Problem 1: On-premises TCO

# Hardware Costs (One-time Purchase)

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| --- | --- | --- | --- |
| **Item** | **Qty** | **Estimated Cost (USD)** | **Total (USD)** |
| Physical Servers (enterprise-grade, e.g., Dell/HP) | 2 | $5,000 each | $10,000 |
| Network Switch (with VLAN support) | 1 | $300 | $300 |
| pfSense Firewall Appliance | 1 | $500 | $500 |
| Storage NAS (RAID-5, 10TB usable) | 1 | $1,200 | $1,200 |
| UPS (Power Backup for 24x7 uptime) | 2 | $400 each | $800 |
| Router (business grade) | 1 | $200 | $200 |
| Backup Storage (External Disk, 10TB) | 1 | $300 | $300 |

## **Subtotal (Hardware): ~ $13,300 one-time**

# Software Costs (mostly Open Source)

|  |  |  |
| --- | --- | --- |
| **Item** | **Software** | **Estimated Cost (USD)** |
| Operating Systems (Linux, Ubuntu/CentOS) | Free (Open Source) | $0 |
| pfSense Firewall OS | Free (Open Source) | $0 |
| Virtualization Platform (Proxmox, KVM) | Free (Open Source) | $0 |
| Backup Software (Bacula, Restic) | Free (Open Source) | $0 |
| Monitoring Tools (Prometheus + Grafana) | Free (Open Source) | $0 |

## **Subtotal (Software):** **~ $0**

# Network/ISP Costs (Monthly Recurring)

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| --- | --- | --- | --- |
| **Item** | **Qty** | **Estimated Cost (USD/month)** | **Total (USD/month)** |
| Public IP Address (1-2 static IPs) | 1 | $10/month | $10 |
| Internet Connection (Business Line, 100 Mbps Fiber) | 1 | $100/month | $100 |

## Subtotal (Networking): ~ $110/month

# Electricity Costs (Monthly Recurring)

Let’s calculate the power consumption:

* Server power (average): ~350W per server.
* Network devices (firewall, switch, router): ~100W combined.
* Total: (350W x 2) + 100W = 800W = 0.8kW.
* Assuming 24x7 operation →  
  0.8kW x 24 hours x 30 days ≈ **576 kWh/month**.
* Electricity rate: ~$0.12/kWh.

## Cost = 576 x 0.12 = ~$69/month

# Maintenance / Labor Costs

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| --- | --- |
| **Item** | **Estimated Cost (USD/year)** |
| IT Administrator (part-time, 10h/month) | ~$5,000/year |

## Cost = About **$400/month** if you budget some basic admin support (even part-time).

# Summary

|  |  |  |
| --- | --- | --- |
| **Item** | **One-time (USD)** | **Monthly Recurring (USD)** |
| Hardware Setup | ~$13,300 | - |
| Software (Open Source) | $0 | - |
| Internet + IP | - | ~$110 |
| Power | - | ~$69 |
| Maintenance (Admin Labor) | - | ~$400 |

### First-Year Cost:

* Hardware + (Monthly costs × 12 months)
* = $13,300 + (($110 + $69 + $400) × 12)
* = $13,300 + ($579 × 12)
* = $13,300 + $6,948
* = **~ $20,248 USD**

### Ongoing Annual Cost (after year 1):

* Only monthly recurring costs
* = $579 × 12
* = **~ $6,948 USD per year**

# Final Output:

|  |  |
| --- | --- |
| **Year** | **Cost** |
| First Year | ~$20,250 USD |
| Every Year After | ~$6,950 USD |

# Notes:

* **Highly optimized** because you're using Open Source.
* **Major expenses** are electricity and minimal IT admin time.
* **Scaling possibility**: You can later add a second Internet line for load balancing (additional $100/mo).
* **Optional**: Add cloud backup ($50/mo extra for 1TB cloud backup).