Modern Resale Platform on AWS

AWS Re-factor Modernization Case Study

Executive Summary

Recurate is a Series A startup ($17.4M total funding amount) with a growing portfolio of clients. The company offers a resale platform for digital commerce and retail businesses. Recurate is growing fast and with aggressive timelines. Therefore, the executive team has engaged with IO Connect Services to design and implement the next generation of the organization's resale platform offerings.

The Challenge

Recurate's MVP is a self-managed semi-monolithic containerized solution that requires constant server rebooting and manual scaling for the proper operation.

The multitenancy approach is rudimentary and delivers content to each client based on a column identifier in the database. This product is a single point of failure, as any application downtime affects all the clients, disrupting the service for everybody. Recurate needed to add more and larger clients to their portfolio. Therefore, a new scalable solution was required to warranty the company's future success.

Why AWS

AWS has been the cloud vendor of choice for Recurate since the beginning. Although the initial architecture leveraged other SaaS to execute some of the use cases, Recurate knew there was more potential in using AWS for these and future use cases. Not only for the infrastructure and hosting point of view but as a cloud platform for application integration.

The extensive services range in AWS offered multiple options to execute different migration or modernization strategies. In this case, AWS Serverless technologies were perceived as the foundation to build the next version of the solution to go to market more efficently: services like AWS Lambda, Amazon SNS, Amazon SQS, Amazon API Gateway, and Amazon DynamoDB, among others.

About Costumer

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Recurate is a tech-enabled resale service that empowers brands and retailers to establish their integrated resale platforms directly on their e-commerce sites. More customers. More sales. More sustainable.

Recurate focuses on designing a superior resale experience for customers that welcomes them into a brand's ecosystem. Their technology integrates with all e-commerce backends and works with each brand to get the look, feel, and functionality just right.

The Solution

At IO Connect Services, we have a cloud-native manifest for startups focusing on business value and product KPIs to build technical solutions. We selected AWS Serverless to shorten development cycles and go to market timelines.

The new platform needed to warranty a real SaaS B2B (business to business) solution. Therefore, we designed the new architecture with the following principal requirements: 1) Each tenant is isolated from the others, and the data and other assets are unique and only accessible to a particular tenant. 2) A new client should be onboarded quickly, regardless of the geographical region, with a target of hours to minutes in future phases. 3) A particular tenant can have custom business logic and composing integrations. 4) A new feature should be customizable for premium tenants and can automatically be released to standard client accounts. 5) SLAs and performance metrics must be standard for all tenants; a higher utilization client must not impact other accounts. 6) All transactions must be auditable.

We managed the new solution as a green field scenario to start fresh. The team decided to implement a multi-account mechanism to address the multitenant-related requirements. We provisioned an AWS Account per B2B client. AWS Organizations was set up with AWS Control Tower to govern all the accounts. With this approach, each tenant is isolated in their account without sharing data access and without competing for service limits and other resources. Moreover, this tactic reduces the blast radius of vulnerabilities and threats and eases the complexity of compliance by providing mechanisms to separate access to resources.

The solution's architecture was designed with a cloud-native approach using AWS Serverless technologies as much as possible. The objective was to rely on tthese services' out-of-the-box features and configurations o leverage the AWS investment. The design had an API-led first approach with a Microservices architecture implemented with Amazon API Gateway and AWS Lambda. We used queues and publisher-subscriber mechanisms with Amazon SQS and Amazon SNS to decouple transactions and to warranty consistent SLAs. All the Lambdas were orchestrated with AWS X-Ray, and activity logs were submitted to Amazon CloudWatch Logs to provide accurate traceability, troubleshooting analysis, and auditing.

We selected Amazon DynamoDB, a No-SQL database, to keep writing and reading times constant and to keep the schema flexibility of the data to be stored, as some premium clients could use different data models. Eventual consistency was a crucial factor in designing asynchronous transactions that could help scale the volume substantially.

"AWS Serverless"

Modern applications are built serverless-first, a strategy that prioritizes the adoption of serverless services, so you can increase agility throughout your application stack. AWS has serverless services for all three layers of your stack: **compute**, **integration**, and **data stores.**

Best Features of AWS Serverless Solution

- Reduced Cost
- Elastic Scalability
- Faster Releases
- Multi-Language Support

To ensure fault tolerance and no data loss during the execution of the microservices, each Lambda implemented a unit of work transaction pattern, and each queue had a corresponding DLQ (dead-letter-queue) to save and quarantine the transaction in case of any failure. A specific message can be replayed without affecting the rest of the business logic.

Our DevOps team created CI/CD pipelines to rapidly deploy new code consistently using AWS CodePipeline and AWS CodeCommit as a Git repository for code and template versioning. Also, we implemented an IaC (Infrastructure as Code) approach to provision assets in AWS consistently and automatically.

Results and Benefits

Because all workloads were designed following a serverless approach, the generated code focuse solely on business needs rather than infrastructure or other non-business-related functions. Using serverless shortened development cycles, the project delivery was on time despite the aggressive deadlines and some last-minute changes in requirements.

Recurate worked with IO Connect Services as an extension of their team. Collaboration was in real-time and in the same time zone, which was crucial to meeting timelines. Besides, Recurate was able to obtain a substantial cost benefit. On average, our nearshore rates are 30% to 50% of those of onshore resources with similar skills.

We ran a load test to provide consistent numbers in throughput, and the results met expectations based on the architectural and design patterns. Each tenant account can handle gracefully more than one thousand transactions per second (1K TPS). Each request besides JSON payload included a couple of images sizing 2 Megabytes per request. These numbers were reached without requesting service limits in any of the services used. Therefore, the platform can easily handle hyper-scaling volumes.

A selection of premium global clients were onboarded in a few days; one deployed in a European region for the UK market. The solution is GDPR-read, and provides a significant advantage to winning new businesses in the European market. Also, the multi-account flexibility allows the client to service faster digital content to the users in low-latency regions closer to them.

Recurate is confident to onboard new clients rapidly. The leadership team is optimistic that the new solution is bringing them to the next level as an organization. They are ready to fast-track new funding rounds with better and proven results.

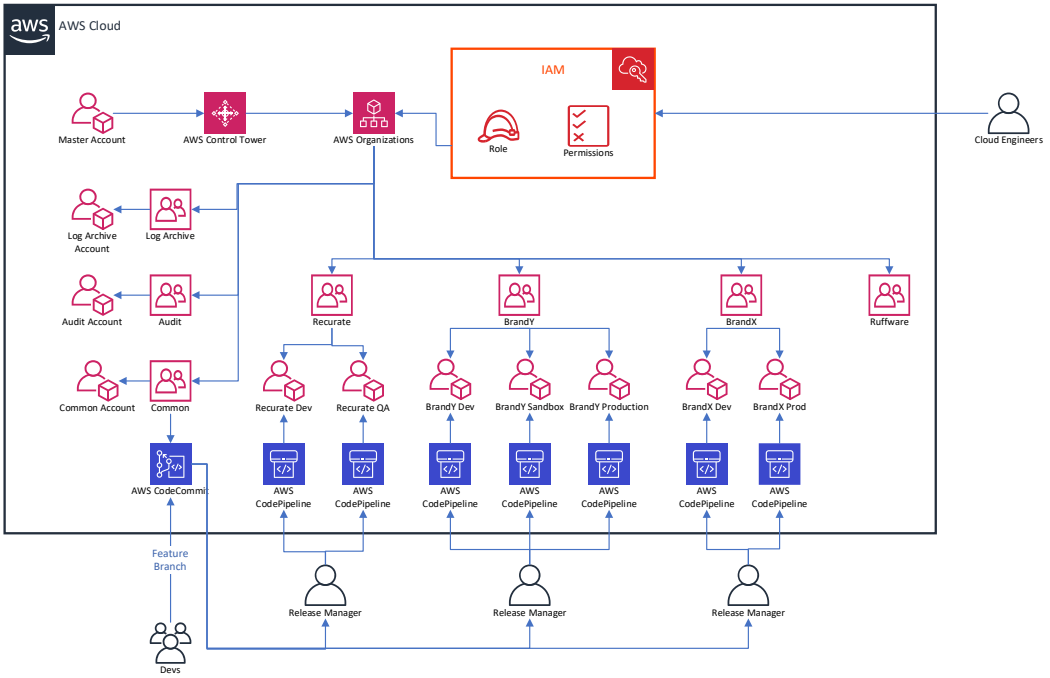

Figure 1. Multi-account approach with AWS Organizations, AWS Control Tower, and CI/CD Pipeline setup

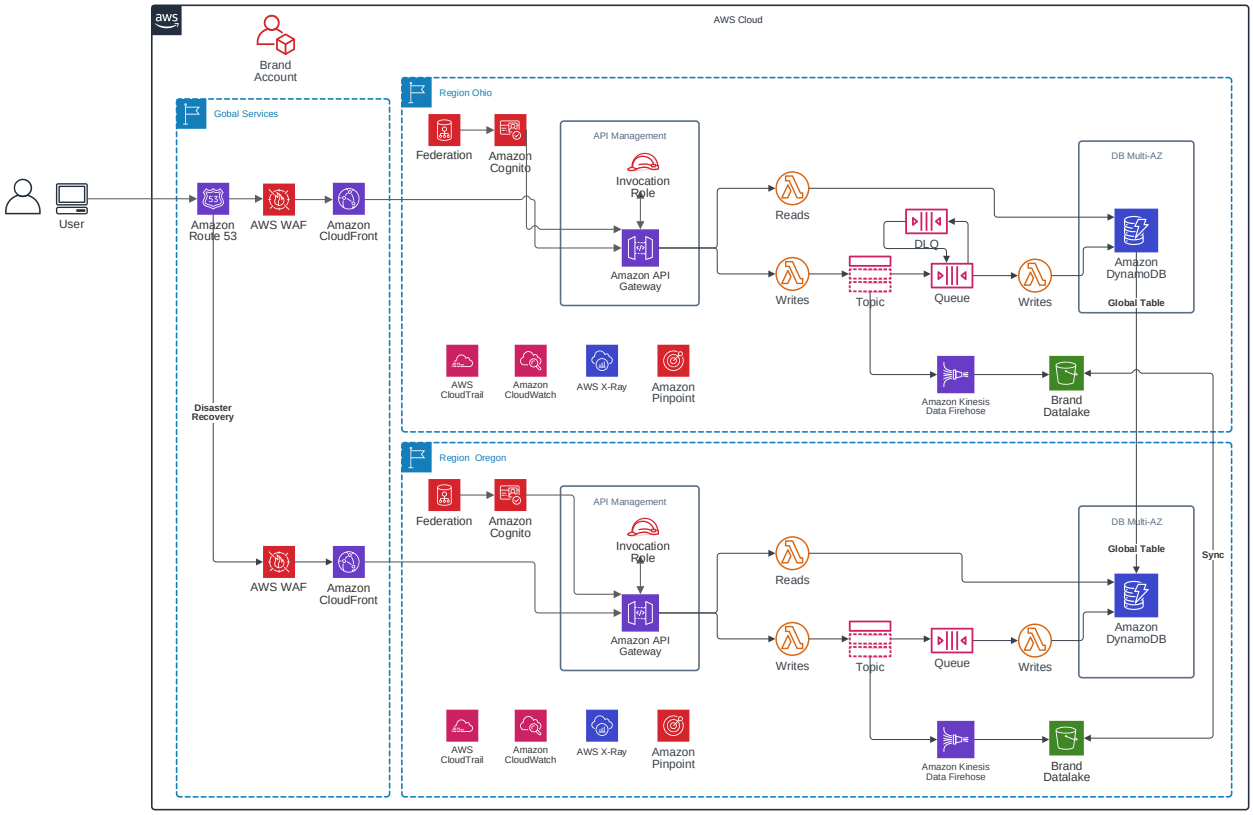

Figure 2. High-level architecture of the patterns and services used in Recurate's platform

Next Steps

There are new requirements to address and others evolving over the time. The main objective is for new standard accounts to onboard with a “one-click deployment” solution. For premium accounts requiring customizations, the goal is to reduce the time to a few days or weeks. Although the foundations of IaC with the CloudFormation templates are available, further automation is required to achieve this goal.

Evolving requirements for more sophisticated BI (business intelligence), data analytics, and potential ML (machine learning) use cases are some of the following priorities. Also, Recurate wants to support other commerce platforms by providing native integrations without any extra coding efforts.

Superior Performance

The serverless approach provides a fast, resilient, and high-availability environment for the application.

Low TCO

Save money by replacing physical hardware with expensive license fees, with AWS you pay for what you use.

Fully Managed

With fully managed resource provisioning, maintenance, and backup, deployments are more efficient.

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About IO Connect Services

IO Connect Services is a company specializing in Information Technology Consultancy Services. All our team members have one thing in common: our enthusiasm for technology and our passion for customer service excellence. We provide services in all North America, LATAM and Europe. Our headquarters are in NYC metropolitan area, and we also have offices in Guadalajara, Mexico and Madrid, Spain.