# 3-Tier Layered Architecture
From your web application

**Presentation Layer**
Frontend (React/TypeScript)
User Interface & Web Support

**Business Logic Layer**
Backend (Next.js)
API Endpoints & Application Logic

**Data Access Layer**
Database (SupaBase)
Cloud Hosted Data Persistence

✓ Clear separation • Unidirectional flow • Maintainable

*integrates with*

# Service-Oriented Architecture
External service integration

**Core Application**
Backend Service (Next.js)

**Payment**
Processing

**Third Party**
APIs

**Performance**
Monitoring

**Authentication**
OAuth

**AI Services**
LLM APIs

✓ Loose coupling • API-driven • Scalable integration

*Creates / implements*

# Use Case Driven Architecture
From your AI analytics system

**InsightAI System Boundary**

«includes»

Connect Integration
Configure Dashboard
View Dashboard
Generate Insights
Export Data
Analyze Content

Ask AI Chatbot
Make Payment

**Key Features:**
• User-centric design • Clear boundaries
• Actor-system interactions defined

✓ Requirements driven • User focused • Testable scenarios

*deployed on*

# Cloud Deployment Pattern
Infrastructure as a Service

**Cloud Platform**
(Vercel)
Deployed together

Frontend + Backend Services

Database Service (SupaBase)

External API Gateway

**Key Features:**
• Auto-scaling infrastructure • Managed services

✓ Scalable • Managed • Cost-effective • Global CDN

## How These Patterns Work Together

## Your Complete System Architecture

**User**

**3-Tier Web App**
UI → API → Database
React + Next.js + SupaBase

**External Services**
Auth • Payment • AI • Monitoring
OAuth + Stripe + OpenAI

**Business Logic**
Analytics • Dashboard • AI Chat
User-driven features

**Cloud Infrastructure**
Auto-scaling deployment
Vercel + Global CDN

**Integration Layer**
OAuth • Data APIs • Payments
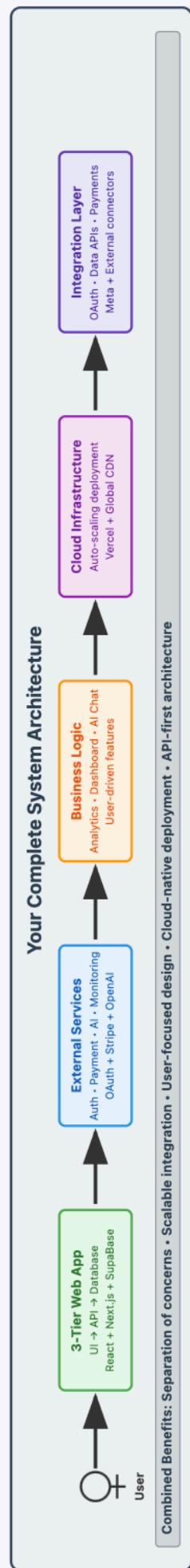Meta + External connectors

**Combined Benefits:** Separation of concerns • Scalable integration • User-focused design • Cloud-native deployment • API-first architecture

## 3-Tier Layered Architecture (Green)
Presentation Layer: Dashboard, Login, LandingPage, ParticleNetwork, SignupModal, Navbar, Logo, LogoutModal
Business Logic Layer: oAuthService, mcp-executor, utils, clientIntegrationService, serverIntegrationService
Data Access Layer: openai-api, supabaseClient, supabaseServer

## Service-Oriented Architecture (Blue)
oAuthService, mcp-executor, utils, clientIntegrationService, serverIntegrationService, openai-api, zustand, tailwind, shadcn

## Use Case Architecture (Orange)
LandingPage, LoginModal, SignUpPage, Paywall, AccountSignIn, Dashboard, OpenAIChat

## Cloud Deployment Pattern (Purple)
Vercel