**1. Go-Based Microservice Stack Overview**

**Framework:**

* [**Gin**](https://github.com/gin-gonic/gin): HTTP web framework for building APIs.
  + Lightweight, high performance.
  + Supports middleware, routing, JSON handling, and more.

**2. Essential Go Packages**

**Routing & HTTP Server**

| **Package** | **Use Case** | **Import Path** |
| --- | --- | --- |
| gin-gonic/gin | HTTP Router and middleware | github.com/gin-gonic/gin |
| gorilla/mux | Alternative HTTP router (optional) | github.com/gorilla/mux |

**Authentication & JWT**

| **Package** | **Use Case** | **Import Path** |
| --- | --- | --- |
| golang-jwt/jwt/v5 | JWT generation & validation | github.com/golang-jwt/jwt/v5 |
| github.com/gin-contrib/sessions | Session management | github.com/gin-contrib/sessions |

**Database**

| **Package** | **Use Case** | **Import Path** |
| --- | --- | --- |
| pgx / lib/pq | PostgreSQL driver | github.com/jackc/pgx/v5 or github.com/lib/pq |
| gorm | ORM | gorm.io/gorm |
| sqlx | Lightweight DB abstraction | github.com/jmoiron/sqlx |

**Password Hashing**

| **Package** | **Use Case** | **Import Path** |
| --- | --- | --- |
| bcrypt | Password hashing | golang.org/x/crypto/bcrypt |

**🧪 Validation**

| **Package** | **Use Case** | **Import Path** |
| --- | --- | --- |
| go-playground/validator | Struct field validation | github.com/go-playground/validator/v10 |

**Utilities**

| **Package** | **Use Case** | **Import Path** |
| --- | --- | --- |
| viper | Configuration management (.env) | github.com/spf13/viper |
| godotenv | Load .env files | github.com/joho/godotenv |
| logrus | Structured logging | github.com/sirupsen/logrus |
| zerolog | Alternative fast logger | github.com/rs/zerolog |
| copier | Copy struct fields | github.com/jinzhu/copier |

**Documentation**

| **Package** | **Use Case** | **Import Path** |
| --- | --- | --- |
| swaggo/gin-swagger | Swagger UI for Gin | github.com/swaggo/gin-swagger |
| swaggo/swag | Generate Swagger docs from comments | github.com/swaggo/swag |

**Middleware (CORS, Logging, Recovery)**

| **Package** | **Use Case** | **Import Path** |
| --- | --- | --- |
| gin-contrib/cors | CORS config | github.com/gin-contrib/cors |
| gin-contrib/logger | Enhanced logging | github.com/gin-contrib/logger |
| gin-contrib/recovery | Panic recovery middleware | github.com/gin-contrib/recovery |

**📤 Messaging (Optional)**

| **Package** | **Use Case** | **Import Path** |
| --- | --- | --- |
| segmentio/kafka-go | Kafka integration | github.com/segmentio/kafka-go |
| nats-io/nats.go | NATS messaging | github.com/nats-io/nats.go |