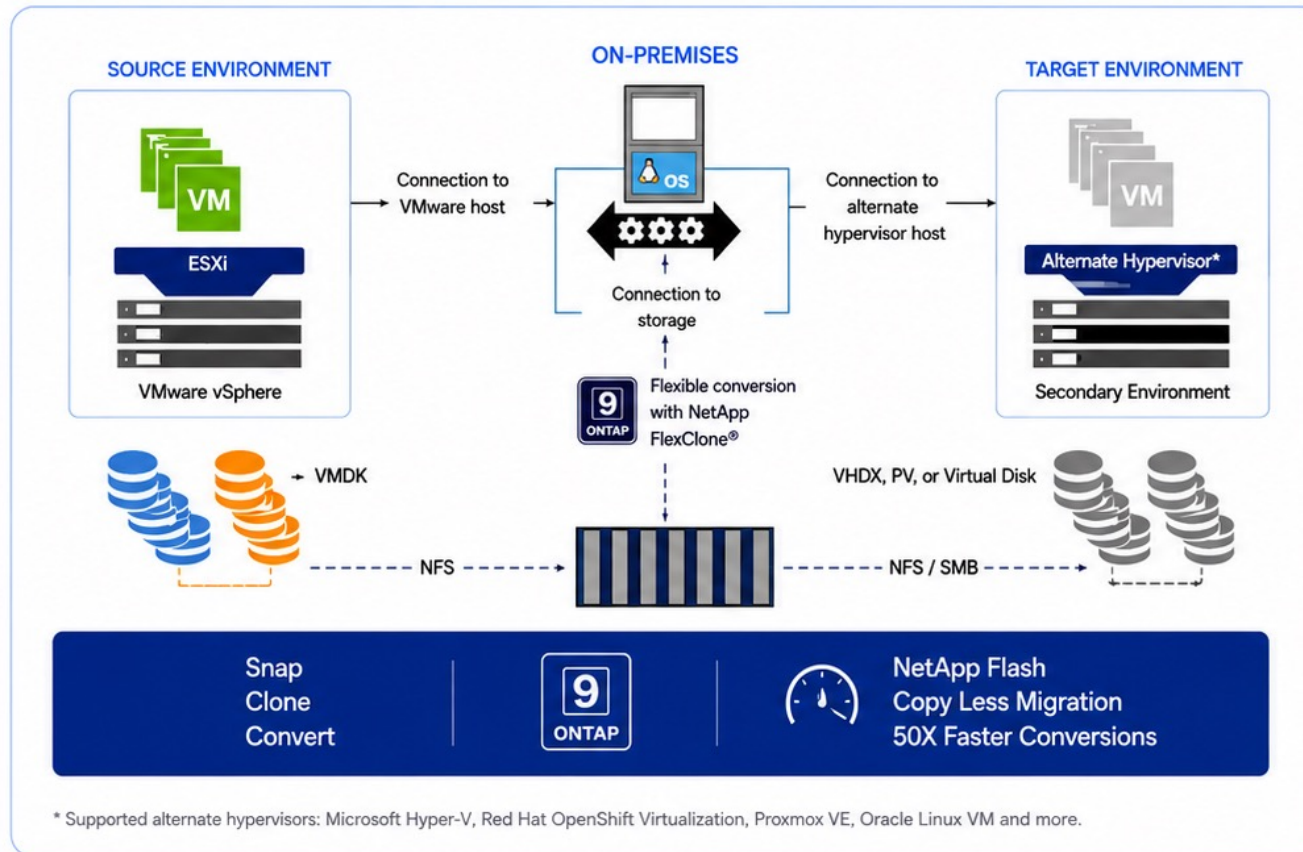
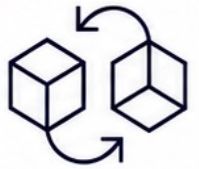


NEW – [Best practices](#) configuration guide available



NetApp Shift Toolkit – Introducing VM conversion

Automated solution for migrating VMs: VMware ESXi & Hyper-V / OpenShift Virt. / OLVM



Fast & reliable VM migration

- Fast & reliable solution for Virtual Machine (VM) migration



Storage-based VM conversion

- VM hard disk conversion with NetApp FlexClone



VM Migrations supported

- VMware vSphere to Microsoft Hyper-V
- Microsoft Hyper-V to VMware vSphere
- VMware vSphere to Red Hat OpenShift Virtualization
- VMware vSphere to Red Hat OpenShift Virtualization using MTV
- VMware vSphere to Proxmox VE
- VMware vSphere to Oracle Linux VM
- ...and more



Customer value

- Minimizes downtime
- Remove vendor lock-in and standardize operations by avoiding hypervisor restriction
- Lower capex with minimum infrastructure resources

VMware to Proxmox Migration

Technology is only half the challenge – the real work is operational.

1 Discover & Assign

Know what to migrate and who is responsible.



- Inventory VMs and applications
- Identify application owners
- Understand dependencies
- Assess criticality and complexity

2 Plan & Schedule

Coordinate, plan downtime and get approvals.



- Plan migration waves
- Define downtime windows
- Coordinate with application owners and stakeholders
- Manage dependencies across multiple VMs

3 Migrate

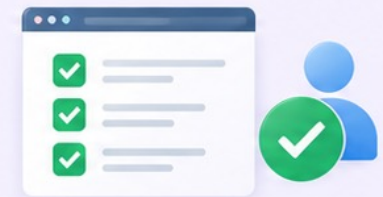
Leverage NetApp tools like Shift Toolkit.



- Automate VM migration with Shift Toolkit
- Support for large scale migrations
- Minimal downtime
- Flexible migration approaches

4 Validate & Approve

Ensure services run as expected and get application owner sign-off.



- Verify application functionality
- Application owner validation
- Fallback if required
- Mark migration as completed

Self-Service Portal for Large Environments

Enable application owners to manage their own migrations – even at scale with hundreds or thousands of VMs.

Application owner view
See all your VMs and containers

Self-service migration
Trigger migration at a defined time

Live status and progress
See what's still on VMware or already on Proxmox

Validate and close
Confirm application is running and approve completion

A screenshot of a laptop displaying the 'Migration Portal' interface. The interface has a sidebar with navigation links: Dashboard, Applications, Virtual Machines, Migrations, Approvals, and Reports. The main content area shows a table with migration details.

Application	Owner	Platform	Status	Actions
ERP	Finance	VMware	Planned	...
CRM	Sales	VMware	In Progress	...
HR	HR	Proxmox	Completed	...
File Services	IT	VMware	Planned	...
Analytics	BI	Proxmox	Completed	...

NetApp SnapMirror active sync with Proxmox

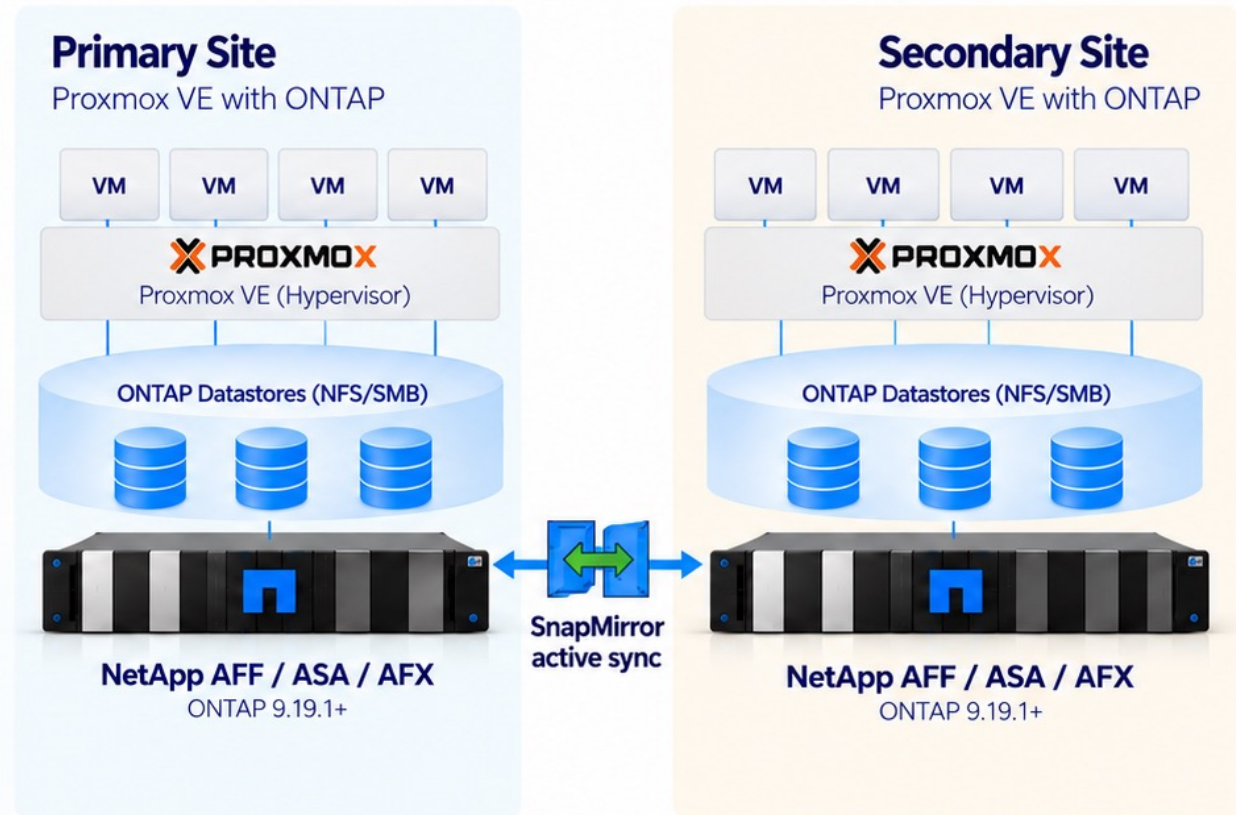
Transparent application failover for business-critical workloads

NEW

NAS supported with
ONTAP 9.19.1
SnapMirror active sync

Functional Capabilities

- Transparent application failover of business-critical applications running on Proxmox
 - Databases (e.g. PostgreSQL, MySQL), business applications
 - File services, home directories, departmental shares
- Application-focused granularity with intuitive workflows, non-disruptive, instantaneous clones and the flexibility of individual DR tests
- Optimize cost by using existing NetApp All Flash FAS (AFF), All SAN Array (ASA) or AFX systems
- Business continuity for NAS (NFS/SMB) applications with protection across separate geographic locations
- Licensing – data protection bundle/premium bundle



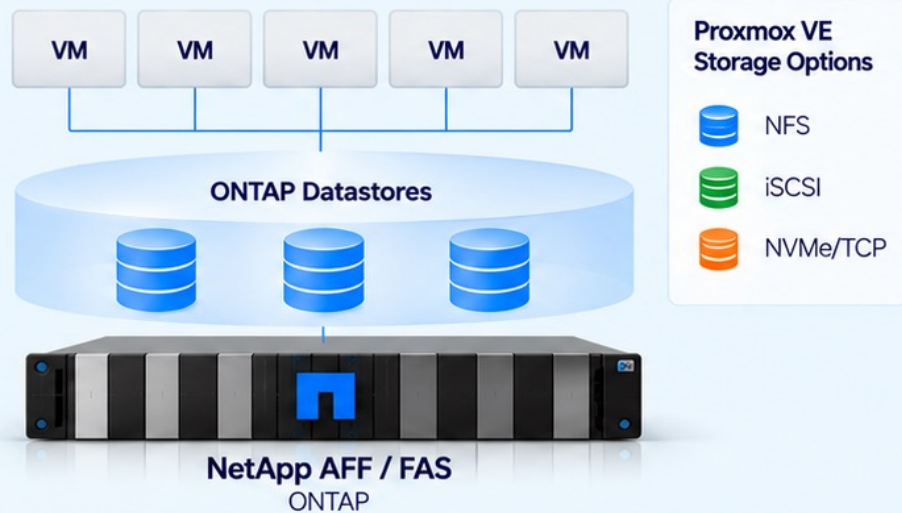
What if ONTAP could run on Proxmox VE?

The same storage platform – on dedicated hardware or as a virtual appliance.

Possible
Future!

Primary Site

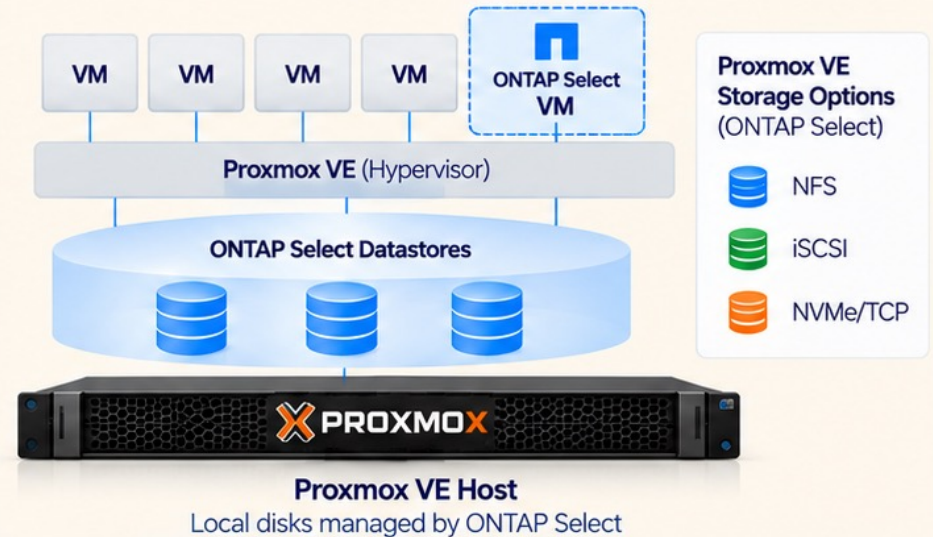
NetApp ONTAP on dedicated hardware



SnapMirror
→
←

Branch Office / Secondary Site

ONTAP Select running on Proxmox VE



Use cases for ONTAP Select with Proxmox VE



Branch Office Storage

Run ONTAP Select on existing Proxmox hosts and use local disks for your VM storage.



Disaster Recovery

Replicate data from your primary ONTAP system to ONTAP Select for DR.



Test & Development

Create efficient, space-saving VM clones and test environments using ONTAP capabilities.



Remote & Edge Locations

Extend ONTAP storage services to remote sites without dedicated storage hardware.

Open APIs Enable Innovation

Build, automate and integrate – your way.



Commercial software is not the only answer.

Modern virtualization platforms and ONTAP provide open APIs that enable customers and partners to build their own automation, orchestration and management solutions.



Open by Design

Comprehensive REST APIs for storage and virtualization platforms



Automation Ready

REST, Ansible, PowerShell, Python and SDK integrations



Customer Innovation

Customers increasingly build tailored solutions for their own workflows



Investment Protection

ONTAP integrates with commercial products and custom-developed platforms

Virtualization & Orchestration Platforms



OpenNebula



HPE Morpheus



Apache CloudStack



OpenStack



VMware Aria Automation



Other / Custom CMPs

Open APIs
Power Innovation

NetApp

ONTAP®

Data
Management

Protection

Cloud
Integration

Performance
& Efficiency

APIs
(REST / SDK)

APIs
(REST / SDK)

Works Your Way



Ansible
Automation



PowerShell
Scripting



Python SDK
Development



Direct
REST API Calls



Your Language
Your Tools

Custom Solutions & Innovation



AI-assisted Development

Build faster with intelligent tools



Internal Portals & Self-Service

Create tailored experiences for your teams



Custom Orchestration

Automate end-to-end workflows across environments



Multi-Hypervisor Management

Manage VMware, Proxmox, Hyper-V and more – your way



Business-Specific Automation

Solve unique challenges with custom-built solutions



FLEXIBLE

Choose the platforms and tools that fit your needs



INTEGRATED

ONTAP works seamlessly with commercial and custom solutions



POWERFUL

APIs built for performance, scale and enterprise reliability



TRUSTED

Proven in thousands of customer environments worldwide



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THANK YOU

