

FM-01

# Full-stack web and mobile development with cloud-based backends

Stefano Sandrini (he/him)

Principal Solutions Architect

Amazon Web Services



# Agenda

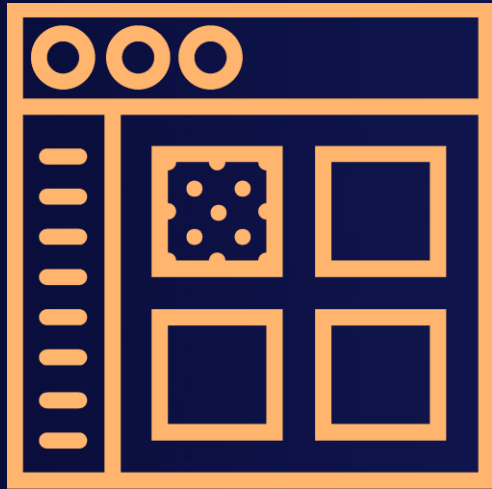
Current challenges in building web and mobile applications

Accelerating development across the full stack

How to develop feature-rich full-stack applications on AWS

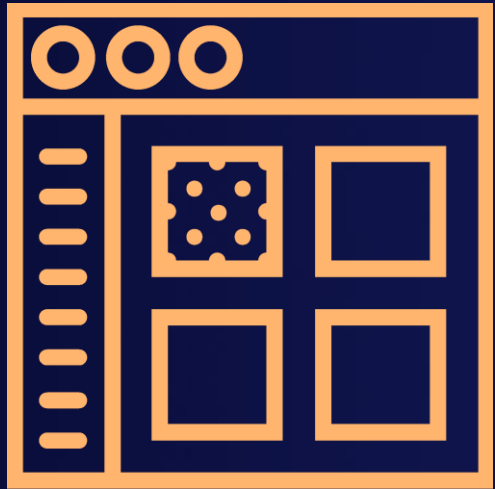
How to support critical workloads at scale

# Front-end development



Front-end developers build what users see

# Front-end development



14M web developers



10M mobile developers

# Evolution of front end



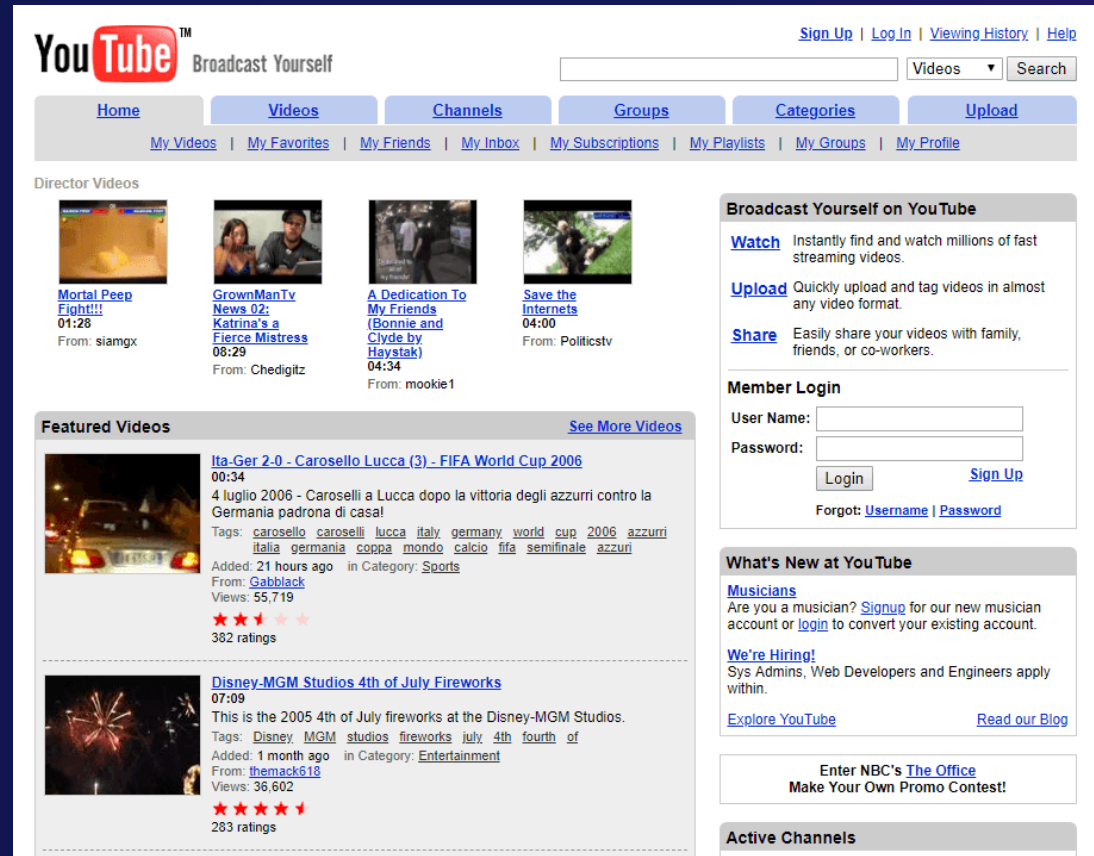
# Types of apps: The '90s

The screenshot shows the Amazon.com homepage with a navigation menu on the left and a main content area. The navigation menu includes links for Text Only, SEARCH BY (Author, Title, Subject, Keyword, ISBN, Advanced Query), BUY BOOKS (Shipping Cart, Checkout), SUPER ROOM (Computer & Internet), MILES OF AISLES (Business, Science Fiction, Nonfiction, Literary Fiction, Romance, Children's Books, And Many More...), LISTS (Titles in the News, Bestsellers, Award Winners, Amazon.com \$0.00, Top 50, Mystery 50, Literary 50, Computer 50, Business 50, Science Fiction 50), ARTICLES & INTERVIEWS (Amazon.com Journal, Espectra, In Their Own Words), SIGN-UP (Eyes, Expert Editors), BIG FUN (Win Prizes, Virtual Play?, Customer Reviews), and PARTNERS (Associates, Publishers, Authors). The main content area features a welcome message, a search bar, and a list of books for sale, including "The God of Small Things" by Arundhati Roy and "The Perfect Storm" by Sebastian Junger.

The screenshot shows the GeoCities homepage with a navigation menu at the top and a main content area. The navigation menu includes links for Main, Neighborhoods, Featured Content, Members, and Ma. The main content area features a welcome message, a search bar, and a list of neighborhoods categorized by interest, including FREE HOME PAGES AND E-MAIL, ARTS AUTOS BUSINESS COMPUTERS CULTURE, EDUCATION ENTERTAINMENT ENVIRONMENT FAMILY FASHION, FOOD GAMES GAY & LESBIAN GOVERNMENT HEALTH, and KIDS MUSIC PEOPLE RECREATION SCIENCE F. The page also displays the date and time: Saturday, 14-Feb-98 19:06:49 PST, and the number of members: ONE MILLION members.

Static content with hyperlinks

# Types of apps: The 2000s



Social media, feature-rich sites such as Facebook and YouTube



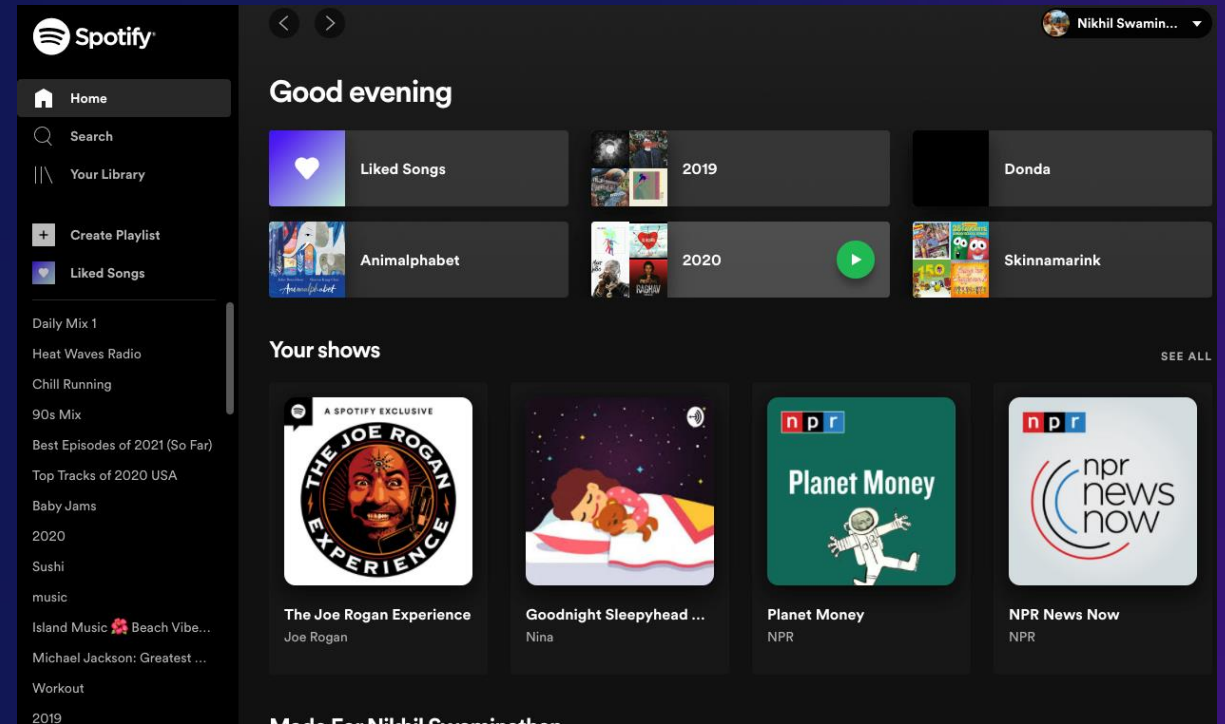
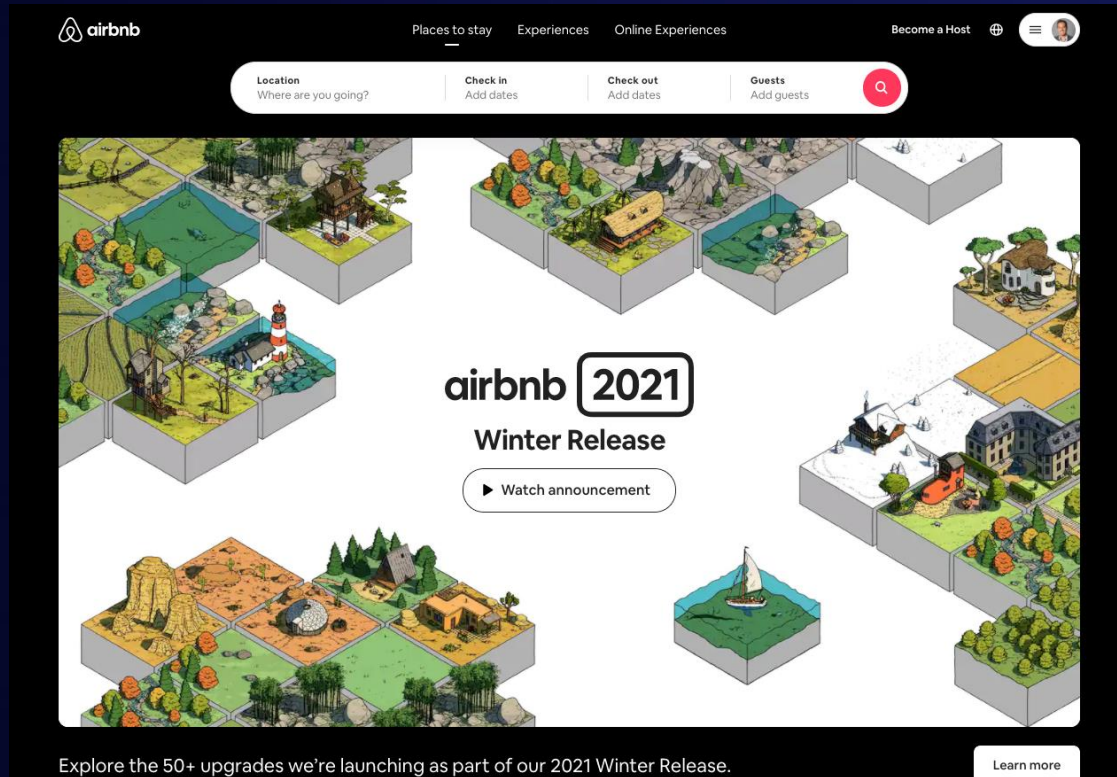
# 2007: The iPhone



Apps were born – feature-rich and performant using device context



# 2010 to present



Web apps – responsive, performant, feature-rich

**How have these changes  
impacted the responsibilities  
of a front-end developer?**

# Full-stack app



# Full-stack app

Backend

Front-end



Database

Servers

Server-side languages

API

Frameworks

Javascript

CSS

HTML



**Serverless**

**Node –  
JavaScript in  
the front end  
and back end**

**GraphQL allows  
front end  
developers to  
query/mutate  
data**

# Full-stack app

Backend

Front-end



Database

Servers

Server-side languages

API

Frameworks

Javascript

CSS

HTML



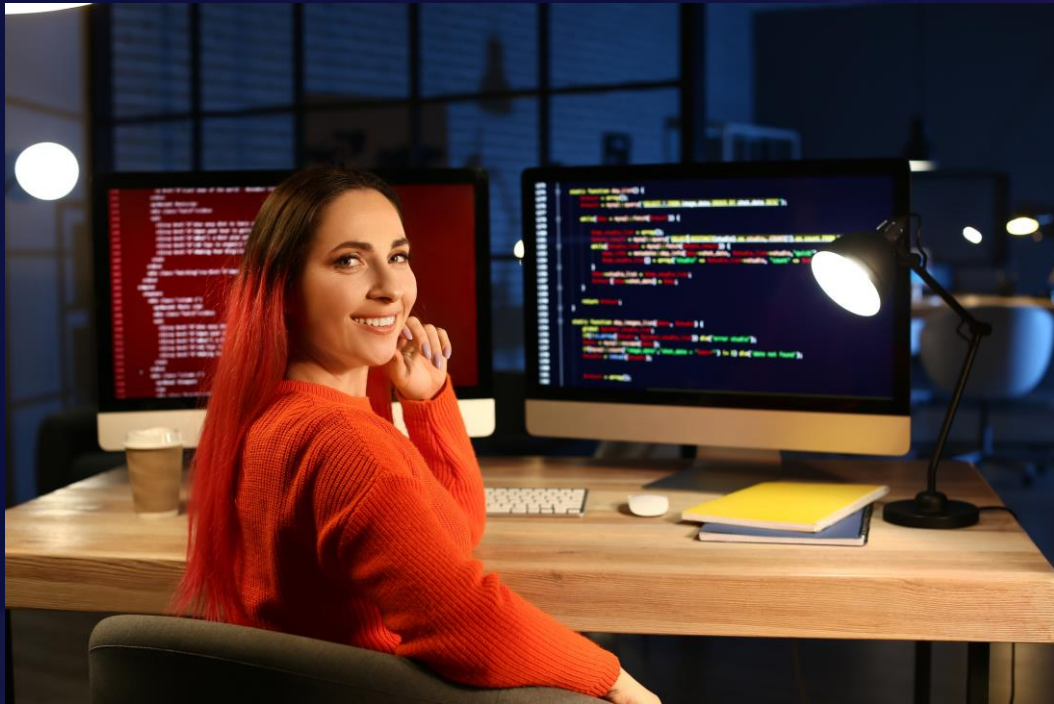
**Front-end developers are increasingly responsible  
for building full-stack functionality**

# How to Simplify Increased Complexity?

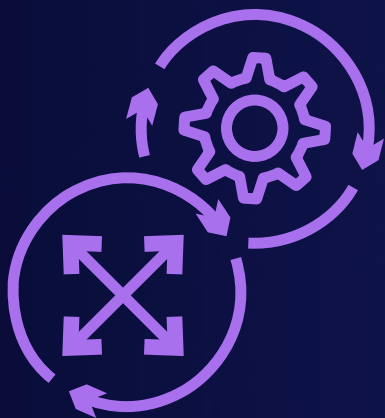


Security  
Online/Offline access  
Cost  
Development time  
Frameworks  
Quality  
Device fragmentation  
Scale  
Locality  
Performance

Front-end developers need solutions that integrate with current tools and workflows and draw on existing skillsets to **accelerate development across the full stack**

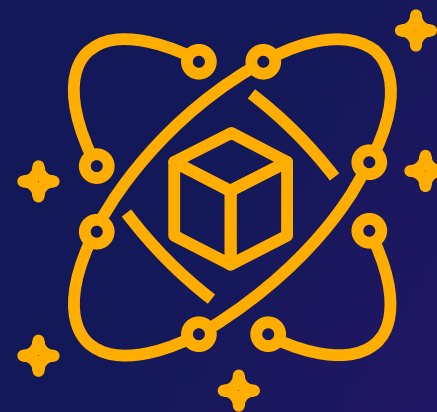






## Modern application development

- Requires an **integrated, seamless** experience with tools that meet front-end developers where they are
- Enables developers to **innovate faster** with confidence



## AWS can help you

- Accelerate **extensible, feature-rich, full-stack** application development
- Support **critical, high-scale** workloads

**AWS can** increase the productivity of front-end developers  
enable individuals, small teams, and enterprises to  
build meaningful, well-architected applications  
provide a broad range of services to support your  
business goals



AWS Amplify



AWS Device Farm



Amazon Location  
Service



AWS AppSync

**You can** accelerate application development,  
increase productivity, and innovate faster



AWS Amplify

We built AWS Amplify to make it easy for front-end developers  
to build full-stack apps

# AWS Amplify provides tools for front-end developers to build, ship, and scale their app

## Build



Configure AWS  
backends fast



Seamlessly  
connect  
front ends

## Ship



Deploy your app  
front end and  
backend

## Scale



Use CDK to  
override, add,  
and export  
resources

# Build and manage app backend

## BUILD



Configure AWS  
backends fast



Seamlessly  
connect frontends



CLI



Studio



Libraries

## Feature categories



Authentication



Analytics



DataStore



PubSub



Storage



Predictions



API (GraphQL & REST)



Interactions



Functions



Notifications



Geo



Extensibility

*Powered by AWS services such as  
AWS AppSync (GraphQL API), Amazon Location Service (Geo),  
and Amazon Cognito (Authentication)*

# Build and manage app backend

Model data and relationships to set up a GraphQL API powered by AWS AppSync

Set up authentication and authorization

Set up file storage

Extend with the CLI toolchain to add functions

Manage app data, files, users, and groups

The screenshot displays the AWS AppSync console's 'Data' tab, which is used for defining the data models and relationships for an application. The interface includes a sidebar on the left with navigation options: Home, Manage (Content, Users), and Set up (Data, Auth, Function, Storage, REST API, Analytics, Predictions, Interactions, Notifications). The main area is titled 'Data' and contains a 'Save and Deploy' button. It features three model configuration panels: 'Vote', 'Candidate', and 'Election'. Each panel has a 'Field name' and 'Type' section, and a 'Relationship name', 'Related to', and 'Cardinality' section. The 'Vote' model has an 'id' field of type 'ID' and a relationship 'candidates' to the 'Candidate' model with a cardinality of 'm:n many Votes...'. The 'Candidate' model has 'id' (ID), 'firstname' (String), 'lastname' (String), and 'electionID' (Relationship Source) fields, and a relationship 'votes' to the 'Vote' model with a cardinality of 'm:n many Candi...'. The 'Election' model has 'id' (ID), 'name' (String), and 'deadline' (AWSDate) fields, and a relationship 'candidates' to the 'Candidate' model with a cardinality of '1:n one Election...'. Each panel also includes '+ Add a field' and '+ Add a relationship' links.

Home

Manage

- Content
- Users

Set up

- Data
- Auth
- Function
- Storage
- REST API
- Analytics
- Predictions
- Interactions
- Notifications

Data

View & edit your app's data models, add fields, and relationships.

Model Test

Save and Deploy

Add Model

☐ Vote

Field name	Type
id	ID

+ Add a field

Relationship name	Related to	Cardinality
candidates	Candidate	m:n many Votes...

+ Add a relationship

☐ Election

Field name	Type
id	ID
name	String
deadline	AWSDate

+ Add a field

Relationship name	Related to	Cardinality
candidates	Candidate	1:n one Election...

☐ Candidate

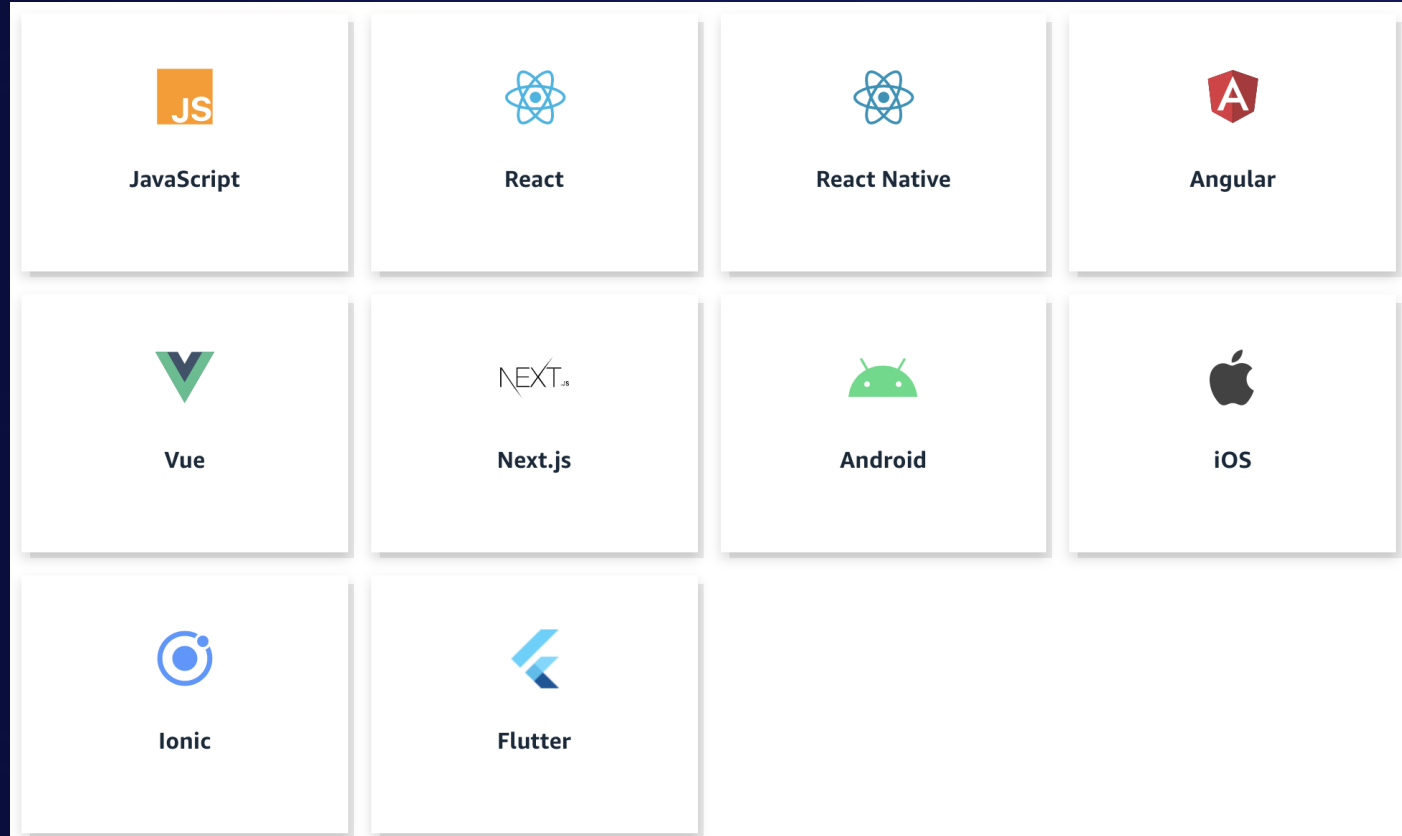
Field name	Type
id	ID
firstname	String
lastname	String
electionID	Relationship Source

+ Add a field

Relationship name	Related to	Cardinality
votes	Vote	m:n many Candi...

+ Add a relationship

# Connect app using Amplify libraries



Front-end libraries for web, iOS, Android, React Native, and Flutter



# Ship faster with Amplify Hosting

Fully managed hosting service  
for modern web apps

Full-stack continuous  
deployments

Easy custom  
domain setup

PR previews


Frontend environmentsBackend environments

This tab lists all connected branches, select a branch to view build details.

Connect branch

dev

Continuous deploys set up with [devs](#) backend [\(Edit\)](#)



<https://dev...amplifyapp.com>

✓

Provision

✓

Build

✓

Deploy

✓

Verify

Last deployment

10/13/2020, 9:24:05 AM

Last commit

This is an autogenerated message | Auto-build | [GitHub](#)  
- [dev](#)

Previews

Disabled

aws

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# Scale with the Amplify CLI

## Modify

```
amplify override ...
```

Override Amplify  
provisioned services  
with new features

## Add

```
amplify add custom
```

Use CDK to add new  
functionality to Amplify  
backend

## Export

```
amplify export
```

Export Amplify  
backend to your own  
DevOps pipeline

**“Using AWS Amplify on a serverless architecture cost us 90 percent less than if we had built the app using a more traditional method. This is a huge win for us.”**

**Hemanth Jayaraman**

Senior Director of Cloud Engineering, Neiman Marcus

**“Busby’s results with Amplify, both in terms of speed to market and cost-savings, speak for themselves. A mere three months from the time I started using Amplify, we had a full-fledged MVP that was ready for use by cyclists and to be shown to investors. Our team estimated that choosing Amplify saved us six months of development time and well over \$100,000 in outside development costs.”**

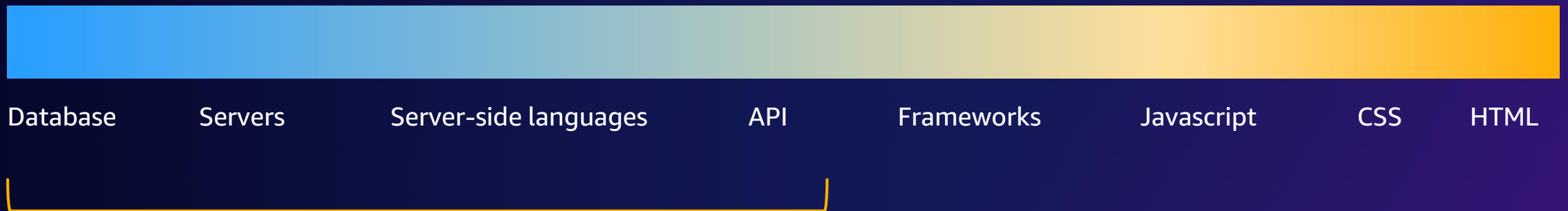
**Kirk Ryan**

Co-founder - Busby

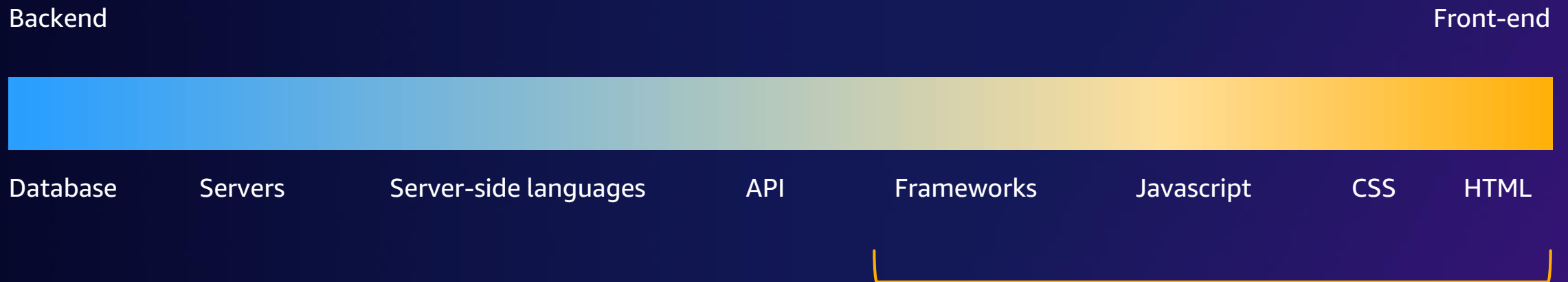
# Until now, our focus has been to help front-end developers accelerate building and connecting to an app backend

Backend

Front-end



Front-end developers also tell us that building UI is time-consuming and a manual process



A solution to help facilitate the designer-developer handoff, ensuring that developers incorporate pixel-perfect UI designs

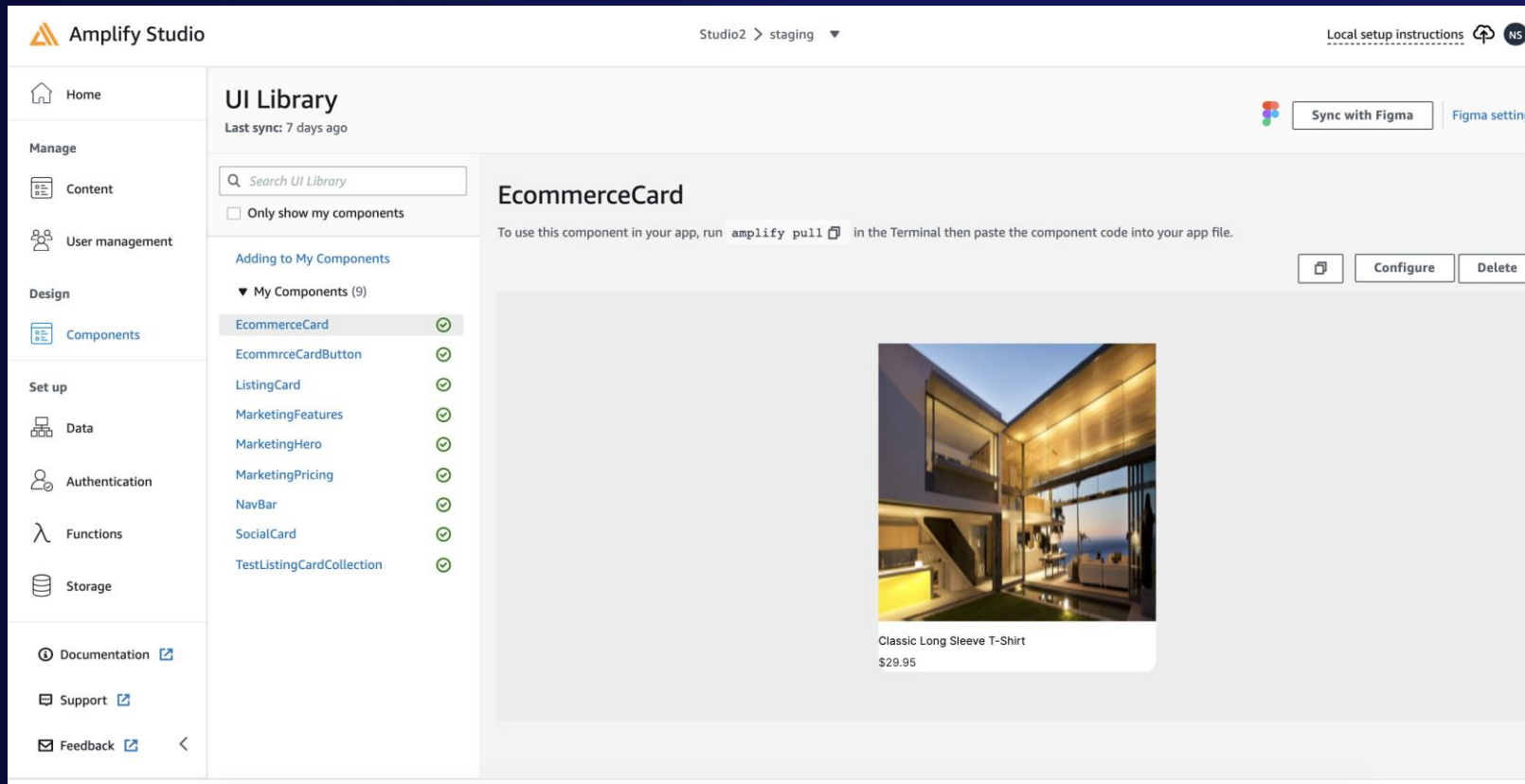
# **Amplify Studio**

## **Accelerate UI app development**



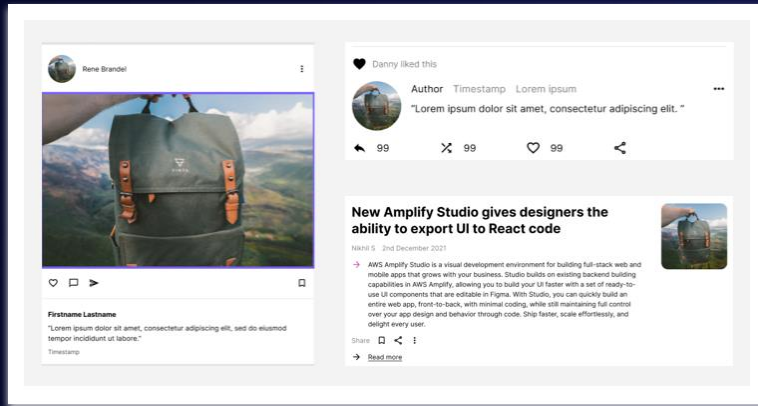


# Amplify Studio



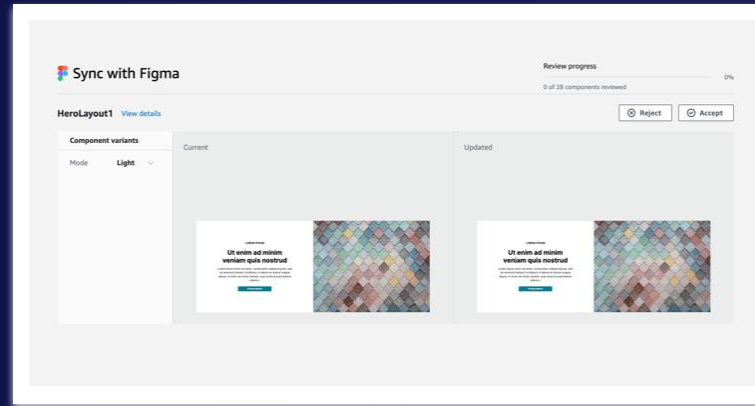
Visually build complete, feature-rich apps in hours instead of weeks, with full control over the application code

# Accelerate UI app development



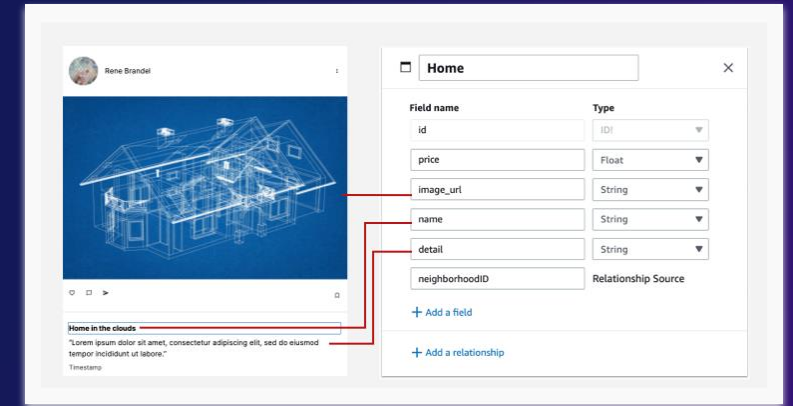
## Pre-built UI component library

Select from dozens of popular React components, such as buttons, forms, and marketing templates, and customize them to fit your style guide



## Figma design-to-code approach

Import Figma prototypes built by designers into Amplify Studio as clean React code for seamless collaboration



## Front-to-back configuration

Visually bind your front-end UI components in your layout to data sources in your cloud-connected app backend in clicks

# Demo



Console Home [Info](#)

Actions ▼

Recently visited [Info](#)

AWS AppSync



CloudFormation



CloudFront



Lambda



CloudWatch



S3



Cognito



CloudShell



RDS



IAM



AWS Glue



X-Ray



AWS Cost Explorer

## Welcome to AWS

[Getting started with AWS](#)

Learn the fundamentals and find valuable information to get the most out of AWS.

[Training and certification](#)

Learn from AWS experts and advance your skills and knowledge.

[What's new with AWS?](#)

Discover new AWS services, features, and Regions.

AWS Health [Info](#)

Open issues

0

Past 7 days

Scheduled changes

0

Upcoming and past 7 days

Cost and usage [Info](#)

Current month costs

\$139.95

Forecasted month end costs

\$1,360.18

Up 2% over last month

## Top costs for current month



Amazon Kinesis

\$27.69



AWS AppSync

\$26.87



Amazon Elastic Container Service

\$17.89

# Amplify Studio UI app development

- Set up UI components within Figma
- Sync components to Studio as React code
- Build an app backend with a database and GraphQL API
- Extend app features by writing code
- Zero-configuration, Git-based workflow for full-stack CI/CD and hosting



AWS Device Farm

Improve the quality of your web and mobile applications by testing  
across **desktop browsers** and **real mobile devices** hosted  
in the AWS Cloud



AWS AppSync

Build scalable applications  
on a range of data sources, including those requiring  
**real-time updates** and **offline data access**



# AppSync Common Use Cases

- GraphQL Microservices
- Unified API for accessing data from data lake
- IoT real-time dashboard
- High throughput real-time fanout to millions of clients
- Real-time currency changes, stock prices, account balance
- Display live tv and video metadata
- Chat and second screen communication within live broadcast
- Field service apps where offline support is critical



## Amazon Location Service

Securely and easily add location functionality to applications  
Track assets and resources, Routing and delivery, Visualization,  
Customer engagement

**AWS can** increase the productivity of front-end developers  
enable individuals, small teams, and enterprises to  
build meaningful, well-architected applications  
provide a broad range of services to support your  
business goals



AWS Amplify



AWS Device Farm



Amazon Location  
Service



AWS AppSync

**You can** accelerate application development,  
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# Learn in-demand AWS Cloud skills



## AWS Skill Builder

Access **500+ free** digital courses and Learning Plans

Explore resources with a variety of skill levels and **16+** languages to meet your learning needs

Deepen your skills with digital learning on demand



Train now



## AWS Certifications

Earn an industry-recognized credential

Receive Foundational, Associate, Professional, and Specialty certifications

Join the **AWS Certified community** and get exclusive benefits



Access **new** exam guides

# Thank you!

Stefano Sandrini

stefano@amazon.com

@electricste





Please complete  
the session survey