Arachnie - Database & Authentication Recommendations

Project Analysis Summary

Arachnie ek comprehensive immigration visa assistance application hai jo:

- US immigration forms (I-130, I-864) auto-fill karta hai
- Passport photos generate karta hai
- Visa status check karta hai
- AI-powered immigration assistance provide karta hai
- PDF processing aur editing support karta hai

Current Tech Stack:

- **Frontend**: Next.js 15 + React 19 + TypeScript
- **Backend**: Python FastAPI
- **Current Auth**: Supabase (with localStorage fallback)
- **Vector DB**: Qdrant Cloud (AI knowledge base ke liye)

DATABASE OPTIONS - Detailed Analysis

1. Supabase (PostgreSQL) - RECOMMENDED

Feature	Details
Type	PostgreSQL (Relational) + Realtime + Storage
Hosting	Fully Managed Cloud

Pricing:

Plan	Price	Database Size	Storage	Bandwidth
Free	$0/month	500 MB	1 GB	2 GB
Pro	$25/month	8 GB	100 GB	250 GB
Team	$599/month	Unlimited	500 GB	Unlimited
Enterprise	Custom	Unlimited	Unlimited	Unlimited

Pros:

- Built-in authentication (Email, Google, Apple, GitHub, etc.)
- Real-time subscriptions out of the box
- Row Level Security (RLS) - data isolation per user
- PostgreSQL ki full power (JSON, Full-text search, PostGIS)
- Instant REST & GraphQL APIs automatically
- Storage bucket for files (PDFs, images)
- Edge Functions (serverless)
- Free tier kaafi generous hai (500 MB database)
- Next.js ke saath seamless integration
- Open source - koi vendor lock-in nahi

Cons:

- Complex queries mein learning curve
- Free tier mein 2 projects limit
- Paused projects after 1 week inactivity (free tier)
- Pricing jump from Free to Pro is significant ($0 → $25)

Best For Your Project Because:

- Immigration forms ka structured data (users, applications, documents)
- User profiles aur form submissions ke liye perfect
- Built-in auth solve karta hai authentication problem
- File storage for passport photos aur PDFs

- Real-time status updates possible

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2. Firebase (Firestore + Realtime DB)

Feature	Details
Type	NoSQL Document Database
Hosting	Google Cloud Managed

Pricing:

Resource	Free Tier	Pay-as-you-go
Storage	1 GB	$0.18/GB/month
Document Reads	50K/day	$0.036/100K reads
Document Writes	20K/day	$0.108/100K writes
Document Deletes	20K/day	$0.012/100K deletes
Network Egress	10 GB/month	$0.12/GB

Pros:

- NoSQL hai toh flexible schema
- Real-time sync excellent
- Firebase Auth bahut mature hai
- Mobile SDKs best-in-class
- Google Cloud ecosystem
- Offline support built-in
- Analytics integration
- Cloud Functions (serverless)

Cons:

- Vendor lock-in (Google)
- Complex queries limited (no joins)
- Pricing unpredictable - usage based
- Immigration forms ke structured data ke liye less ideal
- Migration out of Firebase mushkil hai
- Firestore billing surprises common

Why Not Ideal for Arachnie:

- Immigration forms highly structured hain (I-130 has 100+ fields)
- Complex queries chahiye (visa status by category, date ranges)
- NoSQL schema-less approach forms ke liye risky

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3. MongoDB Atlas

Feature	Details
Type	NoSQL Document Database
Hosting	Multi-cloud (AWS, GCP, Azure)

Pricing:

Plan	Price	Storage	RAM

Plan	Price	Storage	RAM
Free (M0)	$0/month	512 MB	Shared
Serverless	$0.10/million reads	Auto-scale	Auto
Dedicated (M10)	$57/month	10 GB	2 GB
Dedicated (M30)	$215/month	40 GB	8 GB

Pros:

- Document model immigration forms ke liye achha
- Flexible schema - forms evolve ho sakti hain
- Aggregation pipeline powerful
- Atlas Search (full-text built-in)
- Multi-cloud support
- Time-series data support
- Change streams for real-time
- Mongoose (Node.js) mature hai

Cons:

- Transactions limited (multi-document)
- Auth solution separate chahiye
- Memory usage zyada
- Complex joins expensive
- Free tier sirf 512 MB
- $57 jump to dedicated

Consideration for Arachnie:

- Forms as documents achha hai
- But auth alag implement karna padega
- Python ke saath PyMongo use karna hoga

4. PlanetScale (MySQL)

Feature	Details
Type	MySQL (Serverless)
Hosting	Vitess-powered, Multi-cloud

Pricing:

Plan	Price	Storage	Reads	Writes
Hobby	$0/month	5 GB	1 billion/mo	10 million/mo
Scaler	$29/month	10 GB	100 billion/mo	50 million/mo
Scaler Pro	$39/month	10 GB	150 billion/mo	75 million/mo
Enterprise	Custom	Unlimited	Unlimited	Unlimited

Pros:

- Branching (database branches like git)
- Zero-downtime schema changes
- Serverless - auto-scaling
- MySQL compatible (wide ecosystem)
- Non-blocking schema migrations
- Generous free tier (5 GB!)
- Prisma integration excellent
- Read replicas built-in

Cons:

- No foreign keys (by design - Vitess limitation)
- Auth solution separate chahiye
- Row-level security nahi hai
- Real-time subscriptions nahi
- MySQL specific syntax
- Less flexible than NoSQL

Why Good But Not Best:

- No foreign keys problematic for form relationships
- Auth separately implement karna padega
- Real-time features ke liye extra work

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5. Neon (Serverless PostgreSQL)

Feature	Details
Type	PostgreSQL (Serverless)
Hosting	AWS-based

Pricing:

Plan	Price	Compute	Storage	Projects
Free	$0/month	0.25 vCPU	512 MB	1
Launch	$19/month	1 vCPU	10 GB	10
Scale	$69/month	4 vCPU	50 GB	50
Business	$700/month	8+ vCPU	500 GB	Unlimited

Pros:

- Full PostgreSQL compatibility
- Serverless - scales to zero
- Branching like PlanetScale
- Instant database provisioning
- Autoscaling compute
- Point-in-time recovery
- Vercel integration native

Cons:

- Auth separately chahiye
- Free tier bahut limited (512 MB)
- Cold starts possible
- Newer player, less mature
- Real-time nahi hai built-in
- File storage nahi hai

Comparison with Supabase:

- Neon sirf database hai
- Supabase full BaaS hai (Auth + Storage + Realtime)

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6. AWS DynamoDB

Feature	Details
Type	NoSQL Key-Value/Document
Hosting	AWS Managed

Pricing:

Resource	On-Demand	Provisioned
Write Request	$1.25/million	$0.00065/WCU/hour
Read Request	$0.25/million	$0.00013/RCU/hour
Storage	$0.25/GB/month	$0.25/GB/month
Free Tier	25 GB + 25 WCU + 25 RCU	Same

Pros:

- Infinite scale
- Single-digit millisecond latency
- AWS ecosystem integration
- Global tables (multi-region)
- DynamoDB Streams (change data capture)
- Pay-per-request option
- Auto-scaling

Cons:

- Query patterns fixed at design time
- Complex access patterns mushkil
- No joins, limited queries
- Steep learning curve
- AWS vendor lock-in
- GSI/LSI planning required
- Cost unpredictable at scale

Why Not Recommended:

- Immigration forms ke complex queries ke liye unsuitable
- Access patterns plan karna mushkil
- Over-engineered for your use case

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7. Appwrite

Feature	Details
Type	Open Source BaaS
Hosting	Self-hosted or Cloud

Pricing (Cloud):

Plan	Price	Bandwidth	Storage	Users
Free	$0/month	10 GB	2 GB	75,000
Pro	$15/month	300 GB	150 GB	Unlimited
Scale	$599/month	Unlimited	Unlimited	Unlimited

Pros:

- Open source (self-host free)
- Built-in auth (50+ providers)
- File storage included
- Realtime database
- Functions (serverless)
- REST & GraphQL APIs
- Privacy-focused
- Cheaper than Firebase

Cons:

- Less mature than Supabase/Firebase
- Smaller community
- Self-hosting complex
- Limited ecosystem
- Documentation gaps
- Performance at scale unproven

Consideration:

- Good alternative but Supabase more mature
- Self-hosting option attractive for data privacy

AUTHENTICATION OPTIONS - Detailed Analysis

1. Supabase Auth - RECOMMENDED (Database ke saath)

Pricing:

- **Free**: 50,000 MAU (Monthly Active Users)
- **Pro**: 100,000 MAU included, then $0.00325/MAU
- **Team**: Unlimited

Features:

Feature	Available
Email/Password	Yes
Magic Link	Yes
Google OAuth	Yes
Apple OAuth	Yes
GitHub OAuth	Yes
Phone OTP	Yes (paid)
SAML SSO	Pro+
MFA/2FA	Yes
Row Level Security	Yes
Custom Claims	Yes
Session Management	Yes

Pros:

- Database ke saath integrated
- RLS (Row Level Security) - user data isolation
- No separate service needed
- 50K MAU free - bahut generous
- Self-hosted option available
- JWT tokens standard
- Real-time auth state

Cons:

- Supabase ecosystem mein locked (if you leave Supabase)
- Custom flows ke liye learning curve
- Phone auth paid hai

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2. Clerk

Pricing:

Plan	Price	MAU	Features
Free	$0/month	10,000	Basic auth
Pro	$25/month	10,000 included	+ $0.02/MAU after
Enterprise	Custom	Unlimited	SSO, Support

Features:

Feature	Available
Pre-built UI Components	Yes
Email/Password	Yes
Social OAuth (10+)	Yes
Magic Link	Yes
Phone OTP	Yes
Multi-session	Yes
MFA/2FA	Yes
Organizations	Yes
Webhooks	Yes
User Management Dashboard	Yes

Pros:

- Beautiful pre-built components
- Drop-in UI ready to use
- Organizations/Teams support
- Next.js native integration
- Best DX (Developer Experience)
- Session management advanced
- User impersonation
- Webhook events

Cons:

- 10K MAU free (Supabase 50K)
- $25/month + per MAU costly
- Vendor lock-in strong
- Database separately chahiye
- Cannot self-host

Your Project Context:

- Aapke code mein Clerk configured hai but commented out
- Supabase primary chal raha hai
- Clerk use karein to $25/month extra

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3. Auth0

Pricing:

Plan	Price	MAU
Free	$0/month	7,500

Plan	Price	MAU
Essentials	$35/month	500 base
Professional	$240/month	1,000 base
Enterprise	Custom	Unlimited

Pros:

- Most mature auth provider
- Enterprise features (SSO, SAML, LDAP)
- Extensive documentation
- Universal Login (customizable)
- Machine-to-machine auth
- Fine-grained permissions
- Compliance (SOC2, HIPAA)

Cons:

- Pricing complex aur expensive
- 7.5K MAU free (lowest)
- Overkill for MVP
- Configuration complex
- Slow dashboard

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4. Firebase Auth

Pricing:

Plan	Price	Features
Spark (Free)	$0	10K verifications/month (phone)
Blaze (Pay-as-you-go)	Phone: $0.01/verification	$0.06/verification after 10K

Features:

- Email/Password
- Google, Apple, Facebook, Twitter OAuth
- Phone OTP
- Anonymous auth
- Custom tokens
- Multi-factor auth

Pros:

- Effectively free for most apps
- Google ecosystem integration
- Mobile SDKs excellent
- Anonymous auth useful
- Good documentation

Cons:

- Firebase ecosystem mein lock-in
- Limited customization
- No organizations/teams
- Database alag chahiye (if not using Firestore)

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5. NextAuth.js (Auth.js)

Pricing: FREE (Open Source)

Features:

- 50+ OAuth providers
- Email/Password
- Magic Links

- Database adapters (Prisma, Drizzle, etc.)
- JWT or Database sessions
- Callbacks for customization

Pros:

- Completely free
- Full control
- Any database use kar sakte ho
- No vendor lock-in
- Active community
- TypeScript support

Cons:

- Setup yourself karna padega
- No pre-built UI
- Security responsibility yours
- Session management manual
- No admin dashboard
- Maintenance overhead

COMPARISON TABLE - All Databases

Database	Type	Free Tier	Starting Paid	Auth Built-in	Real-time	Best For
Supabase	PostgreSQL	500 MB	$25/mo	Yes	Yes	Full-stack apps
Firebase	NoSQL	1 GB	Pay-per-use	Yes	Yes	Mobile apps
MongoDB	NoSQL	512 MB	$57/mo	No	Yes	Flexible data
PlanetScale	MySQL	5 GB	$29/mo	No	No	Scalable MySQL
Neon	PostgreSQL	512 MB	$19/mo	No	No	Serverless Postgres
DynamoDB	NoSQL	25 GB	Pay-per-use	No	Yes	AWS apps
Appwrite	Multi	2 GB	$15/mo	Yes	Yes	Privacy-focused

COMPARISON TABLE - All Auth Providers

Provider	Free MAU	Paid Starting	Pre-built UI	Best For
Supabase Auth	50,000	Included in Pro	No	Supabase users
Clerk	10,000	$25/mo	Yes	Best DX
Auth0	7,500	$35/mo	Yes	Enterprise
Firebase Auth	Unlimited*	$0.01/verification	No	Google ecosystem
NextAuth.js	Unlimited	Free	No	Full control

*Firebase Auth free except phone verification

FINAL RECOMMENDATION

Database: Supabase

Reasons:

1. **Perfect Fit**: Immigration forms structured data ke liye PostgreSQL ideal hai
2. **All-in-One**: Auth + Database + Storage + Realtime ek jagah
3. **Free Tier**: 500 MB + 50K MAU - MVP ke liye kaafi
4. **Already Setup**: project mein already configured hai
5. **File Storage**: Passport photos aur PDFs ke liye bucket
6. **Row Level Security**: User data isolation automatic
7. **Real-time**: Visa status updates live possible
8. **No Vendor Lock-in**: PostgreSQL standard, migrate kar sakte ho

Authentication: Supabase Auth

Reasons:

1. **Integrated**: Database ke saath tightly coupled
2. **Free**: 50,000 MAU - most generous free tier
3. **RLS Integration**: Auth + Authorization combined
4. **Social Login**: Google, Apple, GitHub ready
5. **Already Working**: Aapke code mein implemented hai
6. **MFA Support**: 2-factor authentication available

Cost Estimation (Monthly)

Free Tier (MVP Phase):

Service	Cost
Supabase Free	$0
Qdrant Free	$0
Vercel Free	$0
Total	**$0/month**

Growth Phase (1,000+ users):

Service	Cost
Supabase Pro	$25
Qdrant Starter	$25
Vercel Pro	$20
Total	**$70/month**

Scale Phase (10,000+ users):

Service	Cost
Supabase Pro + Usage	~$50-100
Qdrant Growth	~$100
Vercel Pro	$20
Total	**$170-220/month**

Why NOT Other Options?

Firebase:

- NoSQL structured immigration forms ke liye less ideal

- Pricing unpredictable
- Vendor lock-in severe

MongoDB:

- Auth separately implement karna padega
- Complex joins expensive
- $57 jump to dedicated

PlanetScale:

- No foreign keys (form relationships ke liye problem)
- Auth separately chahiye
- Real-time nahi hai

Clerk (for Auth):

- Extra $25/month when Supabase Auth free
- Less MAU free (10K vs 50K)
- Database separately needed anyway

Conclusion

Supabase is the **BEST choice** for Arachnie because:

1. **Cost Effective**: Free tier se shuru, gradual scaling
2. **Feature Complete**: Auth + DB + Storage + Realtime
3. **Immigration Data Friendly**: PostgreSQL structured forms ke liye perfect
4. **Already Integrated**: Minimal changes required
5. **Future Proof**: Open source, no vendor lock-in
6. **Developer Experience**: Excellent documentation, large community

Sirf ensure karein:

- Proper RLS policies set hain
- Storage buckets configured hain
- Environment variables production mein secure hain
- Database schema optimized hai

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n Visa Assistance Application*