AWS Cost Estimate - Student Records Web Application

Project Overview

Region: us-east-1
Duration: 12 months
Scenario: Highly available, scalable web application for thousands of users during peak periods

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Cost Breakdown by Service

1. Amazon EC2 (Web Servers)

Instance Type: t3.medium (2 instances minimum)

- **vCPUs:** 2 per instance
- **Memory:** 4 GB per instance
- **Usage:** 2-4 instances (Auto Scaling)
- **Operating System:** Ubuntu (free tier)

Monthly Cost Calculation:

- Base: 2 × t3.medium × $0.0416/hour × 730 hours = $60.74
- Peak scaling: Additional 2 instances × 25% uptime = $15.18
- **Monthly Total:** ~$76/month
- **Annual Total:** ~$912

2. Application Load Balancer

Type: Application Load Balancer

- **Load Balancer Hours:** 730 hours/month
- **Load Balancer Capacity Units (LCU):** ~5 LCUs average

Monthly Cost Calculation:

- Fixed cost: $16.20/month
- LCU charges: 5 × $5.84 = $29.20/month
- **Monthly Total:** ~$45/month
- **Annual Total:** ~$540

3. Amazon RDS MySQL

Instance Type: db.t3.micro

- **vCPUs:** 2
- **Memory:** 1 GB
- **Storage:** 20 GB General Purpose SSD
- **Multi-AZ:** No (single AZ per requirements)

Monthly Cost Calculation:

- Instance: $12.41/month
- Storage: 20 GB × $0.115 = $2.30/month
- **Monthly Total:** ~$15/month
- **Annual Total:** ~$180

4. NAT Gateway

Usage: 1 NAT Gateway in public subnet

- **Data Processing:** ~100 GB/month

Monthly Cost Calculation:

- NAT Gateway: $32.40/month
- Data processing: 100 GB × $0.045 = $4.50/month
- **Monthly Total:** ~$37/month
- **Annual Total:** ~$444

5. AWS Secrets Manager

Secrets: 1 secret (database credentials)

- **API calls:** ~1000/month

Monthly Cost Calculation:

- Secret storage: $0.40/month
- API calls: minimal cost (~$0.10/month)
- **Monthly Total:** ~$0.50/month
- **Annual Total:** ~$6

6. Data Transfer

Estimates:

- CloudFront (optional): Not included
- Internet data transfer: ~50 GB/month outbound

Monthly Cost Calculation:

- First 1 GB: Free
- Next 49 GB: 49 × $0.09 = $4.41/month
- **Monthly Total:** ~$4.50/month
- **Annual Total:** ~$54

7. Amazon VPC

Components:

- VPC: Free
- Subnets: Free
- Internet Gateway: Free
- Route Tables: Free

Monthly Cost: $0

Cost Summary

Service	Monthly Cost	Annual Cost
EC2 Instances	$76	$912
Application Load Balancer	$45	$540
RDS MySQL	$15	$180
NAT Gateway	$37	$444
Secrets Manager	$0.50	$6
Data Transfer	$4.50	$54
TOTAL	**$178**	**$2,136**

Cost Optimization Notes

Current Optimizations:

1. **t3.micro for RDS** - Smallest viable instance
2. **Single AZ database** - Per project requirements
3. **t3.medium for EC2** - Balanced performance/cost
4. **Minimal Secrets Manager usage** - Only 1 secret

Potential Savings:

1. **Reserved Instances:** Could save ~30% on EC2 and RDS with 1-year commitment

2. **Spot Instances:** Could use for non-critical workloads (not recommended for production)

3. **CloudWatch monitoring:** Basic monitoring included, detailed monitoring adds ~$3/month

Scaling Considerations:

- **Peak load:** Additional EC2 instances will auto-scale (cost increases proportionally)

- **Database scaling:** May need larger RDS instance during heavy usage

- **Data transfer:** Costs will increase with more users

Assumptions Made:

- Moderate traffic load with periodic scaling to 4 instances

- 100 GB monthly data processing through NAT Gateway

- 50 GB monthly outbound data transfer

- Standard AWS pricing (no enterprise discounts)

- Single availability zone for database (per requirements)

Total Estimated Annual Cost: $2,136
Average Monthly Cost: $178

Note: Actual costs may vary based on real usage patterns, data transfer volumes, and scaling requirements during peak periods.