NUL on AWS - A Service-Based Approach

GOALS

As we transitioned to AWS, we replaced many specialized systems (transcoding, streaming, database) with services. This allowed for simplified management, better testing, and improved user-experience.

STAGING & PROVISIONING

AWS now requires a complex architecture. By moving our entire system to AWS, we can cost-effectively stand up staging and development systems. During massive upgrades, we can test an entire system in the dark.

STREAMING

NU replaced its streaming system (Wwwo) with AWS CloudFront. The front-end cache allows streaming at a global scale, simplifying management, and reduces a major bandwidth bottleneck.

TRANSCODING

Converting formats for streaming is time-consuming and CPU-intensive. NU switched to AWS Elastic Transcoder to create streaming derivatives. This change greatly improved our user-experience during ingestion. Derivative creation for a 2-hour movie is now faster.

STORAGE

Video is big. Using S3 allows us to only expand storage based on need. We are looking for ways to further cut costs by using Glacier for master files.

OUR AWS ARCHITECTURE

WEBAPP

The user-facing web application for ingest, content management, discovery, and access. One instance running at a time that scales up or down depending on user traffic and demand.

STREAMING & TRANSCODING

The Elastic Transcoder engine provides scalable and efficient content conversion and distribution.

WORKERS

Hundreds of independent tasks required by the application like transcoding, building and delivering streaming jobs, dashboard metrics, etc. One instance running at a time that scales up or down depending on the number of jobs waiting in the queue.

SERVICES WE’RE USING

ELASTIC TRANSCODER

Transcoding as a service, used by Sammer’s ActiveFence code to transcode audio and video source material to streaming-ready derivatives. Replaces OpenCast Matterhorn.

CLOUDFRONT

Edge-caching network with HTTP and RTMP media streaming capabilities. Switching to AWS CloudFront has made it possible for users all over the world (including NU Qatar) to stream audiovisual content smoothly and efficiently.

SIMPLE QUEUE SERVICE

A robust message queue, dispatching background jobs and status updates among the web applications and their worker boxes.

CLOUDWATCH

Amazon’s resource monitoring and logging service, which provides a central dashboard to review repository and application health.

SIMPLE STORAGE SERVICE

Data storage “buckets” for master files (source content), derivatives, code distribution, and configuration files.

ELASTIC BEASTNALK

Simplifies complex application provisioning, configuration, deployment, scaling, and monitoring.

LAMBDA

Runs code on demand without keeping a dedicated server running. Used for short-lived and cross-repository tasks like mining unique IDs.

RELATIONAL DATABASE SERVICE

PostgreSQL database service for our Fedora repository and each Sammer application.

ROUTE S3

Provides Blobstore Domain Name Services for resources hosted on AWS.

Northwestern

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