# Capstone: AI Workflow — Deploy a Business Solution

This document describes the project structure and implementation to satisfy the peer-graded rubric. It contains details on unit tests, API, monitoring, data ingestion, modeling, EDA, and containerization.

## Rubric Items & Implementation

• Unit tests for API, model, logging: Implemented under tests/ folder with pytest.

• Single command to run all tests: tests/run\_tests.py executes all tests.

• Monitoring: Prometheus client exposes /metrics endpoint in FastAPI app.

• Isolation of tests: Tests use temporary dirs, not production models/logs.

• API functionality: FastAPI app in src/api.py supports predictions for specific country and all countries.

• Data ingestion: src/ingest.py as function and CLI script, supports automation.

• Multiple models compared: Baseline, Linear Regression, Random Forest compared; best chosen by MAE.

• EDA visualizations: src/eda.py generates figures stored in reports/figures/.

• Dockerization: Dockerfile provided, container exposes API.

• Visualization of model vs baseline: Bar plot of MAE values saved to reports/figures/.

## Project Structure

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├── Dockerfile  
├── requirements.txt  
├── src/  
│ ├── api.py  
│ ├── config.py  
│ ├── eda.py  
│ ├── ingest.py  
│ ├── logger.py  
│ ├── model.py  
│ ├── monitoring.py  
│ └── utils.py  
├── tests/  
│ ├── test\_api.py  
│ ├── test\_logging.py  
│ ├── test\_model.py  
│ └── run\_tests.py  
├── data/  
├── models/  
├── reports/  
│ ├── figures/  
│ └── metrics/  
└── README.md

## Quickstart

1. Create and activate virtual environment  
2. pip install -r requirements.txt  
3. Run tests: python tests/run\_tests.py  
4. Ingest data and train models  
5. Run API: uvicorn src.api:app --reload  
6. Access API docs at http://localhost:8000/docs  
7. Access metrics at http://localhost:8000/metrics

## Docker Usage

docker build -t capstone-ai .  
docker run -p 8000:8000 capstone-ai  
Then open http://localhost:8000/docs