Custom Email Campaign Management Solution

Introduction:

Businesses often rely on third-party platforms, such as Mailchimp or HubSpot, to manage email campaigns. While these services are user-friendly, they become prohibitively expensive as the number of contacts and emails grows—often reaching hundreds of dollars per month. For organizations sending large volumes of campaigns, these costs significantly impact budgets without offering enough flexibility in data ownership, reporting, or integration.

To address this challenge, we designed and implemented a custom email campaign management solution using AWS services. The goal was to replace costly third-party tools with a scalable, serverless architecture that not only reduces operational costs but also offers full control over data, reporting, and campaign execution.

Our system empowers users with a web-based dashboard to create, launch, and monitor campaigns. It integrates with Amazon SES for email delivery, DynamoDB for event storage, and Lambda functions for automation, ensuring scalability and efficiency at a fraction of the cost of traditional providers.

Client Details:

Name: Confidential | **Industry:** Media & Entertainment, Software | **Location:** USA

Technologies:

- **AWS Services:** Amazon SES, Amazon S3, Amazon DynamoDB, Amazon SNS, AWS Lambda, Amazon API Gateway, Amazon CloudFront
- **Frontend:** HTML/CSS/JavaScript (S3-hosted portal with CloudFront distribution)
- **Authentication:** Basic authentication with CloudFront functions
- **Reporting:** Custom HTML/PDF reports generated via Lambda

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Application Workflow

The project was organized into four major components:

1. Campaign Management Dashboard

A **single-page web portal** hosted on Amazon S3 and fronted by CloudFront serves as the main interface for admin users.
Features include:

- Viewing best-performing campaigns with KPIs (sent, delivered, opened, clicked, bounced, complaints).
- Searching, filtering, and sorting campaigns.
- Generating reports with customizable sections (e.g., bounce list, complaint list, per-link click breakdown).
- Uploading new contact CSV files for upcoming campaigns.
- Managing campaign drafts and publishing campaigns directly from the portal.

2. Contact Ingestion

Users upload campaign-specific CSV files (containing email addresses, names, and metadata) directly through the dashboard.

- CSV files are stored in **Amazon S3**.
- An **ingestion Lambda** validates and processes these files, then stores contacts in **DynamoDB**.
- Draft campaigns can be created from these contact lists until the user publishes them.

3. Campaign Execution

Campaigns are launched from the portal via **API Gateway → Lambda → Amazon SES**.

- The Lambda formats campaign emails and instructs SES to deliver them.
- This architecture allows sending millions of emails at SES pricing—orders of magnitude cheaper than Mailchimp.

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- SES ensures compliance, deliverability, and bounce/complaint handling.

4. Event Tracking & Reporting

When emails are sent, **SES generates events** (deliveries, opens, clicks, bounces, complaints).

- Events are pushed to **Amazon SNS**, where a subscribed **Lambda function** processes them.
- Data is stored in **DynamoDB** for long-term analysis.
- A **report builder Lambda** aggregates metrics and generates professional HTML/PDF reports with engagement stats and per-link insights.
- Reports can also enrich contact data with CRM/Leads DB details (name, company, etc.) for deeper insights.

Architecture:

1. **Admin User** logs into the **Dashboard Web Portal** (S3 + CloudFront).
2. The portal communicates **wi**th backend **Lambda functions via the API Gateway**.
3. **Contact Uploads**: CSVs uploaded to **S3** → processed by **Lambda** → stored in **DynamoDB**.
4. **Campaign Launch**: Portal triggers Lambda → **SES sends campaign emails**.
5. **Event Tracking**: SES events → **SNS Topic** → **Lambda handler** → stored in **DynamoDB**.
6. **Reports & Dashboard**: Metrics pulled from DynamoDB → shown in the portal or emailed as reports via SES.

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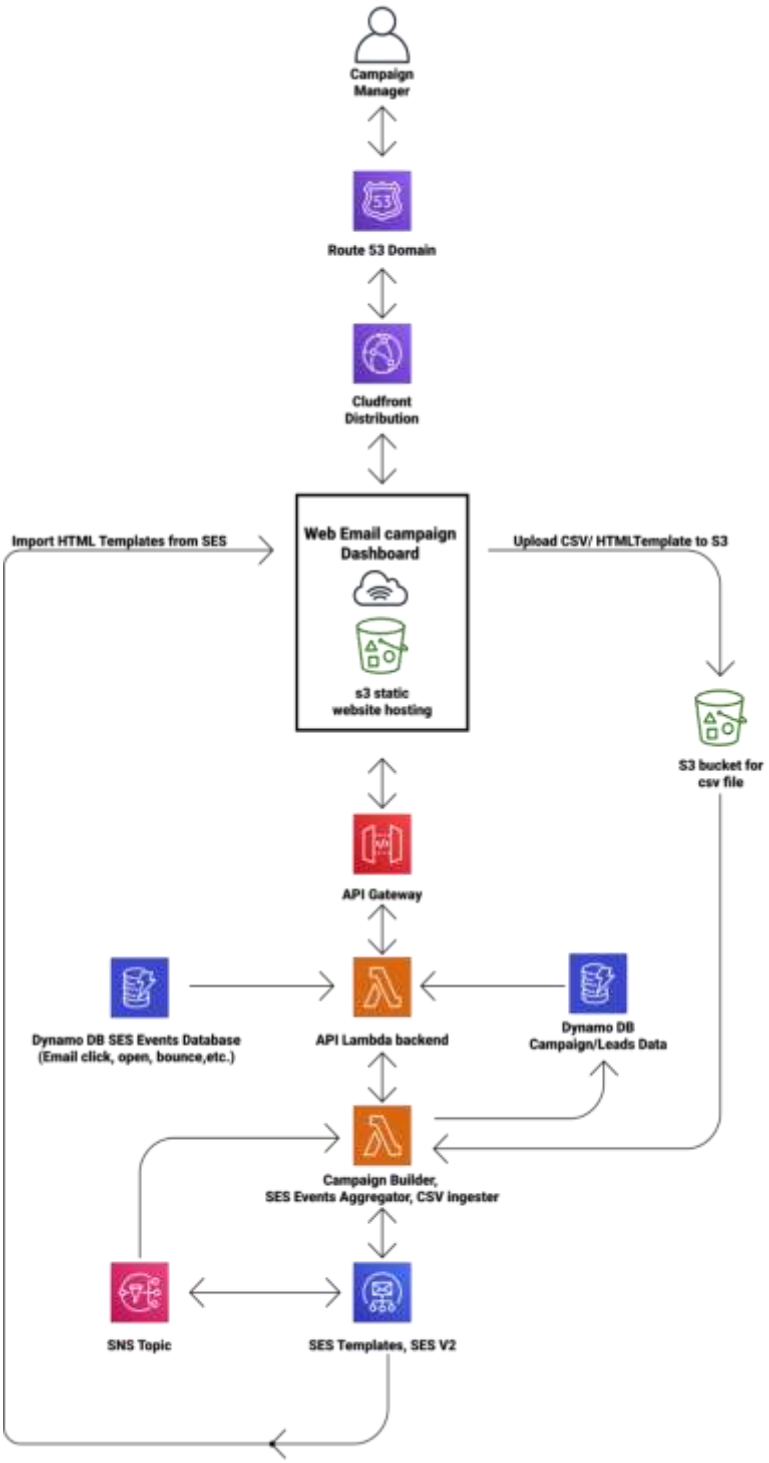
Architecture Diagram:



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Outcomes & Benefits

- **Cost Savings**: Reduced email campaign costs by up to **90% compared to Mailchimp**, especially for high-volume campaigns.
- **Full Data Control**: All campaign events, contacts, and metrics are stored in DynamoDB under the client's control.
- **Scalability**: Serverless AWS design scales automatically with campaigns of any size.
- **Customization**: Reports are fully tailored—something third-party platforms charge extra for.
- **Ease of Use**: A modern, intuitive dashboard enables non-technical users to manage the entire campaign lifecycle.

Conclusion

This project successfully demonstrates how businesses can replace costly third-party email campaign tools with a scalable, serverless solution on AWS. By leveraging SES, S3, Lambda, DynamoDB, and CloudFront, the system delivers full control over campaigns, transparent reporting, and seamless automation—at a fraction of the cost. With its cost efficiency, scalability, and customizable features, the platform empowers organizations to run high-volume campaigns while maintaining complete ownership of their data and insights.

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Screenshots: