

Updated Architecture Diagram – Full Feature Overview

This document describes the full, updated system architecture integrating Stable Diffusion (AUTOMATIC1111 WebUI + SD API), Ollama, Blender, backend services, and frontend delivery for the Automotive and Diesel LMS platform.

Architecture Layers

Frontend Layer

- Next.js / Docs Site
- Course Catalog UI
- Thumbnail & Media Consumption
- Admin & Instructor Interfaces

Edge & Routing Layer

- Nginx Reverse Proxy
- TLS Termination
- Request Routing to Backend APIs

Backend Application Layer

- Phoenix API (Elixir): Auth, Jobs, Metadata
- FastAPI (Python): AI & Media Orchestration
- Provider Routing (WebUI / Future Providers)

AI & Compute Services Layer

- Ollama (LLM Prompt + Curriculum Generation)
- Blender Worker (3D Models, Renders, Sim Assets)
- Stable Diffusion WebUI (A1111 SD API – txt2img)

Storage Layer

- PostgreSQL (Jobs, Assets, Metadata)
- S3 / MinIO (Images, Thumbnails, Models, Exports)

Infrastructure & Ops Layer

- Docker / Kubernetes (optional GPU nodes)
- Readiness Probes (/sdapi/v1/options)
- GPU Scheduling & Node Affinity

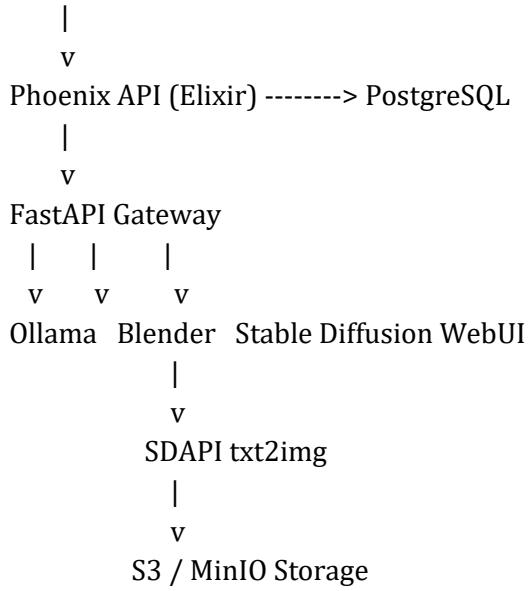
Logical Architecture Diagram (Textual)

Frontend (Next.js / Docs)

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Nginx / Edge Router



Stable Diffusion Integration Notes

Stable Diffusion runs as a dedicated image generation service. It must be launched with the `--api` flag to expose SDAPI endpoints. For lower VRAM GPUs (e.g., GTX 1650 4GB), use `--medvram --no-half --precision full` to ensure stability and prevent NaN errors.