Event Ticket System

Cost Analysis and Scalability Plan

Cost Breakdown

Monthly Cost Estimate

Based on 10,000 events/month and 100,000 registrations

Compute (AWS Lambda)

Function	Invocations/month	Duration (ms)	Memory (MB)	Cost
create_event_fn	10,000	500	512	$0.84
list_events_fn	150,000	300	512	$7.56
event_stats	200,000	400	512	$13.44
register_fn	100,000	2000	1024	$33.60
pay	100,000	300	512	$5.04
scan	50,000	200	256	$1.68
Total Lambda				**$62.16**

Database (DynamoDB)

Component	Cost
On-Demand Reads (10M reads)	$2.50
On-Demand Writes (500K writes)	$6.25
Storage (10 GB)	$2.50
Total DynamoDB	**$11.25**

Storage (S3)

Component	Cost
Standard Storage (100 GB)	$2.30
PUT Requests (100K)	$0.50
GET Requests (300K presigned URLs)	$0.12
Total S3	**$2.92**

CDN (CloudFront)

Component	Cost
Data Transfer Out (100 GB)	$8.50
HTTP Requests (1M)	$1.00
Total CloudFront	**$9.50**

Authentication (Cognito)

Component	Cost
Monthly Active Users (50,000 MAU)	$0.00 (free tier)
Total Cognito	**$0.00**

API Gateway

Component	Cost
HTTP API Requests (600K)	$0.60
Total API Gateway	**$0.60**

Payment Processing (Stripe)

Component	Cost
Transactions (100K × ¥500)	~¥11,450,200 (~$17,400)
Total Stripe Fees	~$17,400

Total Monthly Cost Estimate

Category	Monthly Cost (USD)
AWS Services	$86.43
Stripe (passes to customer)	$17,400
Total Infrastructure	**$86.43**

Cost Optimization Tips

1. **Use DynamoDB On-Demand:** Pay only for actual reads/writes instead of provisioned capacity.
2. **Optimize Lambda Memory:** Right-size memory allocation to balance performance and cost.
3. **S3 Lifecycle Policies:** Move old tickets to Glacier after 90 days for significant storage savings.
4. **CloudFront Caching:** Increase TTL for static assets to reduce origin requests.
5. **Reserved Capacity:** If consistent load is observed, purchase reserved capacity for long-term savings.
6. **API Gateway Caching:** Reduce Lambda invocations for read-heavy endpoints by 70%.

Free Tier Benefits (First 12 months)

- **Lambda:** 1M requests/month, 400,000 GB-seconds compute
- **DynamoDB:** 25 GB storage, 25 WCU, 25 RCU
- **S3:** 5 GB storage, 20,000 GET, 2,000 PUT
- **CloudFront:** 50 GB data transfer out
- **Estimated Free Tier Savings:** ˜$30-40/month

Scalability Plan

Current Capacity

Component	Current Limit	Bottleneck Point
Lambda Concurrent Executions	1,000	Regional soft limit
DynamoDB Throughput	On-Demand (auto-scales)	None
API Gateway	10,000 RPS	Regional soft limit
S3	3,500 PUT, 5,500 GET/s	Per prefix
Cognito	25,000 MAU (free tier)	Pay above threshold

Scaling Strategies

Horizontal Scaling (0 - 1M events/year)

- Serverless auto-scaling with no manual intervention required
- Pay-per-use pricing model ensures cost efficiency
- Supports up to 100,000 concurrent users
- Handles millions of API requests per day
- Unlimited storage growth capability

Performance Optimization (1M - 10M events/year)

Database Optimizations:

- **Add Caching Layer:** Implement ElasticCache (Redis) to cache frequently accessed events and statistics with 30-60 second TTL.
- **DynamoDB Enhancements:** Enable Auto Scaling, use DAX for read-heavy workloads, and implement conditional writes to prevent race conditions.

Lambda Optimizations:

- **Provisioned Concurrency:** Configure for frequently-used functions to eliminate cold starts and ensure predictable latency.
- **Function Optimization:** Increase memory to 1024 MB for register_fn, use Lambda Layers for shared dependencies, and implement connection pooling.

API Gateway Optimizations:

- Enable Caching: Cache GET /events for 60 seconds and event stats for 30 seconds to reduce Lambda invocations by 70%.
- Request Throttling: Implement rate limiting per user to protect against DDoS attacks.

Global Expansion (10M+ events/year)

Multi-Region Deployment:

- Primary Region: us-east-1 (N. Virginia)
- Secondary Region: eu-west-1 (Ireland)
- Tertiary Region: ap-south-1 (Mumbai)

Architecture Changes:

- DynamoDB Global Tables: Multi-region replication with local read/write in each region and automatic conflict resolution.
- Route 53 Geo-Routing: Route users to nearest region with latency-based routing and health checks with failover.
- S3 Cross-Region Replication: Replicate tickets to multiple regions for lower latency downloads and disaster recovery.
- CloudFront Distribution: Already global by default, configure custom origins per region and optimize cache behaviors.

Estimated Costs at Scale

Scale	Monthly Events	Infrastructure Cost	Notes
Small	10,000	$86	Current
Medium	100,000	$520	Add caching
Large	1,000,000	$3,800	Multi-region
Enterprise	10,000,000	$28,000	Full optimization