

# What is Amazon API Gateway?

---

---

## Overview

Amazon API Gateway is a fully managed service for creating, publishing, maintaining, monitoring, and securing REST APIs and WebSocket APIs at any scale. It acts as the "front door" for applications to access data, business logic, or functionality from backend services.

## API Types

- **REST APIs:** Full-featured APIs with caching, throttling, and authorization
- **HTTP APIs:** Lower-cost, lower-latency option for simple use cases
- **WebSocket APIs:** Real-time two-way communication

## Key Features

- **Traffic Management:** Handle hundreds of thousands of concurrent calls
- **Request Throttling:** Control requests per second for each method
- **Caching:** Improve performance with response caching
- **API Versioning:** Run multiple versions simultaneously
- **Stage Management:** Separate alpha, beta, and production stages
- **Custom Domain Names:** User-friendly API URLs

## Security Features

- **IAM Roles:** AWS Identity and Access Management integration
- **Custom Authorizers:** Lambda-based authorization logic
- **Amazon Cognito:** User pool integration for authentication
- **API Keys:** Fine-grained access control for third-party developers
- **AWS WAF:** Protection against common web exploits
- **Mutual TLS:** Enhanced security with client certificates
- **Private Endpoints:** VPC-only access for internal APIs

## Monitoring and Analytics

- Amazon CloudWatch integration for metrics and logs
- API Gateway dashboard for visual monitoring
- AWS X-Ray for end-to-end request tracing
- Detailed metrics on calls, latency, and error rates
- Custom CloudWatch alarms for proactive monitoring

## Backend Integration

- AWS Lambda functions for serverless backends
- HTTP endpoints for existing web services
- AWS services (DynamoDB, S3, SNS, SQS)
- VPC Link for private resources
- Mock integrations for testing

**Best Practices:** Implement least privilege IAM policies, enable CloudWatch logs, use latest TLS protocol, enable response caching and encryption, control access with API keys, rotate SSL certificates regularly, and enable X-Ray tracing.