

# Glen Hub - Research and Analysis Document

By  
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Subject: Interaction Theory 200

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The Open Window



# 1 INTRODUCTION

In today's fast-paced digital era, the entertainment industry has witnessed a significant shift towards online platforms, providing users with instant access to a vast array of content. With the rising popularity of video streaming services like Netflix, Amazon Prime Video, and Hulu, there is a burgeoning demand for innovative platforms that offer captivating and personalised experiences to viewers.

Recognizing this immense potential, Glen Hub, a start-up company at the ideation phase, has developed a video streaming website aimed at delivering high-quality content to its target audience.

As an IT Specialist hired by Glen Hub in an advisory capacity, my primary responsibility is to provide expert guidance on the deployment options available for their video streaming platform. Deploying a web-based service that can handle significant user traffic, maintain high-performance levels, and ensure seamless content delivery is crucial for the success of Glen Hub's ambitious venture.

This **Research and Analysis Document** aims to comprehensively outline an **Internal Networking Plan**, a **Hosting Plan**, a **Threat Analysis** and an **Implementation Budget** enabling **GlenHub** to make informed decisions regarding the most suitable infrastructure for their platform.

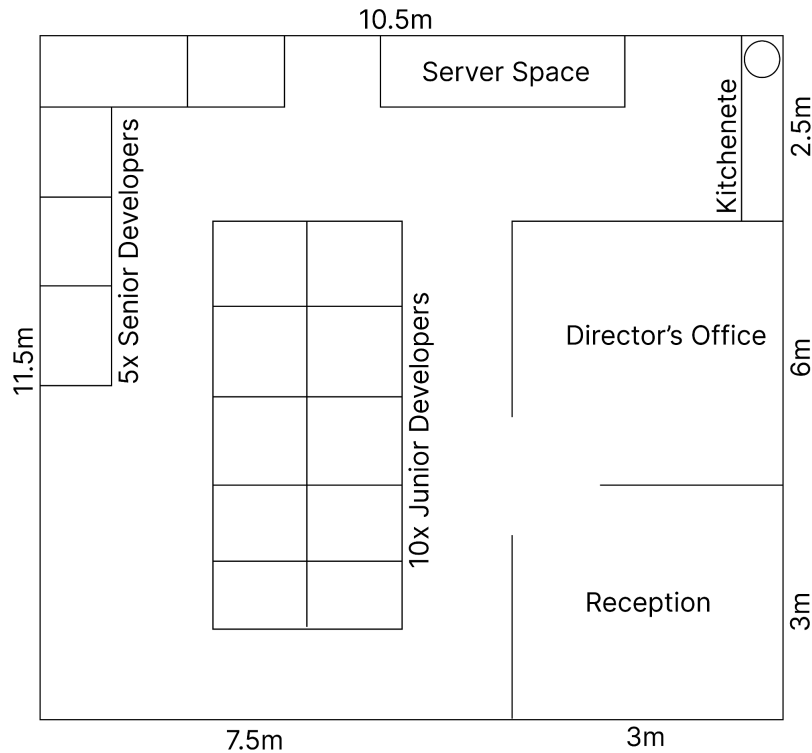
The founder of Glen Hub, along with his dedicated development team, has worked tirelessly to create a compelling and user-friendly video streaming website. However, they now face the critical challenge of identifying the optimal deployment strategy that aligns with their business objectives, technical requirements, and scalability goals. They have relocated to renting offices in Centurion, Gauteng, South Africa and they have acquired 3 rooms in this regard (a **reception office**, a **developers workspace that accommodates 15 developers** and a **director's office**).

Ultimately, the goal of this Research and Analysis Document is to provide Glen Hub with a comprehensive evaluation of deployment options, empowering them to make well-informed decisions that will pave the way for a robust and scalable video streaming platform.

## 2 INTERNAL NETWORK PLAN

Within this section I will outline an **Internal Network Plan** while highlighting the **Network Topologies** implemented, **all devices in the network** along with the **transmission media** used in different parts of the office for GlenHub.

Proposed Office Layout:



For a team of 15 developers working on a video streaming website (with a receptionist and a director), a suitable internal network topology would be a combination of a **star topology** for local connectivity and a **client-server model** for **server infrastructure**. Here's a recommended approach:

### 1. Local Area Network (LAN):

Implement a **star topology** for the **LAN** within the office or development environment. In this configuration, each developer's workstation or device connects directly to a central network switch.

Advantages:

- Simplified network management and troubleshooting.
- Easy scalability by adding more devices to the central switch.
- Provides reliable and high-speed connectivity.

Considerations:

- Use **Gigabit Ethernet switches** to ensure sufficient bandwidth for video streaming and development activities.
- Plan for future growth by choosing switches with additional ports or stackable capabilities.

## 2. **Server Infrastructure:**

Set up a **dedicated server infrastructure** to support the video streaming website's development and testing environments. The server infrastructure can follow a **client-server model**, where the developers' workstations connect to centralised servers.

Advantages:

- Centralised data storage, database management, and development platforms.
- Facilitates collaboration and version control.
- Enables efficient resource allocation and management.

Considerations:

- Deploy servers for web hosting, content delivery, databases, development platforms, and any other required services.
- Consider using virtualization technologies (e.g., virtual machines or containers) for flexibility and scalability.

### 3. Internet Connectivity:

Ensure a **high-speed and reliable internet connection** to support the developers' work and streaming requirements. A dedicated business-grade internet service with sufficient bandwidth is recommended.

Advantages:

- Seamless access to online resources, cloud services, and APIs.
- Efficient streaming of video content for development and testing purposes.
- Supports communication and collaboration tools.

Considerations:

- Choose an internet service plan with adequate upload and download speeds for smooth video streaming and development activities.
- Implement network traffic management techniques to prioritise video streaming traffic if necessary.

### 4. Wireless Network:

Consider implementing a secure wireless network, also in **star topology**, to provide connectivity for mobile devices or for developers who require flexibility in their workspace. Ensure proper security measures, such as WPA2 or WPA3 encryption and strong passwords.

Advantages:

- Enhanced mobility and flexibility for developers.
- Support for testing and development on mobile devices.

Considerations:

- Segment the wireless network from the main LAN for security reasons.
- Implement access controls to restrict unauthorised access.

Devices in the network:

1. **Workstations:**

- **15 Developer Workstations** (desktops or laptops) for software development and testing.
- **1 Workstation for receptionist.**
- **1 Workstation for the director.**
- **17 (or more) Possible Mobile Devices** for personal use, software development and testing.

2. **Network Equipment:**

- **Network Switch:** Central switch to connect all devices within the local network.
- **Router:** Provides connectivity to the internet and manages traffic between the internal network and external networks.
- **Repeater:** Repeats the wifi signal for strong connectivity throughout the office.

In summary the 15 developer workstations will be connected via ethernet cables to the central switch while the receptionist and director will be connected via wifi to the network.

### **3 HOSTING PLAN**

To accommodate the expected number of users (1,200,000 users in Southern Africa and 500,000 users in the midwest region of the United States of America) and the large video library (500,000 to 1,000,000 videos) for GlenHub, a robust and scalable hosting plan is required. Here's a suggested hosting plan that can handle the anticipated traffic and video streaming demands:

## 1. Infrastructure:

Deploy a cloud-based hosting infrastructure to ensure scalability, flexibility, and high availability. Cloud providers like Amazon Web Services (AWS), Microsoft Azure, or Google Cloud Platform (GCP) offer a range of services suitable for hosting large-scale websites and streaming platforms. We will be using Oracle for this purpose:

MySQL HeatWave for OLTP:

“MySQL HeatWave for OLTP enables organisations to rapidly and securely develop and deploy modern, cloud-native applications using the world’s most popular open source database. You can easily enable the HeatWave in-memory query accelerator to benefit from real-time analytics and machine learning, along with transaction processing, in one MySQL database service.”

MySQL HeatWave for OLTP ...

Estimated Monthly Cost **ZAR 3,408.68** ▼

Database - MySQL ⓘ ▼

UTILIZATION [Edit](#)  
1 instance x 744 hrs/month

ESTIMATED MONTHLY COST  
**ZAR 3,408.68**

Total OCPU  
2

Memory per OCPU [GB]  
16

Total memory [GB]  
32

Shape  
Optimized - Intel X9

**1 OCPU equals 2 vCPUs.**  
Deploy various shapes from 1 up to 64 OCPU per VM.

MySQL storage [GB]  
80

Backup storage [GB]  
80

## 2. Content Delivery Network (CDN):

Utilise a CDN to improve video streaming performance and reduce latency for users across different regions. CDNs distribute video content to servers located closer to the users, resulting in faster and more reliable streaming experiences. Popular CDNs include Cloudflare, Akamai, and Amazon CloudFront.

### 3. Compute Resources:

Opt for scalable compute resources, such as virtual machines (VMs) or containers, to handle the anticipated traffic. Consider using auto-scaling features to automatically adjust resources based on demand. This ensures that the hosting infrastructure can handle traffic spikes without performance degradation.

**My Estimate** ... Configure and estimate costs for OCI services ([Learn more](#)) **Start for Free** ZAR - South Afri- Estimated Monthly Cost **ZAR 4,232.23**

Add configuration

**Compute VM** ... SHAPE: VM.Standard.E4.Flex PROCESSOR: AMD OCPU: 8 MEMORY: 64GB CAPACITY TYPE: ON-DEMAND Estimated Monthly Cost **ZAR 4,232.23**

**Compute - Virtual Machine**

UTILIZATION 1 instance x 744 hrs/month

ESTIMATED MONTHLY COST **ZAR 4,152.10**

**SHAPE**

Processor AMD

Shape VM.Standard.E4.Flex

OCPU 8

Memory [GB] 64

OS Image Autonomous Linux

8 OCPU equals 16 vCPUs.  
Min. 1 and max. 64 OCPUs allowed.

Min. 1 and max. 1760 GB of total memory allowed, max. 64 GB per OCPU.

**PRICING OPTIONS** [Learn more about capacity types](#)

Capacity type On-Demand

Allow burstable? No

**BOOT VOLUME**

**Storage - Block Volumes**

UTILIZATION 1 instance

ESTIMATED MONTHLY COST **ZAR 80.13**

Storage capacity [GB] 100

Performance level Balanced

VPU 10

Max IOPS: 25000  
Max Throughput (MBps): 480

### 4. Storage:

Employ a combination of storage options for different purposes:

- Object Storage: Use object storage services, such as Amazon S3, Azure Blob Storage, or Google Cloud Storage, to store and serve video files. These services provide durability, scalability, and high availability for storing a large number of videos.

**Object Storage** ... Estimated Monthly Cost **ZAR 9,674.52**

**Storage - Object Storage**

ESTIMATED MONTHLY COST **ZAR 9,674.52**

Storage type Standard

Object Storage - Storage 20,000

Object Storage - Requests 1,000

Gigabyte Storage Capacity Per Month  
Unit price: ZAR 0.480777

10,000 Requests per Month (first 50,000 free)  
Unit price: ZAR 0.0641036

Tiered pricing applied. Click on info icon for details.

Tiered pricing applied. Click on info icon for details.

Example: Qty 8 = 80,000 Requests



- Database Storage: Implement a relational or NoSQL database for storing metadata, user information, and other dynamic data. MySQL, PostgreSQL, MongoDB, or DynamoDB are popular choices for database storage.

Autonomous Database ...
Estimated Monthly Cost **ZAR 653,858.88**

Database - Autonomous Database
UTILIZATION Edit 744 hrs/month
ESTIMATED MONTHLY COST **ZAR 653,858.88**

License Type  
License Included

Deployment Type  
Serverless

Workload Type  
Transaction Processing and Mixed

Metric  
OCPU

Autoscaling lowers your total cost of ownership by reducing your peak OCPU count by up to 67% when those resources are not being actively used.

Workload for Transaction Processing and Mixed

Peak OCPU  
16

% of Time at Peak  
50

Storage [TB]  
200

## 5. Bandwidth and Data Transfer:

Estimate the required bandwidth based on the expected number of users and streaming activity. Consider partnering with a hosting provider that offers scalable bandwidth options to handle peak traffic. Be aware of data transfer costs, as streaming video can consume significant bandwidth.

Afrihost Monthly cost:

# Browse Packages.

All package prices include data and line rental. Uncapped. Unshaped. Unthrottled.<sup>1</sup>

Some Fibre providers may not be available in your area. Use our [Fibre Coverage Tool](#) to check availability in your area.

VUMA

Approx 1 week Installation <sup>1</sup>

OPENSERVE

Approx 1 week Installation <sup>1</sup>

OCTOTEL

Approx 1 week Installation <sup>1</sup>

TT Connect

Approx 1 week Installation <sup>1</sup>

All TT Connect Packages

R2 247 pm

↓ 1000Mbps ↑ 1000Mbps

R1 847 pm

↓ 750Mbps ↑ 750Mbps

R1 647 pm

↓ 450Mbps ↑ 450Mbps

R1 447 pm

↓ 300Mbps ↑ 300Mbps

R1 097 pm

↓ 150Mbps ↑ 150Mbps

R927 pm

↓ 75Mbps ↑ 75Mbps

R827 pm

↓ 30Mbps ↑ 30Mbps

R677 pm

↓ 15Mbps ↑ 15Mbps

✓ Uncapped

✓ Unshaped

✓ Unthrottled

✓ No Thresholds

You will need the 1000 Mbps Download and 1000 Mbps Upload option.

Thus the Hosting Plan Monthly Cost is the following:

Service	Cost (R per month)
MySQL HeatWave for OLTP	3408.68
Compute VM	4232.23
Object Storage	9674.52
Autonomous Database	653858.88
ISP - Afrihost	2247.00
<b>Total (R per month)</b>	<b>673,421.31</b>

## 4 THREAT ANALYSIS

Here's a detailed threat analysis highlighting **4 major networking threats** for GlenHub, along with **countermeasures to mitigate them**:

### 1. DDoS Attacks:

Threat: **Distributed Denial of Service (DDoS)** attacks can overwhelm the website's servers and network infrastructure with a flood of traffic, leading to service disruptions and downtime.

Countermeasures:

- Implement DDoS protection services provided by the hosting provider, such as AWS Shield, Azure DDoS Protection, or Cloudflare DDoS Protection.
- Use traffic filtering techniques like rate limiting, IP blocking, or traffic prioritisation to mitigate malicious traffic.
- Monitor network traffic patterns and deploy anomaly detection systems to identify and respond to DDoS attacks.
- Maintain scalable and redundant infrastructure to handle sudden increases in traffic.

### 2. Data Breaches and Unauthorised Access:

Threat: The compromise of sensitive user data, unauthorised access to the network, or unauthorised modifications to the website's code or database can lead to privacy breaches, legal consequences, and loss of user trust.

Countermeasures:

- Implement strong access controls and authentication mechanisms, including two-factor authentication (2FA) for administrative access.
- Regularly patch and update server software and applications to address known vulnerabilities.

- Employ a Web Application Firewall (WAF) to filter out malicious traffic and protect against common web application vulnerabilities.
- Encrypt sensitive data at rest and in transit using SSL/TLS certificates and secure encryption algorithms.

### **3. Insider Threats:**

Threat: Internal employees or contractors with authorised access can intentionally or inadvertently cause damage, steal sensitive information, or compromise the network's security.

Countermeasures:

- Implement least privilege access control, granting employees access only to the resources required for their roles.
- Conduct thorough background checks on employees and contractors before granting access to sensitive systems.
- Regularly review and audit access logs and user activity to detect any unauthorised or suspicious behaviour.
- Educate employees about security best practices, including social engineering awareness and reporting of suspicious activities.

### **4. Malware and Phishing Attacks:**

Threat: Malicious software (malware) and phishing attacks can compromise user devices, steal login credentials, distribute malware, or trick users into revealing sensitive information.

Countermeasures:

- Use reputable antivirus and anti-malware software on all devices and regularly update definitions.

- Implement email filtering and spam detection mechanisms to block phishing emails and malicious attachments.
- Educate users about phishing techniques, such as suspicious email links or requests for sensitive information.
- Regularly update software and operating systems on user devices to patch known vulnerabilities.


Remember that the threat landscape is constantly evolving, so it's essential to stay up-to-date with the latest security practices and employ a layered defence approach. Additionally, consulting with cybersecurity professionals and conducting regular security assessments can help identify and address specific risks for the business.

## 5 IMPLEMENTATION BUDGET

The Company will need 16 developer workstations (15 for developers and 1 for Director) and a normal workstation for the receptionist. Along with the workstations a Gigabit Ethernet Switch is required along with a router and a repeater. Ethernet cables will also be required.

1x (Receptionist)

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Thus the total Implementation/ Setup cost is:

Product	Cost (R)
Lenovo IdeaPad 3 i5 (1x)	9499.00
Asus TUF Gaming i9 (16x)	479984.00
Switch (1x)	15999.00
Router (1x)	8999.00
Repeater (1x)	379.00
Ethernet Network Cables (15x)	3735.00
Total	518,595.00

## **6 CONCLUSION**

This document has provided GlenHub with a comprehensive evaluation of deployment options for their video streaming website. By examining various deployment models, considering factors such as cost, security, scalability, performance, and maintenance, I have empowered GlenHub to make informed decisions regarding their platform's infrastructure.

By leveraging the insights, industry knowledge, and best practices outlined in this document, Glen Hub can navigate the complexities of deployment and position themselves for success in the dynamic and ever-growing video streaming market. With careful planning, robust infrastructure, and a user-centric approach, Glen Hub has the potential to captivate audiences and establish itself as a leading player in the industry.



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