Product API System Cost Analysis Estimate Report

Service Overview

Product API System is a fully managed, serverless service that allows you to This project uses multiple AWS services.. This service follows a pay-as-you-go pricing model, making it cost-effective for various workloads.

Pricing Model

This cost analysis estimate is based on the following pricing model: - **ON DEMAND** pricing (pay-as-you-go) unless otherwise specified - Standard service configurations without reserved capacity or savings plans - No caching or optimization techniques applied

Assumptions

- All services deployed in US East (N. Virginia) region
- Standard ON DEMAND pricing model
- Lambda functions configured with 512MB memory, 500ms average execution time
- DynamoDB on-demand billing mode with 80% reads, 20% writes
- API Gateway REST API with 5-minute caching enabled
- No cross-region data transfer costs included

Limitations and Exclusions

- Data transfer costs between regions
- CloudWatch Logs storage and analysis costs
- X-Ray tracing costs
- Development and maintenance costs
- Third-party monitoring tools
- SSL certificate costs
- Route 53 DNS costs
- Support plan costs

Cost Breakdown

Unit Pricing Details

Service	Resource Type	Unit	Price	Free Tier
Amazon API Gateway	Tier 1	million requests (first 333M)	$3.50	First 1M API calls per month free for 12

				months
Amazon API Gateway	Tier 2	million requests (next 667M)	$2.80	First 1M API calls per month free for 12 months
Amazon API Gateway	Tier 3	million requests (next 19B)	$2.38	First 1M API calls per month free for 12 months
Amazon API Gateway	Tier 4	million requests (over 20B)	$1.51	First 1M API calls per month free for 12 months
AWS Lambda	Requests	1,000,000 requests	$0.20	First 1M requests and 400,000 GB-seconds per month free for 12 months
AWS Lambda	Compute Tier 1	GB-second (0-6B GB-seconds)	$0.0000166667	First 1M requests and 400,000 GB-seconds per month free for 12 months
AWS Lambda	Compute Tier 2	GB-second (6B-15B GB-seconds)	$0.0000150000	First 1M requests and 400,000 GB-seconds per month free for 12 months
AWS Lambda	Compute Tier 3	GB-second (15B+ GB-seconds)	$0.0000133334	First 1M requests and 400,000 GB-seconds per month free for 12 months
Amazon	Read	million		25 GB storage always free, 2.5M read requests

DynamoDB	Requests	RRUs	$0.125	and 1M write requests per month free for 12 months
Amazon DynamoDB	Write Requests	million WRUs	$0.625	25 GB storage always free, 2.5M read requests and 1M write requests per month free for 12 months
Amazon DynamoDB	Storage	GB-month (after first 25 GB free)	$0.25	25 GB storage always free, 2.5M read requests and 1M write requests per month free for 12 months

Cost Calculation

Service	Usage	Calculation	Monthly Cost
Amazon API Gateway	REST API endpoints for product data access with tiered pricing (Medium Usage: 2,000,000 requests per month, High Usage: 10,000,000 requests per month, Enterprise Usage: 50,000,000 requests per month)	Medium: 2M × $0.0000035 = $7.00, High: 10M × $0.0000035 = $35.00, Enterprise: 50M × $0.0000035 = $175.00	$7.00 - $175.00 per month
	Serverless		

AWS Lambda	compute for product API business logic (Node.js 18.x) (Medium Usage: 2M requests × 0.5GB × 0.5s = 500K GB-seconds, High Usage: 10M requests × 0.5GB × 0.5s = 2.5M GB-seconds, Enterprise Usage: 50M requests × 0.5GB × 0.5s = 12.5M GB-seconds)	Medium: $0.40 (requests) + $8.33 (compute) = $8.73, High: $2.00 + $41.67 = $43.67, Enterprise: $10.00 + $208.33 = $218.33	$8.73 - $218.33 per month
Amazon DynamoDB	NoSQL database with on-demand billing and Global Secondary Indexes (Medium Usage: 1.6M reads, 400K writes, 50 GB storage, High Usage: 8M reads, 2M writes, 200 GB storage, Enterprise Usage: 40M reads, 10M writes, 1000 GB storage)	Medium: $0.20 (reads) + $0.25 (writes) + $6.25 (storage) = $6.70, High: $1.00 + $1.25 + $43.75 = $46.00, Enterprise: $5.00 + $6.25 + $243.75 = $255.00	$6.70 - $255.00 per month

Total	**All services**	**Sum of all calculations**	**$22.43/month**

Free Tier

Free tier information by service: - **Amazon API Gateway**: First 1M API calls per month free for 12 months - **AWS Lambda**: First 1M requests and 400,000 GB-seconds per month free for 12 months - **Amazon DynamoDB**: 25 GB storage always free, 2.5M read requests and 1M write requests per month free for 12 months

Cost Scaling with Usage

The following table illustrates how cost estimates scale with different usage levels:

Service	Low Usage	Medium Usage	High Usage
Amazon API Gateway	$3/month	$7/month	$14/month
AWS Lambda	$4/month	$8/month	$17/month
Amazon DynamoDB	$3/month	$6/month	$13/month

Key Cost Factors

- **Amazon API Gateway**: REST API endpoints for product data access with tiered pricing
- **AWS Lambda**: Serverless compute for product API business logic (Node.js 18.x)
- **Amazon DynamoDB**: NoSQL database with on-demand billing and Global Secondary Indexes

Projected Costs Over Time

The following projections show estimated monthly costs over a 12-month period based on different growth patterns:

Base monthly cost calculation:

Service	Monthly Cost
Amazon API Gateway	$7.00
AWS Lambda	$8.73
Amazon DynamoDB	$6.70
Total Monthly Cost	**$22**

Growth Pattern	Month 1	Month 3	Month 6	Month 12
Steady	$22/mo	$22/mo	$22/mo	$22/mo
Moderate	$22/mo	$24/mo	$28/mo	$38/mo
Rapid	$22/mo	$27/mo	$36/mo	$63/mo

- Steady: No monthly growth (1.0x)
- Moderate: 5% monthly growth (1.05x)
- Rapid: 10% monthly growth (1.1x)

Detailed Cost Analysis

Pricing Model

ON DEMAND

Exclusions

- Data transfer costs between regions
- CloudWatch Logs storage and analysis costs
- X-Ray tracing costs
- Development and maintenance costs
- Third-party monitoring tools
- SSL certificate costs
- Route 53 DNS costs
- Support plan costs

Recommendations

Immediate Actions

- Optimize Lambda memory configuration (test 256MB vs 512MB vs 1024MB) for best price/performance ratio
- Enable API Gateway caching with 5-minute TTL to reduce Lambda invocations by up to 80%
- Implement efficient DynamoDB query patterns using GSIs to minimize RRU/WRU consumption
- Use batch operations for DynamoDB reads/writes to reduce request unit costs #### Best Practices
- Set up CloudWatch billing alarms at $25, $100, and $500 monthly spend thresholds
- Monitor API Gateway throttling metrics and Lambda duration for performance optimization
- Consider DynamoDB reserved capacity for predictable workloads (up to 53% savings)
- Implement data lifecycle policies for archiving old product data using DynamoDB IA storage class
- Enable AWS Cost Anomaly Detection for unexpected spend pattern alerts

Cost Optimization Recommendations

Immediate Actions

- Optimize Lambda memory configuration (test 256MB vs 512MB vs 1024MB) for best price/performance ratio
- Enable API Gateway caching with 5-minute TTL to reduce Lambda invocations by up to 80%
- Implement efficient DynamoDB query patterns using GSIs to

minimize RRU/WRU consumption

Best Practices

- Set up CloudWatch billing alarms at $25, $100, and $500 monthly spend thresholds
- Monitor API Gateway throttling metrics and Lambda duration for performance optimization
- Consider DynamoDB reserved capacity for predictable workloads (up to 53% savings)

Conclusion

By following the recommendations in this report, you can optimize your Product API System costs while maintaining performance and reliability. Regular monitoring and adjustment of your usage patterns will help ensure cost efficiency as your workload evolves.