



Case Study

AI-ENHANCED VIDEO TRANSCRIPTION AND ENRICHMENT PIPELINE FOR ARIVIHAN

At a Glance

Arivihan, an EdTech platform serving JEE and NEET aspirants across India, partnered with AceCloud to build a scalable video transcription and enrichment pipeline on AWS. The new architecture automated transcription, improved accuracy for academic content, and delivered secure, low-latency video access to students nationwide, backed by an automated, governed, and continuously monitored cloud foundation.

The engagement addressed two problems at once: a content-operations bottleneck that was slowing the delivery of new lectures to students and a performance ceiling that emerged precisely when it mattered most, during the high-traffic weeks before major exams. Rather than treating these as separate issues, AceCloud designed a single pipeline where transcription, storage, delivery and monitoring scale together as one system.

Outcomes

- Reduced transcription turnaround time from days to hours.
- Improved transcription accuracy by 30% with hybrid AI models.
- Cut video latency by 40% during peak exam seasons.
- Optimized storage and processing costs by 25–40%.
- Enhanced student engagement through contextual tagging and insights.
- Achieved zero manual changes to production infrastructure, with every deployment automated and peer-reviewed.

The Client

Arivihan is an EdTech platform that serves thousands of JEE and NEET aspirants. With thousands of hours of recorded lectures and a growing student base, the company aims to deliver accessible, high-quality education across India, including Tier-2 and Tier-3 cities.

Many of Arivihan's students prepare from smaller towns with less reliable connectivity and fewer local coaching options, making the platform's video library one of their most consistent sources of instruction. That makes both content accuracy, including clear and correctly transcribed explanations of complex technical material, and reliable access, including fast-loading video under heavy simultaneous demand, central to the product experience rather than secondary features.

The Challenge

As Arivihan's content library expanded, manual transcription became slow, resource-heavy and prone to errors, especially when handling technical terms. Physics, Chemistry, and Biology lectures are dense with domain-specific vocabulary, chemical names, formulae, and numerical notation that generic transcription approaches routinely mishandled.

This required extensive manual correction and added days to the process. Students often faced delays in receiving transcripts, limiting their exam preparation, particularly during the final weeks before an exam when every day of study time counts.

At the same time, platform usage spiked sharply during exam seasons. This caused performance bottlenecks in video delivery: pages loaded slower, videos buffered more, and the experience degraded exactly when the highest number of students were relying on it simultaneously. Ensuring secure, low-latency access for verified students while protecting sensitive user data and preventing unauthorized redistribution of paid content presented additional challenges that a simple capacity increase would not have solved on its own.

The Solution

To overcome these challenges, Arivihan partnered with AceCloud to deploy a modern, cloud-native, AI-driven video content pipeline. The design goal was not just to make transcription faster, but to build a pipeline that would keep working smoothly as content volume and student traffic continued to grow, without requiring constant manual intervention.

Raw videos are uploaded to Amazon S3, which serves as the central repository, and are distributed globally through Amazon CloudFront with signed URLs to enforce secure access. This ensures that only authenticated, verified students can retrieve a given video and helps prevent links from being freely reused outside the platform. The processing pipeline is fully event-driven, using Amazon SQS and AWS Lambda to automate the workflow from ingestion through delivery. As soon as a lecture is uploaded, the pipeline picks it up, processes it and makes it available without requiring anyone to trigger the next step manually.

For transcription, a hybrid approach was designed to balance speed, cost, and accuracy. Amazon Transcribe delivers rapid baseline transcriptions within minutes of upload, while domain-specific accuracy is improved with Whisper inference running on Amazon EKS — a second pass tuned specifically for the technical vocabulary that trips up general-purpose transcription.

The enriched transcripts are stored in Amazon DynamoDB for low-latency search and retrieval, so students can jump to a specific point in a lecture by searching the transcript rather than scrubbing through video manually.

- **Governed, Automated Infrastructure**

The environment is organized around AWS multi-account best practices, with a master payer account and AWS Control Tower establishing baseline guardrails, and dedicated accounts separating the pipeline's workloads for security and manageability. This separation means that a configuration issue or access change in one part of the environment cannot inadvertently affect another, and it gives Arivihan a clear, auditable picture of exactly what is running where.

All infrastructure is deployed and managed exclusively through Terraform, with remote state stored in a dedicated Amazon S3 backend and state-locking enforced via Amazon DynamoDB to prevent concurrent modification conflicts. No manual changes are made to production infrastructure through the AWS Console. Every change passes through a plan/apply cycle gated by a peer-reviewed pull request, providing both an additional review layer and a clear record of what changed, who made the change and why.

The pipeline decouples ingestion from processing by academic subject (Physics, Chemistry, Biology), so each subject's Amazon ECS Fargate service scales independently based on its own queue depth, without one subject's load affecting another's throughput. In practice, this means a surge in Biology lecture uploads ahead of a NEET exam window doesn't slow down Physics or Chemistry processing running at the same time.

Production releases use a blue/green strategy: new versions are shifted gradually from 10% to 100% of traffic only after passing sustained health checks, with automatic rollback on failure. Every change is validated in an identically configured staging environment before reaching production. This allows updates such as new model versions, bug fixes and feature additions to be released frequently without unnecessarily putting the live student experience at risk.

- **Enrichment and Continuous Monitoring**

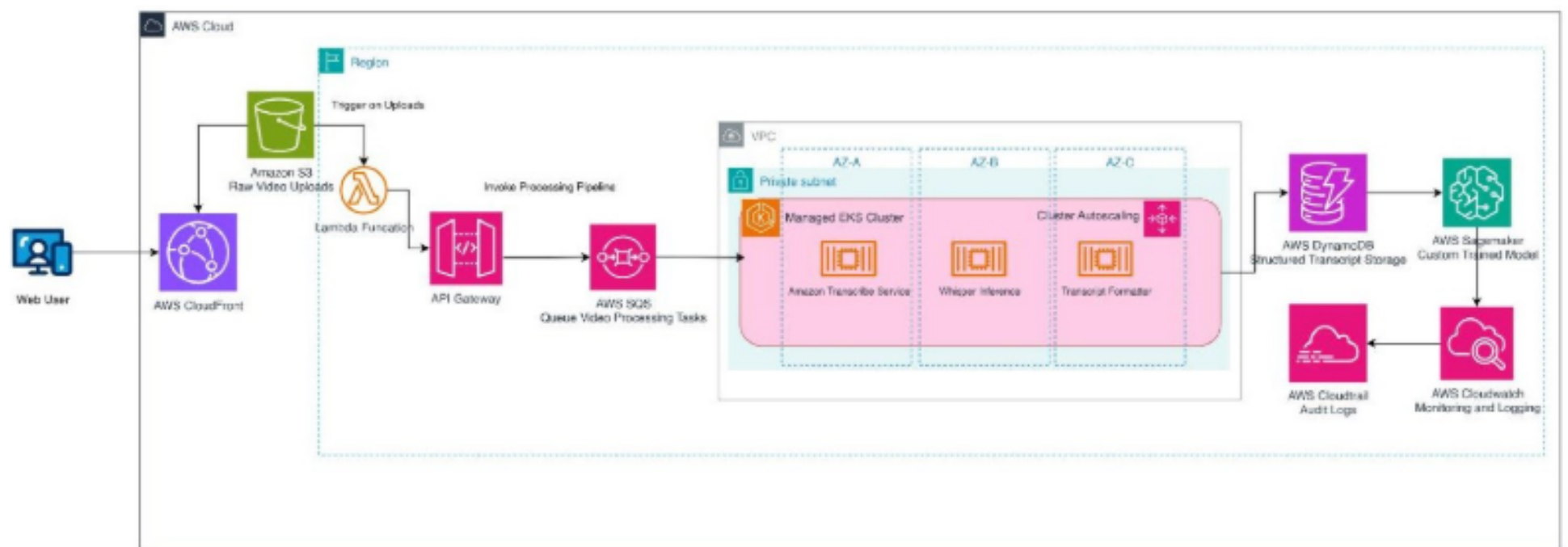
Amazon SageMaker enhances transcripts with contextual tagging, highlights and learning insights that integrate directly with the learning platform, turning a flat transcript into a navigable, searchable study resource with key concepts and topic boundaries marked automatically. Amazon CloudWatch and AWS CloudTrail provide continuous monitoring, compliance evidence and governance across the environment, giving the team visibility into system health and a full audit trail of activity at all times, not just when something goes wrong.

The same Terraform codebase used for daily operations also serves as the pipeline's disaster recovery mechanism and is capable of recreating the entire environment, including networking, identity and access management, data stores and compute, in another AWS Region. Because recovery uses the same infrastructure code and deployment process as routine operations, it is not dependent on a rarely tested manual procedure that may fail when it is needed most. Instead, the underlying deployment process is exercised whenever the pipeline infrastructure is deployed.

The architecture scales dynamically with demand. Spot Instances are used for GPU-based Whisper workloads, which represent the heaviest compute requirement in the pipeline. Amazon S3 lifecycle policies support ongoing storage cost optimization by automatically moving older or less frequently accessed video content to lower-cost storage tiers over time without manual housekeeping.

Architectural Diagram

The diagram below shows how a video moves through the pipeline end to end: from upload, through transcription and enrichment, to a fully monitored and audited destination.



Results and Benefits

- **Faster Content Availability:** Transcripts generated within hours instead of days, giving students same-day or next-day access to fully transcribed lectures rather than waiting through a manual queue.
- **Higher Accuracy:** 30% improvement in handling academic and multilingual terms, reducing the manual correction work that previously slowed the pipeline down.
- **Seamless Student Experience:** 40% reduction in video latency during high demand, so peak exam-season traffic no longer means a degraded experience for students who can least afford the disruption.

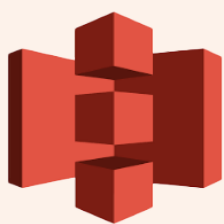
Cost Optimization:

1. 25% lower storage costs with S3 lifecycle policies.
2. 40% savings on inference using Spot Instances.

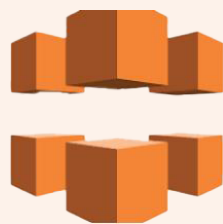
- **Scalability:** Elastic, per-subject architecture adapts automatically to seasonal exam traffic, so the team doesn't need to forecast and manually provision extra capacity ahead of each exam cycle.
- **Security and Compliance:** Least-privilege access, encryption, and edge protection safeguard sensitive data and paid content alike.
- **Operational Resilience:** Automated recovery and blue/green deployments remove manual risk from every release, so the pace of new feature delivery doesn't come at the cost of stability.

AWS Services Used

The pipeline draws on a focused set of AWS services, each handling a specific stage of the content lifecycle:



Amazon S3



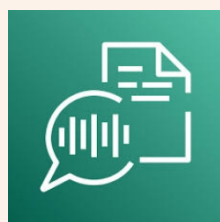
Amazon
CloudFront



AWS
Lambda



Amazon
SQS



Amazon
Transcribe



Amazon
EKS



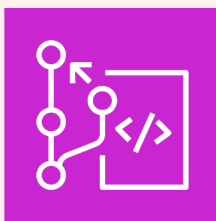
**Amazon
DynamoDB**



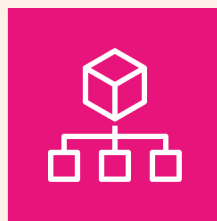
**Amazon
SageMaker**



**Amazon CloudWatch
and AWS CloudTrail**



**AWS CodeDeploy
and AWS CodeCommit**



**AWS Control Tower
and AWS Organizations**

Conclusion

By leveraging AWS, Arivihan built a secure and automated video platform that scales with changing student demand. The hybrid transcription pipeline improves accuracy for academic content, while SageMaker-powered enrichment enhances the learning experience. With improved performance, reduced costs, strong governance and a resilient, automated foundation, Arivihan is well positioned to continue delivering accessible, high-quality digital education across India, including in Tier-2 and Tier-3 cities where reliable access matters most.



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About Us



Years of Exp

15+



Data Center

10+



Awards

100+

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AceCloud is a brand of Real Time Data Services (RTDS) group of companies – a leading provider of information technology capabilities specializing in Cloud Computing and Cloud Telephony. RTDS Group has an employee base of 600+ across India, the US, and the UK, supporting over 20,000+ customers and IT infrastructure in 10+ data centers spanning the globe. It offers industry-leading technological solutions that help customers streamline their operations and enhance efficiency.

As an advanced consulting and certified AWS Well-Architected Partner, AceCloud recently achieved the prestigious AWS Storage Competency and is also recognized as an Amazon RDS Service Delivery Partner. These achievements underscore its deep expertise in AWS technologies and commitment to delivering high-quality cloud solutions.



- Public Sector
- Amazon RDS Delivery
- Storage Services Competency
- Well-Architected Partner Program