Healthcare System Architecture

Comprehensive microservices-based telemedicine platform

System Architecture   Data Flow   Infrastructure

Cloud Infrastructure (AWS/GCP)

☁ Compute & Orchestration

Kubernetes (EKS/GKE) – Container orchestration

Docker – Containerization

Auto-scaling groups

Load balancers (ALB/NLB)

Service mesh (Istio)

API Gateway (Kong/AWS API Gateway)

▤ Storage & Data

RDS (PostgreSQL) – Primary database

S3 – Object storage

ElastiCache (Redis) – Caching

CloudFront – CDN

DynamoDB – NoSQL (optional)

Backup & disaster recovery

CI/CD Pipeline

Continuous Integration & Deployment

Source Control

GitHub/GitLab

Branch protection

Code review

Git hooks

Build & Test

GitHub Actions/Jenkins

Unit tests

Integration tests

Security scanning

Docker build

Deployment

ArgoCD/Flux

Blue-green deployment

Canary releases

Rollback strategy

Infrastructure as Code (IaC)

⚙️ Terraform & Configuration Management

Terraform Modules

VPC & networking setup

Kubernetes cluster provisioning

Database infrastructure

S3 buckets & IAM roles

Load balancers & DNS

Monitoring & logging setup

Configuration

Helm charts for microservices

Environment variables (dev/staging/prod)

Secrets management (Vault)

ConfigMaps for Kubernetes

Service discovery

Certificate management

Monitoring & Observability

Metrics

Prometheus

Grafana dashboards

Custom metrics

Resource utilization

Performance KPIs

Logging

ELK Stack

CloudWatch Logs

Structured logging

Log aggregation

Search & analysis

Tracing & Alerts

Jaeger/Zipkin

Distributed tracing

PagerDuty/OpsGenie

Slack notifications

SLA monitoring

Security & Compliance

HIPAA compliance

End-to-end encryption

WAF (Web Application Firewall)

DDoS protection

Vulnerability scanning

Audit logging

Data backup & encryption

Network isolation

Secret rotation

Penetration testing

GDPR compliance

Regular security audits

Legend

Client Applications

Backend Services

AI/ML Services

Data Layer