Integration of Lightbits and Proxmox : Implementation Framework

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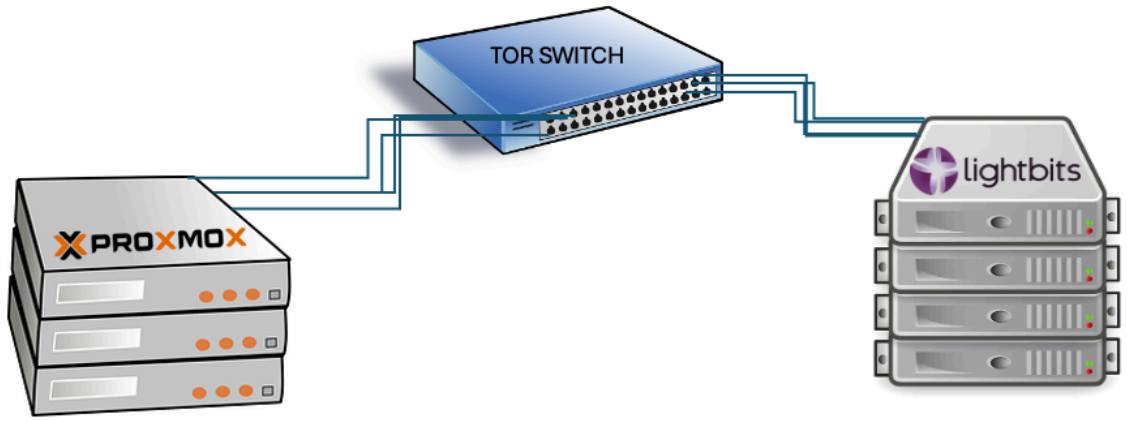
May 2025

In a modern virtualization environment, there are multiple hypervisors available to businesses, and Proxmox has begun to distinguish itself amongst VMware users as it has a familiar interface and the ease of use of VMware. By integrating Lightbits as a shared block storage platform with Proxmox, we can provide an easy-to-use, highly performant shared storage environment with consistent low latency. This white paper provides a comprehensive framework for integrating Lightbits into a Proxmox cluster, empowering businesses to deliver a secure, efficient, high-performance, and easy-to-use virtualization stack.

1. Introduction

Creating a shared Logical Volume Manager (LVM) setup across Proxmox nodes enhances virtualization efficiency by enabling seamless live migration. Lightbits, a software-defined NVMe/TCP storage solution, provides high-performance backend block storage that supports shared LVM configurations. This paper outlines the step-by-step process for integrating Lightbits with Proxmox to enable shared LVM and live migration capabilities.



2. Prerequisites

Before diving into integration with Proxmox and Lightbits, a solid foundation is essential. You'll need a fully functional Proxmox deployment with administrative access, ensuring smooth orchestration and resource management. A Lightbits cluster must be up and running, ready to deliver high-performance, software-defined storage to Proxmox. Lastly, a well-configured network is critical, enabling secure, efficient communication between Proxmox components and Lightbits for optimal performance and scalability. With these key prerequisites in place, you're set to unlock the full potential of multi-tenant cloud storage.

Furthermore, there will be three variables we are going to work with, and please change those to what is suitable for your environment:

- Project = default
- LB User = root
- PM User = root

3. Lightbits Setup

For testing, we are using the default Lightbits Project.

1. Retrieve the NQN and Create a Lightbits Volume

1. Log in to your Lightbits cluster.
2. Retrieve the NQN using:

```
Unset
lbcli get cluster
```

3. Create a volume on the Lightbits cluster to be shared by Proxmox nodes.

```
Unset
lbcli create volume --acl acl1 --name lightbits-3x --replica-count=3 --size 100GiB --project-name default
```

4. Attaching Lightbits Storage to Proxmox Nodes

To unlock the full potential of Lightbits storage in your Proxmox environment, the first step is to prepare each Proxmox node so it has the Lightbits discovery client and the NVMe CLI.

1. Perform the following steps on each Proxmox node:

```
Unset
wget https://dl.lightbitslabs.com/public/discovery-client/deb/ubuntu/pool/any-version/main/d/di/discovery-client_3.13.1~b12920387115-1~/discovery-client_3.13.1~b12920387115-1~_amd64.deb -O lightbits-discovery-client
dpkg -i lightbits-discovery-client
systemctl start discovery-client
systemctl enable discovery-client
discovery-client add-hostnqn -a <LIGHTBITS_IP>:8009 -n <NQN_FROM_CLUSTER> -q acl1 --name global-lvm
systemctl restart discovery-client
apt install nvme-cli -y
```

Command Breakdown:

- Download and install the Lightbits discovery client.
- Start and enable the discovery client service.
- Add the Lightbits NQN to the node.
- Restart the discovery client to apply changes (if necessary).
- Install NVMe CLI for managing NVMe devices.

2. Verify Lightbits Volume Attachment

- Check if the volume is accessible on all nodes:

```
Unset
nvme list
```

- The expected output should display the Lightbits volume as an NVMe device.

5. Configuring Shared LVM on Proxmox

In this chapter, the guidelines will take you through the integration of Lightbits with Proxmox.

1. Create a New Volume Group (VG)

- On one of the Proxmox nodes, run:

```
Unset
vgcreate lightbits /dev/nvme1n1
```

You may name the volume group (VG) differently based on your environment.

2. Configure Proxmox Storage Using GUI

- Log in to the Proxmox web interface at `https://<proxmox-ip>:8006`.
- Navigate to `Datacenter` > `Storage`.
- Click `Add` and select `LVM`.
- In the configuration window:
  - Assign a descriptive name (e.g., `lightbits-cluster`).
  - Select the newly created VG (`lightbits`).
  - Enable the `Shared` option.
  - Choose nodes that should access the shared storage.
- Click `Add` to complete the configuration.

The Lightbits shared LVM should now appear under all selected Proxmox nodes as an additional storage type.

6. Live Migration in Proxmox

In this chapter, the guidelines have you deploy a VM and test Live Migration.

1. Deploy a Virtual Machine

- Create a VM using the shared Lightbits storage. For example, an Alma 9.5 VM named lb-test.

2. Perform Live Migration

- Right-click on the VM and select `Migrate`.
- Choose a new target node connected to the Lightbits volume.
- Click `Migrate`. A progress window will track the process.
- Once completed, the VM will reside on the new node.

7. Conclusion

Seamless, Secure, and Scalable: The Future of OpenStack Storage with VirtIO and Lightbits

In the world of cloud infrastructure, agility, security, and simplicity define the difference between a good deployment and a great one. Imagine a world where OpenStack tenants enjoy seamless, high-performance storage without ever seeing the complexity underneath—no exposed networks, no API risks, no additional VLAN headaches. That's the power of Lightbits combined with OpenStack and VirtIO.

By leveraging the VirtIO driver, OpenStack instances connect effortlessly to Lightbits volumes, ensuring that tenants get the storage they need without ever seeing—or managing—the storage network. Unlike traditional approaches that expose IP addresses, JWTs, or network elements, this setup keeps the storage infrastructure completely invisible to the tenant. The result? A dramatically reduced attack surface and enhanced security with no risk of unauthorized API calls or storage manipulations.

Beyond security, this solution eliminates operational complexity. No special VLANs are required, simplifying network configuration while maintaining performance and reliability at scale. This is cloud storage the way it was meant to be—fast, secure, and hassle-free.

With VirtIO and Lightbits, OpenStack operators can finally deliver the perfect balance of security, efficiency, and performance. No compromises. No unnecessary exposure. Just seamless, high-performance storage that works—out of sight, but never out of mind.

To learn more about Lightbits Labs, visit https://www.lightbitslabs.com.

About Lightbits Labs

Lightbits Labs® (Lightbits) invented the NVMe over TCP protocol and offers best-of-breed software-defined block storage that enables data center infrastructure modernization for organizations building a private or public cloud. Built from the ground up for low consistent latency, scalability, resiliency, and cost-efficiency, Lightbits software delivers the best price/performance for real-time analytics, transactional, and AI/ML workloads. Lightbits Labs is backed by enterprise technology leaders [Cisco Investments, Dell Technologies Capital, Intel Capital, Lenovo, and Micron] and is on a mission to deliver the fastest and most cost-efficient data storage for performance-sensitive workloads at scale.

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