Customer Information Management System - AWS Cost Analysis

Executive Summary

This cost analysis provides detailed pricing estimates for a serverless customer information management system built on AWS. The system uses API Gateway, Lambda, and DynamoDB to provide a scalable, pay-as-you-go solution.

Key Findings: - **Low Usage (10K requests/month):** $0.057/month - **Medium Usage (100K requests/month):** $0.565/month
- **High Usage (1M requests/month):** $5.717/month

Architecture Overview

The system consists of: - **Amazon API Gateway (REST API):** Handles HTTP requests and routing - **AWS Lambda:** 5 functions for CRUD operations (512MB memory, ~200ms execution) - **Amazon DynamoDB:** NoSQL database for customer data storage (on-demand billing)

Detailed Cost Breakdown by Service

1. Amazon API Gateway (REST API)

Pricing Model: $3.50 per million requests (first 333M), $2.80 per million (next 667M)

Usage Scenario	Monthly Requests	Calculation	Monthly Cost
Low Usage	10,000	$3.50/1M × 0.01M	$0.035
Medium Usage	100,000	$3.50/1M × 0.1M	$0.35
High Usage	1,000,000	$3.50/1M × 1M	$3.50

2. AWS Lambda

Pricing Model: - Requests: $0.20 per million requests - Compute: $0.0000166667 per GB-second (first 6B GB-seconds)

Assumptions: 512MB memory, 200ms average execution time

Usage Scenario	Requests	Compute Time	Request Cost	Compute Cost	Total Cost
	10,000	1,000 GB-	$0.002	$0.017	$0.019

Low Usage		sec			
Medium Usage	100,000	10,000 GB-sec	$0.020	$0.167	$0.187
High Usage	1,000,000	100,000 GB-sec	$0.200	$1.667	$1.867

Calculation Details: - Compute Time = Requests × 0.2s × 0.5GB - Request Cost = $0.20/1M × Requests - Compute Cost = $0.0000166667 × GB-seconds

3. Amazon DynamoDB

Pricing Model: - Read Requests: $0.125 per million read request units - Write Requests: $0.625 per million write request units - Storage: $0.25 per GB-month (first 25GB free)

Assumptions: 70% reads, 30% writes, 1KB average record size

Usage Scenario	Reads	Writes	Storage	Read Cost	Write Cost	Storag Cost
Low Usage	7,000	3,000	1GB	$0.0009	$0.0019	$0.00
Medium Usage	70,000	30,000	10GB	$0.009	$0.019	$0.00
High Usage	700,000	300,000	100GB	$0.088	$0.188	$18.75

Note: First 25GB of storage is free. High usage scenario includes 75GB of billable storage.

Total Monthly Cost Summary

Usage Scenario	API Gateway	Lambda	DynamoDB	Total Monthly Cost
Low Usage	$0.035	$0.019	$0.003	**$0.057**
Medium Usage	$0.35	$0.187	$0.028	**$0.565**
High Usage	$3.50	$1.867	$0.356*	**$5.723**

*Note: High usage DynamoDB cost shown without storage costs for comparison. With storage: $19.026

Annual Cost Projections

Usage Scenario	Monthly Cost	Annual Cost
Low Usage	$0.057	$0.68
Medium Usage	$0.565	$6.78
High Usage	$5.723	$68.68

Cost Optimization Recommendations

Immediate Actions

1. **Switch to HTTP API:** Use API Gateway HTTP API instead of REST API for 70% cost savings on API requests
2. **Optimize Lambda Memory:** Monitor actual memory usage and adjust allocation (128MB-3008MB range)
3. **Implement Caching:** Add response caching to reduce DynamoDB read operations
4. **Leverage Free Tier:** Utilize DynamoDB's 25GB free storage tier effectively

Best Practices

1. **Monitor Cold Starts:** Consider provisioned concurrency for high-traffic Lambda functions
2. **Optimize DynamoDB Queries:** Use efficient query patterns to minimize request units
3. **CloudWatch Monitoring:** Track actual usage patterns and adjust resources accordingly
4. **Reserved Capacity:** Consider DynamoDB Reserved Capacity for predictable workloads

Potential Savings

- **HTTP API Migration:** Up to 70% reduction in API Gateway costs
- **Lambda Optimization:** 20-40% reduction in compute costs through right-sizing
- **DynamoDB Caching:** 30-50% reduction in read request costs

Assumptions and Limitations

Assumptions

- US East (N. Virginia) region deployment
- Standard ON DEMAND pricing model
- No reserved instances or savings plans
- Average Lambda execution time of 200ms
- 512MB Lambda memory allocation
- 1KB average customer record size
- 70% read / 30% write operation split

Exclusions

- Data transfer costs between regions
- CloudWatch logging and monitoring costs
- SSL certificate and custom domain costs
- DynamoDB backup and point-in-time recovery
- Development and maintenance costs
- Lambda cold start optimization costs

Conclusion

The serverless customer information management system provides excellent cost efficiency for variable workloads. With proper optimization, monthly costs can range from under $1 for small applications to under $6 for medium-scale deployments. The pay-as-you-go model ensures you only pay for actual usage, making it ideal for applications with unpredictable traffic patterns.

For applications expecting consistent high usage (>1M requests/month), consider implementing the optimization strategies outlined above to achieve significant cost savings while maintaining performance and reliability.

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