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Enhanced Ghostart System Architecture

1. Frontend (Vercel)

- Next.js App Router
 - Protected Routes
 - Public Routes
- API Routes
- Edge Caching
 - Static content
 - API responses
- User data

2. Caching Layer (Redis)

- User Data Cache
 - Profile information
 - Preferences
 - Exercise responses
- Content Cache
 - Generated posts
 - Templates
 - Training materials
- Analytics Cache
 - Performance metrics
 - Engagement stats
- System health data

3. Queue System

- Message Queue
 - Content generation tasks
 - Analytics processing
 - Email notifications
- Task Scheduler
 - Scheduled posts
 - Data aggregation
- Cache invalidation

4. Backend (Supabase)

- Authentication System
- PostgreSQL Database
- Edge Functions
- Row Level Security
- Backup System

5. AI Service (Render)

- Python Backend
- Background Workers
- Retry Mechanisms
- Fallback Systems

6. Monitoring System

- Error Tracking (Sentry)
 - Frontend errors
 - Backend errors
 - API errors
- APM Tools
 - Response times
 - Error rates
 - Resource usage
- Activity Logging
 - User actions
 - System events
 - Performance metrics

7. External Services Integration

- OpenAI API
- LinkedIn API
- Stripe API

8. Security & Performance

- JWT Authentication
- API Key Management
- OAuth Token Storage
- Rate Limiting
- DDoS Protection
- SSL/TLS Encryption

9. Backup & Recovery

- Database Backups
- Cache Persistence
- Disaster Recovery Plan