| **Section** | **Description** |
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| Cloud Infrastructure (Google Cloud Platform - GCP) | > Google Kubernetes Engine (GKE) for containerized deployment and automatic scaling.  > Cloud Load Balancing for distributing traffic across multiple regions.  > Cloud SQL (PostgreSQL) for relational data storage.  > Cloud Storage for object storage. |
| 4. Backend Architecture | > Rust with Actix web framework for high performance and concurrency.  > Kafka for inter-component communication (audit-logging). |
| 5. Frontend Architecture | > Android: Native development using Kotlin.  > iOS: Native development using Swift.  > Web: HTMX. |
| 6. API Design | > RESTful APIs using JSON for data exchange.  > Authentication using JSON Web Tokens (JWT) and HTTPS for secure communication.  > Swagger for API documentation and testing. |
| 7. Database Design | > PostgreSQL as the primary relational database for user accounts, orders, and trade history.  > Redis as a caching layer for frequently accessed data to reduce database load. |
| 8. Security Architecture | > Secure user authentication using bcrypt for password hashing and salting.  > HTTPS for all client-server communication ensuring data confidentiality and integrity.  > Two-factor authentication (2FA) using Google Authenticator or WhatsApp (choose from user).  > Regular security audits and penetration testing to identify and fix vulnerabilities. |
| 10. Monitoring and Logging | > Google Cloud Monitoring for real-time system metrics and alerts.  > Centralized logging using Google Cloud Logging, storing logs in Cloud Storage for long-term retention.  > Prometheus for visualizing metrics and creating dashboards.  > Alerts for critical errors and anomalies to enable quick incident response send via email. |
| 11. Deployment and DevOps | > CI/CD pipeline using Jenkins for automated build, testing, and deployment.  > Canary releases for zero-downtime deployments. |