

Technical Challenge: Backend/AWS

Technical Challenge: Designing a Scalable Backend System

Scenario

You've joined a fictional construction management startup that is rapidly growing. The backend is currently a single **ExpressJS API** deployed on an EC2 instance, backed by **Postgres** and **S3**. As usage has grown, some pain points have emerged:

- The API infrastructure is fragile, with scaling and deployment difficulties.
- Users increasingly need to upload large numbers of documents and images (sometimes thousands at once).
- The system needs to remain reliable, observable, and secure as it grows.

Your task is to propose how you would **re-architect the backend system** to address these needs.

Your Assignment

Design and propose a backend architecture that can support this growing application.

You should assume requirements like these:

- The system will need to handle up to **5,000 file uploads per day**, with spikes when projects are created.
- Uploads can be large (documents, images), and users want to be able to see the status of their uploads.

- The API should be **scalable, reliable, and observable**.
 - You may assume unlimited AWS services are available, but you should be thoughtful about your choices and trade-offs.
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Deliverables

- A **short proposal** (max ~5–6 pages).
 - At least one **architecture diagram** (system-level, with components and interactions).
 - (Optional) a sequence diagram or flow diagram for a key workflow you think is important.
 - A **30-minute walkthrough** of your design, followed by Q&A.
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What We're Looking For

We don't expect you to implement the solution. Instead, we're interested in:

- How you think about **system design** and scalability.
 - How you use **AWS services** (containers, queues, storage, networking, observability, etc.).
 - How you design **APIs** and workflows (REST principles, idempotency, error handling).
 - How you consider **resilience, observability, and security**.
 - How you communicate trade-offs and explain your reasoning.
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Notes

- Keep it fictional; don't worry about exact costs or our real system.
 - You are free to make assumptions — just state them clearly.
 - If you want to go above and beyond, that's great, but the base expectation should take about 1 day (max 2) of effort.
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