

Master Documentation: Updates for Emsync

Project: Emergency Coordination & Management System

Lead Developer: Alan Joseph P V

Status: Active Development (Post-Phase 3 Refinement)

1. Core Infrastructure & Deployment

- **Orchestration:** The system is managed via **Docker Compose**, running three isolated microservices (ML, Routing, Transfer).
 - **DevOps:** Automated **CI/CD** pipelines are triggered by GitHub Actions, building images to Docker Hub and maintaining a "Thin Client" local setup.
 - **Network Protocol:** Services communicate over a private emsync-network bridge with host="0.0.0.0" bindings to ensure container-to-host accessibility.
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2. Functional Module Refinements (Phase 3+)

A. Inter-Hospital Transfer (Secure Coordination)

- **Resource Expansion:** Migrated from a single "Bed" count to a high-granularity tracking system supporting **12 specific emergency categories** (e.g., Cardiac ICU, NICU, Dialysis, Ventilators).
- **Database Schema:** Updated Hospital and TransferSession models to store resource inventories as JSON-based dictionaries for dynamic scaling.
- **Real-Time Synchronization:** Implemented **Flask-SocketIO** broadcasts to ensure that accepting a transfer instantly decrements the specific resource count across all connected dashboards.

B. Security & Data Integrity

- **Encryption Bug Fix:** Resolved a data mapping error where the Date of Birth (DOB) was incorrectly encrypted.
- **JSON Handshake:** Identity data (Name, DOB) and the **Requested Service Type** are now bundled into a structured JSON payload before **AES-256 CBC** encryption, ensuring 100% data integrity during the transfer handshake.

3. UI/UX Enhancements (React Shell App)

- **Service Selection:** Integrated a dynamic dropdown in the **Registry (Step 1)** to allow paramedics to book specific emergency services alongside patient entry.
- **Dynamic Admin View:** Developed a "drill-down" interface in **Admin View (Step 4)** where clicking a hospital opens a specific resource management panel that updates in real-time via WebSockets.
- **System Reset:** Improved the **Reset Simulation** function to clear all active database sessions and reset all 12 resource categories to their default values across the entire network.

4. Technical Specification Summary

Component	Technology	Update Log
Backend	Flask / SQLAlchemy	JSON-based resource storage.
Security	PyCryptodome (AES-256)	Structured JSON payload encryption.
Frontend	React / Lucide-React	Dynamic Admin View & Hospital Selector.
Real-time	Socket.IO	Automated resource_update broadcasts.

```
C:\Windows\system32\cmd.exe X + v
6 files changed, 315 insertions(+), 13 deletions(-)
create mode 100644 phase3-transfer/__pycache__/hosital_model.cpython-313.pyc

(virtual_network_emsync_env) G:\Final Year PROJECTTTTTTTTTTTTTTT\p4 final EMSYNC\emsync-root\phase3-transfer>git push origin main
Enumerating objects: 19, done.
Counting objects: 100% (19/19), done.
Delta compression using up to 16 threads
Compressing objects: 100% (10/10), done.
Writing objects: 100% (11/11), 6.07 KiB | 327.00 KiB/s, done.
Total 11 (delta 5), reused 0 (delta 0), pack-reused 0 (from 0)
remote: Resolving deltas: 100% (5/5), completed with 5 local objects.
To https://github.com/Alan-JPV/EMSYNC_DOCKER_BACKEND.git
 5fba7f0..29509cb  main -> main

(virtual_network_emsync_env) G:\Final Year PROJECTTTTTTTTTTTTTTT\p4 final EMSYNC\emsync-root\phase3-transfer>python init_db.py
Database reset and initialized with 12 service categories for: ['Aster Medicity', 'Lourdes Hospital', 'Rajagiri Hospital', 'General Hospital Ernakul
am']

(virtual_network_emsync_env) G:\Final Year PROJECTTTTTTTTTTTTTTT\p4 final EMSYNC\emsync-root\phase3-transfer>git add .

(virtual_network_emsync_env) G:\Final Year PROJECTTTTTTTTTTTTTTT\p4 final EMSYNC\emsync-root\phase3-transfer>git commit -m "Fix: Dynamic Admin View
and Reset Simulation Logic"
[main 72a0ad8] Fix: Dynamic Admin View and Reset Simulation Logic
 2 files changed, 50 insertions(+), 2 deletions(-)

(virtual_network_emsync_env) G:\Final Year PROJECTTTTTTTTTTTTTTT\p4 final EMSYNC\emsync-root\phase3-transfer>git push origin main
Enumerating objects: 11, done.
Counting objects: 100% (11/11), done.
Delta compression using up to 16 threads
Compressing objects: 100% (5/5), done.
Writing objects: 100% (6/6), 777 bytes | 155.00 KiB/s, done.
Total 6 (delta 4), reused 0 (delta 0), pack-reused 0 (from 0)
remote: Resolving deltas: 100% (4/4), completed with 4 local objects.
To https://github.com/Alan-JPV/EMSYNC_DOCKER_BACKEND.git
 29509cb..72a0ad8  main -> main

(virtual_network_emsync_env) G:\Final Year PROJECTTTTTTTTTTTTTTT\p4 final EMSYNC\emsync-root\phase3-transfer>
```