### **Back of the Envelope Calculation for 100,000 Users**

#### **Assumptions:**

1. **User Activity**:
   * 30% active users = 30,000 active users.
2. **Usage Metrics**:
   * Average video file size: 500MB.
   * Average viewing time per user per month: 10 hours.
   * Peak usage time: 10% of active users simultaneously streaming (3,000 users).
3. **Infrastructure Components**:
   * Web Server: NGINX.
   * Application Server: Express.js.
   * Video Storage: Amazon S3.
   * Database: Amazon RDS (PostgreSQL).
   * Media Server: FFmpeg for transcoding.
   * Content Delivery Network (CDN): Amazon CloudFront.
4. **EC2 Instances**:
   * Web Server & Application Server: t3.medium (2 vCPUs, 4GB RAM).
   * Media Processing Server: c5.large (2 vCPUs, 4GB RAM).
   * Database Server: db.m5.large (2 vCPUs, 8GB RAM).
   * Estimated cost: t3.medium $0.0416/hr, c5.large $0.085/hr, db.m5.large $0.115/hr.
5. **Amazon S3 Storage**:
   * Standard storage pricing: $0.023/GB.
   * Data transfer out: $0.09/GB for the first 10TB.
6. **CloudFront CDN**:
   * Data transfer out: $0.085/GB for the first 10TB.

### **1. Compute Resource Requirements**

#### **Web and Application Servers**

* 3,000 simultaneous users, assuming each server can handle 500 users.
* Total servers needed: 3,000 / 500 = 6 servers.
* Cost for 6 t3.medium servers:
  + Monthly cost per server: 24 \* 30 \* 0.0416 = $29.95
  + Total monthly cost: 6 \* $29.95 = $179.70

#### **Media Processing Server**

* Estimated to handle 10 concurrent video transcodings.
* Total servers needed: 1 (assuming on-demand processing).
* Cost for 1 c5.large server:
  + Monthly cost per server: 24 \* 30 \* 0.085 = $61.20
  + Total monthly cost: $61.20

#### **Database Server**

* Single db.m5.large instance.
* Cost for 1 db.m5.large server:
  + Monthly cost per server: 24 \* 30 \* 0.115 = $82.80
  + Total monthly cost: $82.80

### **2. Storage Requirements**

#### **Amazon S3 Storage**

* Total video storage: 100,000 videos \* 500MB = 50TB (51,200GB).
* Monthly cost for S3 storage:
  + Storage cost: 51,200GB \* $0.023 = $1,177.60
  + Data transfer out (assume 10% data viewed per month): 5,120GB \* $0.09 = $460.80
  + Total S3 cost: $1,177.60 + $460.80 = $1,638.40

### **3. Content Delivery Network (CDN)**

#### **Amazon CloudFront**

* Data transfer out: 5,120GB \* $0.085 = $435.20

### **4. Summary of Monthly Costs**

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| **Resource** | **Monthly Cost ($)** |
| --- | --- |
| Web and Application Servers | 179.7 |
| Media Processing Server | 61.2 |
| Database Server | 82.8 |
| Amazon S3 Storage | 1,638.40 |
| CloudFront CDN | 435.2 |
| **Total** | **$2,397.30** |

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### **5. Resource List**

#### **Human Resources**

* 1 Project Manager
* 2 Full-Stack Developers
* 1 DevOps Engineer
* 1 UI/UX Designer
* 1 QA Engineer
* 1 Customer Support Representative

#### **Technical Resources**

* **Web Servers**: 6 t3.medium EC2 instances.
* **Application Servers**: 6 t3.medium EC2 instances.
* **Media Processing Server**: 1 c5.large EC2 instance.
* **Database Server**: 1 db.m5.large RDS instance.
* **Storage**: Amazon S3 for video files.
* **CDN**: Amazon CloudFront for content delivery.
* **Domain**: Domain registration and management.
* **Load Balancer**: AWS Elastic Load Balancing (ELB).

### **6. High Availability (HA) and Disaster Recovery (DR) Policies**

#### **High Availability**

* **Load Balancing**: Use AWS ELB to distribute traffic across multiple servers.
* **Auto-Scaling**: Configure auto-scaling for EC2 instances to handle peak loads.
* **Multi-AZ Deployment**: Deploy EC2 instances and RDS across multiple Availability Zones.

#### **Disaster Recovery**

* **Regular Backups**: Automated backups of RDS databases and S3 buckets.
* **Replication**: Data replication across multiple AWS regions.
* **Failover**: Set up failover mechanisms for EC2 instances and RDS databases.
* **Monitoring and Alerts**: Use AWS CloudWatch for real-time monitoring and alerts.

### **7. Marketing Strategy**

#### **MVP Launch**

* **Social Media Campaign**: Promote the platform on social media channels.
* **Influencer Partnerships**: Collaborate with influencers to reach a wider audience.
* **Email Marketing**: Send newsletters and promotional emails to potential users.

#### **Phase 2**

* **Content Partnerships**: Partner with content creators to offer exclusive content.
* **SEO Optimization**: Optimize the platform for search engines to increase visibility.
* **Referral Program**: Implement a referral program to encourage user growth.

#### **Phase 3**

* **Paid Advertising**: Invest in Google Ads, Facebook Ads, and other online advertising.
* **Public Relations**: Engage with media outlets to feature the platform in news articles.
* **Events and Webinars**: Host events and webinars to engage with the community.

This comprehensive plan ensures that the Dash VOD Project is both technically and financially feasible, providing a scalable and robust platform for video streaming while also addressing high availability and disaster recovery requirements.