**💪 Technical Infrastructure and Modular Architecture**

**🚀 Core Technology Stack**

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| **Layer** | **Tools/Frameworks** | **Purpose** |
| Frontend | React, Tailwind CSS | SPA architecture and UI components |
| Backend | Flask / FastAPI | API handling, session management |
| Database | MongoDB Atlas | Document-based storage and flexible schema support |
| Auth | Flask-JWT / Flask-Login | Authentication and access control |
| Hosting | Netlify, Render, VPS | CI/CD deployment and hosting |

**📁 Project Structure**

**Frontend – React Structure**

/client-stack-tracker-frontend

├── public/

├── src/

│ ├── components/ # Modular components

│ ├── pages/ # Page-level views

│ ├── context/ # Application state

│ ├── hooks/ # Reusable logic

│ ├── utils/ # Utility scripts

│ └── App.jsx # App container

├── tailwind.config.js

└── package.json

**Backend – Flask Structure**

/client-stack-tracker-backend

├── app/

│ ├── routes/ # API endpoints

│ ├── models/ # Database schema

│ ├── services/ # Business logic

│ ├── utils/ # Logging, export, helpers

│ └── app.py # Main application

├── requirements.txt

└── wsgi.py

**🔒 Authentication and Role Logic**

* Session control using JWT tokens
* UI and API protection by role
* Admin-only controls for user access provisioning

**🧠 API Routes**

POST /auth/login

GET /auth/me

GET /clients

POST /clients

GET /clients/<id>

PUT /clients/<id>

DELETE /clients/<id>

GET /export/pdf/<id>

GET /export/csv/<id>

GET /backup

**📊 Database Design**

* Core collections: clients, users, optionally logs
* Embedded tier array per client
* Indexed fields for rapid querying

**💡 Key React Components**

|  |  |
| --- | --- |
| Component | Description |
| TreeView | Recursive display of stack architecture |
| ClientPage | Client detail and editing interface |
| SearchBar | Search tool with autocomplete |
| TagFlagManager | Manage tags and flags |
| ExportMenu | Export options menu |
| DarkModeToggle | Session-aware dark mode |
| AuthForm | Secure login and token handling |

**🔧 Libraries and Enhancements**

* **PDF Export**: pdfkit, wkhtmltopdf, or reportlab
* **CSV Export**: pandas, csv module
* **Tree UI**: react-treebeard, react-sortable-tree
* **Search**: fuse.js for fuzzy search

**🔁 DevOps Workflow**

* GitHub Actions for continuous deployment
* .env + GitHub Secrets for environment configuration
* Deployment on main branch merge

**🧪 Testing and QA**

* **Frontend**: Jest, React Testing Library
* **Backend**: PyTest
* **Mobile QA**: Physical iPhone + emulators
* **Data Validation**: Backup/export testing for fidelity