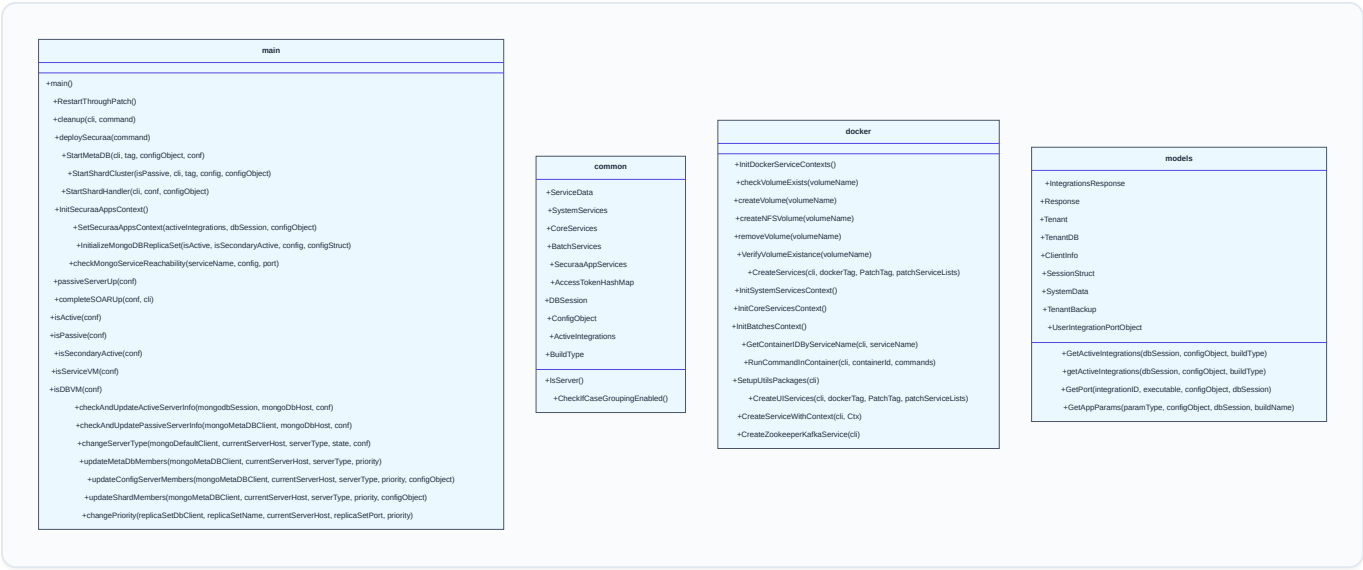


Low-Level Design (Low Level Design) – zona_process_manager¶

1. Detailed Component Design¶

Class Diagrams (Mermaid)¶



Data Structures & Relationships

- `ServiceData` : Represents a service with name, context, port, replicas.
- `IntegrationsResponse` : Integration metadata for tenants.
- `Tenant` , `TenantDB` , `TenantBackup` : Tenant and database details.
- `SessionStruct` : MongoDB session wrapper.
- Global maps: `SystemServices` , `CoreServices` , `BatchServices` , `SecuraaAppServices` (all map[string]ServiceData).

2. Database Design

Entity Relationship Diagram (Mermaid)

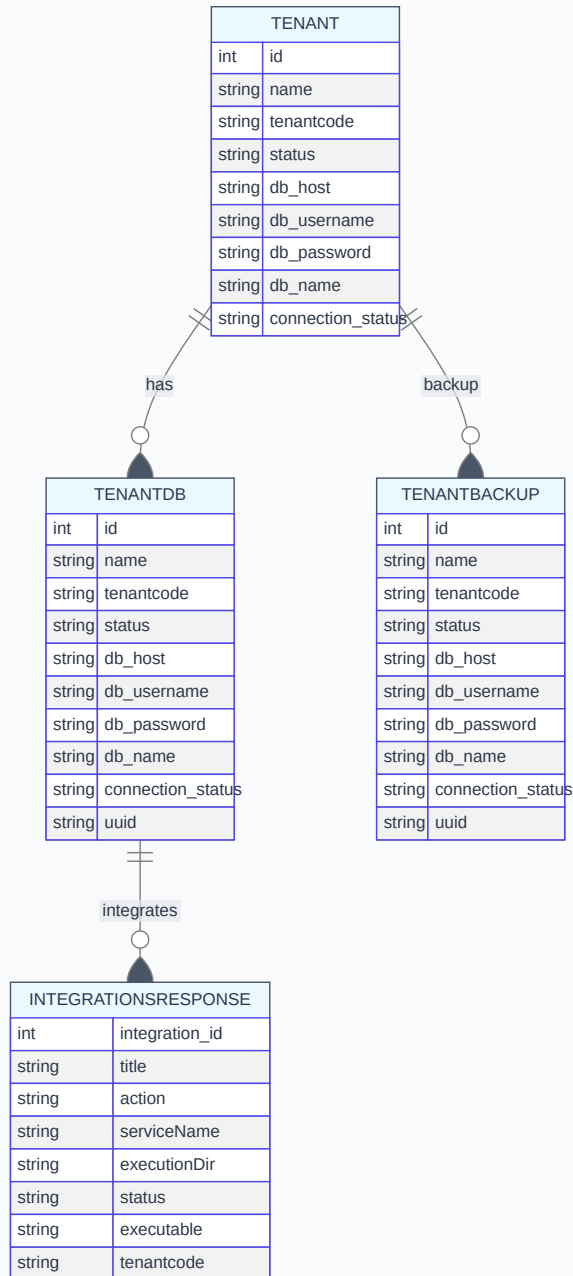


Table Schemas

- **TENANT**: id (int), name (string), tenantcode (string), status (string), db_host (string), db_username (string), db_password (string), db_name (string), connection_status (string)
- **TENANTDB**: id (int), name (string), tenantcode (string), status (string), db_host (string), db_username (string), db_password (string), db_name (string), connection_status (string), uuid (string)
- **INTEGRATIONSRESPONSE**: integration_id (int), title (string), action (string), serviceName (string), executionDir (string), status (string), executable (string), tenantcode (string)
- **TENANTBACKUP**: id (int), name (string), tenantcode (string), status (string), db_host (string), db_username (string), db_password (string), db_name (string), connection_status (string), uuid (string)

Relationships

- One tenant can have multiple databases and backups.
- Each database can have multiple integrations.

3. API Design Details

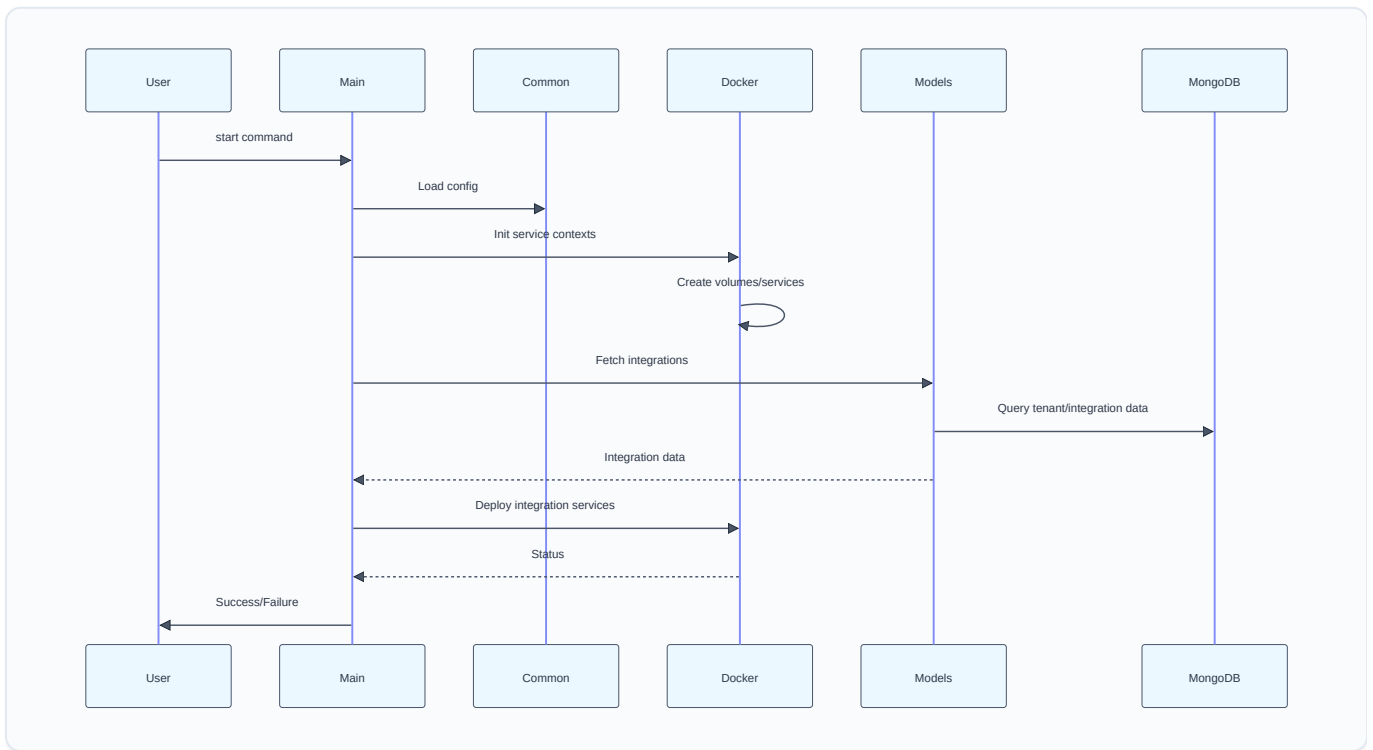
The codebase does not expose HTTP endpoints directly; orchestration is via CLI and Docker APIs. If extended to REST, typical endpoints would be:

ENDPOINT	METHOD	REQUEST SCHEMA	RESPONSE SCHEMA	AUTH
/service/start	POST	{serviceName: string}	{status: string, details: object}	Token
/service/stop	POST	{serviceName: string}	{status: string}	Token
/integration/list	GET	-	[IntegrationsResponse]	Token
/tenant/list	GET	-	[Tenant]	Token
/status	GET	-	{services: [...], integrations: [...]}	Token

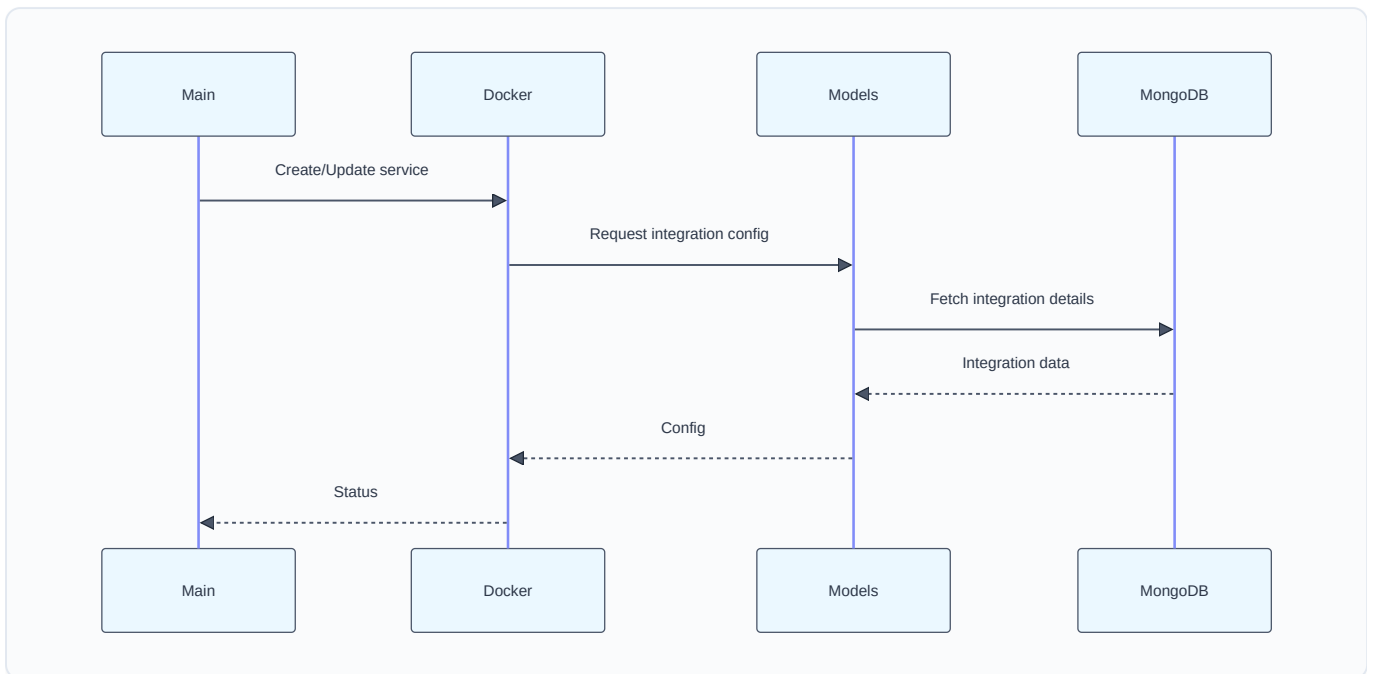
- **Authentication:** Token-based (JWT or API key recommended)
- **Request/Response Schemas:** Use JSON, matching Go struct fields

4. Sequence Diagrams (Mermaid)

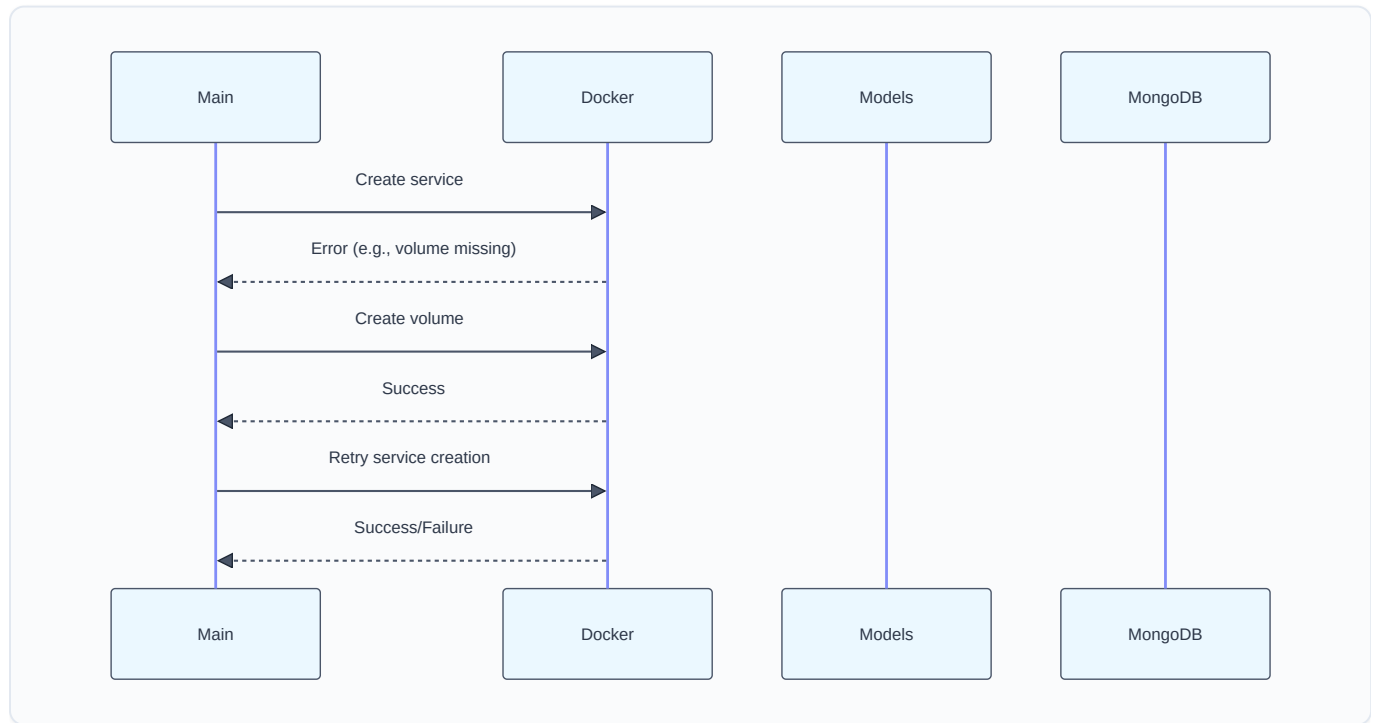
Service Startup Workflow



Inter-Service Communication



Error Handling Scenario



5. Implementation Details

Design Patterns

- **Singleton:** Global config/state objects in `common/`
- **Factory:** Service context creation in `docker/`
- **Repository:** Data access patterns in `models/`
- **Observer:** Patch-based restart monitoring

Algorithms & Data Structures

- Maps for service contexts and integration lists
- Iterative service deployment and health checks
- Dynamic port and parameter resolution for integrations

Code Organization

- `/main.go` : Orchestration logic
- `/common/` : Global state, utilities
- `/docker/` : Docker orchestration
- `/models/` : Data models, integration logic

6. Technical Specifications¶

Configuration Management¶

- Centralized config object loaded at startup
- Shared across modules via `common/`
- Supports dynamic updates and patch-based restarts

Error Handling Strategies¶

- Centralized logging via `securaa_lib`
- Error propagation and handling in all major methods
- Retry logic for critical operations (e.g., MongoDB reachability)

Performance Considerations¶

- Asynchronous service startup and monitoring
 - Efficient use of maps for service/integration lookup
 - Docker-based scaling and replica management
-

Summary¶

This LLD provides a detailed breakdown of the `zona_process_manager` codebase, including class diagrams, database design, (potential) API details, sequence diagrams, implementation patterns, and technical specifications. All diagrams use actual class and method names from the codebase for clarity and traceability.