Teacher Timetable Platform – C4 Diagrams & ADRs

C4 Level 1 – System Context Diagram

Teacher / Admin → Teacher Timetable Platform → OCR Engine / LLM Provider. Teachers upload timetable documents in any format and later retrieve them in a common UI representation.

Actor / System	Responsibility
Teacher / Admin	Upload and view timetables
Teacher Timetable Platform	Normalization, storage, retrieval
OCR Engine	Extract text from documents
LLM Provider	Infer timetable structure

C4 Level 2 – Container Diagram

The system is composed of a Frontend UI, Backend API, Blob Storage, Relational Database, and an Extraction Pipeline.

Container	Technology	Responsibility
Frontend UI	React / Web	Upload and display timetable
Backend API	ASP.NET Core / Node.js	Orchestration
Blob Storage	Azure Blob	Store original files
Database	Azure SQL	Store normalized timetable
Extraction Pipeline	OCR + LLM	Convert documents to structured data

C4 Level 3 – Component Diagram

Core backend components responsible for upload, extraction, and retrieval.

Component	Responsibility
UploadTimetableUseCase	Handle uploads and persist raw files
ExtractTimetableUseCase	OCR, AI extraction, normalization
GetTimetableUseCase	Retrieve normalized timetable
TimetableRepository	Persist and query timetable data

C4 Level 4 – Code / Clean Architecture View

Clean Architecture layers separate concerns and isolate infrastructure.

Layer	Contents
Presentation	Controllers, UI DTOs
Application	Use cases
Domain	Timetable, TimeBlock, Value Objects
Infrastructure	Blob, OCR, AI, DB adapters

Architecture Decision Records (ADR)

ADR-001: Store Raw Timetable Files in Blob Storage

Decision: Store all uploaded timetable files immutably in Blob Storage. Rationale: Enables reprocessing, auditing, and future AI improvements. Consequences: Increased storage usage but higher reliability.

ADR-002: Canonical Timetable Domain Model

Decision: Normalize all timetables into a single domain model. Rationale: Ensures consistent UI rendering regardless of source format. Consequences: Requires upfront normalization logic.

ADR-003: AI as Anti-Corruption Layer

Decision: Isolate AI/OCR outputs from domain logic. Rationale: AI outputs are probabilistic and untrusted. Consequences: Additional validation layer, but improved correctness.