SS7 HA Gateway - Project Brief

Project Description

SS7 HA Gateway is an open-source, carrier-grade protocol handling layer designed for SS7/MAP/CAP networks. It serves as a bridge between legacy telecom infrastructure (HLR, MSC, VLR) and modern application ecosystems.

The gateway provides high availability through distributed state management using NATS JetStream Key-Value Store and implements a low-latency event-driven architecture by publishing clean JSON events to NATS Core. This allows modern applications to interact with SS7 networks without needing complex SS7 stack knowledge or heavy middleware.

Who is this library for?

This library is designed for a wide range of stakeholders in the telecommunications industry:

- Telecom Operators & Carriers: For modernizing legacy infrastructure and exposing services via modern APIs.
- Mobile Virtual Network Operators (MVNOs): To implement core network services efficiently.
- Value-Added Service (VAS) Providers: Companies building SMS Centers (SMSC), USSD gateways, or Location Based Services (LBS).
- FinTech & Authentication Providers: For delivering OTPs and 2FA services via reliable SMS channels.
- Software Developers: Who need to integrate with SS7 networks using familiar tools like NATS and JSON, avoiding the steep learning curve of SS7 protocols.

Key Advantages

The SS7 HA Gateway offers several significant benefits:

1. High Availability & Reliability:
Utilizes NATS JetStream Key-Value Store for distributed dialog state management. This ensures continuous operation even if a gateway node fails, as any other instance can retrieve the dialog state and continue the session. It guarantees seamless failover and data consistency.

2. Simplified Architecture & Operations:
Replaces the complex combination of Apache Kafka and Redis with a single, lightweight NATS Server. This drastically reduces operational complexity and deployment footprint.

3. Scalability & Load Balancing:
Built for horizontal scalability using NATS Queue Groups. Incoming SS7 traffic is automatically load-balanced across all available gateway instances. You can simply add more gateway nodes to handle increased load.

4. Ultra-Low Latency Event-Driven Design:
Decouples the complex SS7 layer from business logic using NATS Pub/Sub. Applications consume standard JSON events with sub-millisecond latency.

5. Cost-Effective & Open Source:
Reduces reliance on expensive proprietary hardware. It runs efficiently on standard commodity hardware or containerized environments (Docker/Kubernetes).