Mastering AWS Amplify Hosting

A Full-Stack Lifecycle Guide: From Code to Scale

A comprehensive deep dive into deploying, configuring, securing, and scaling modern web applications using AWS Amplify. This guide moves beyond the basics to cover advanced architectural patterns, CI/CD pipelines, and enterprise-grade security hardening.

The One-Stop Shop for Modern Web Apps

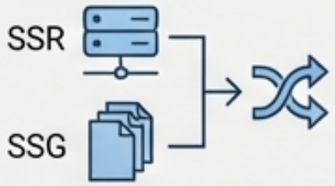
Amplify Hosting

CI/CD Pipeline

Fully managed, zero-config deployments triggered via Git.

Compute & Static

Hybrid support for SSG (Static) and SSR (Server-Side Rendering).



Global Delivery

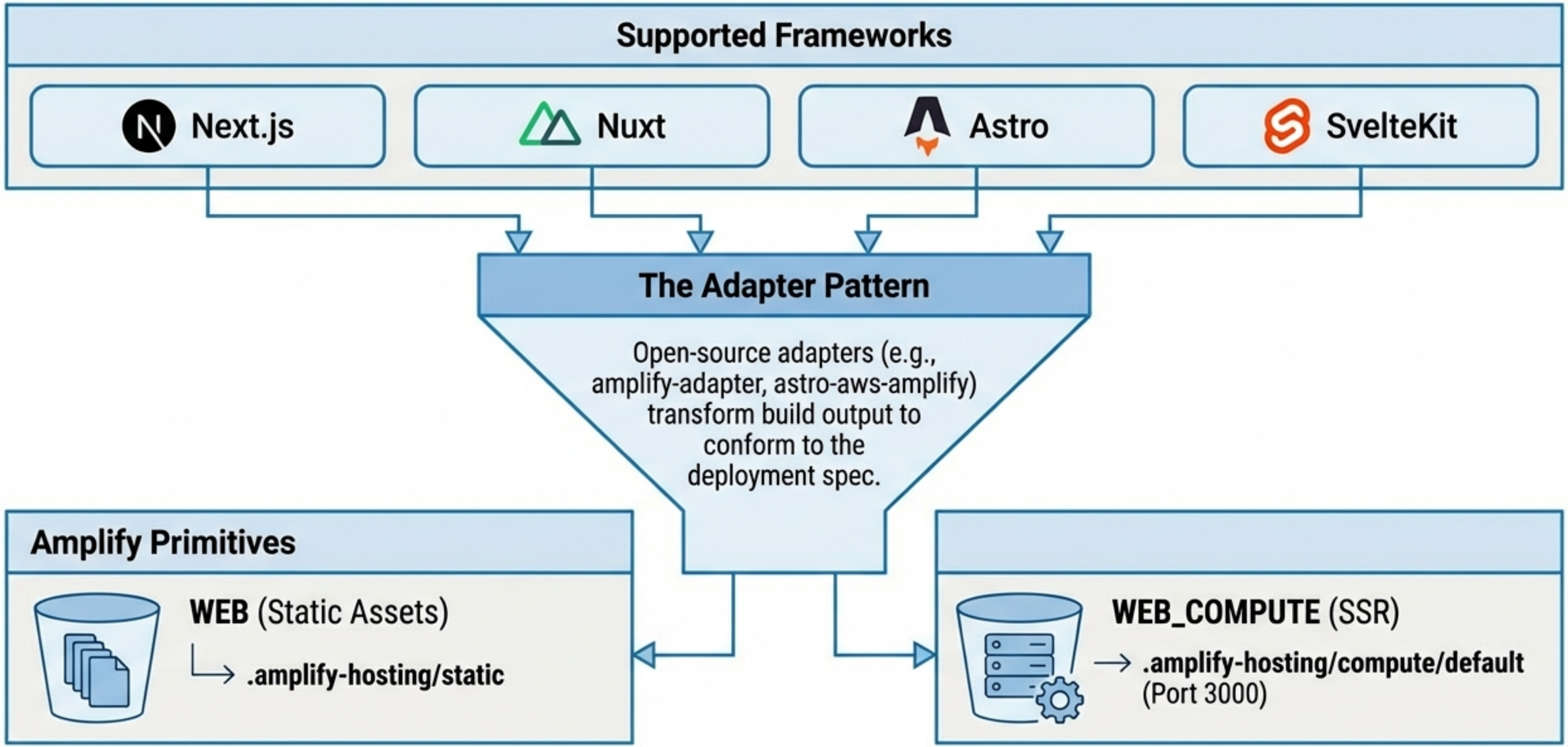
Content served via AWS Global Edge Network (CDN).

Pull Request Previews

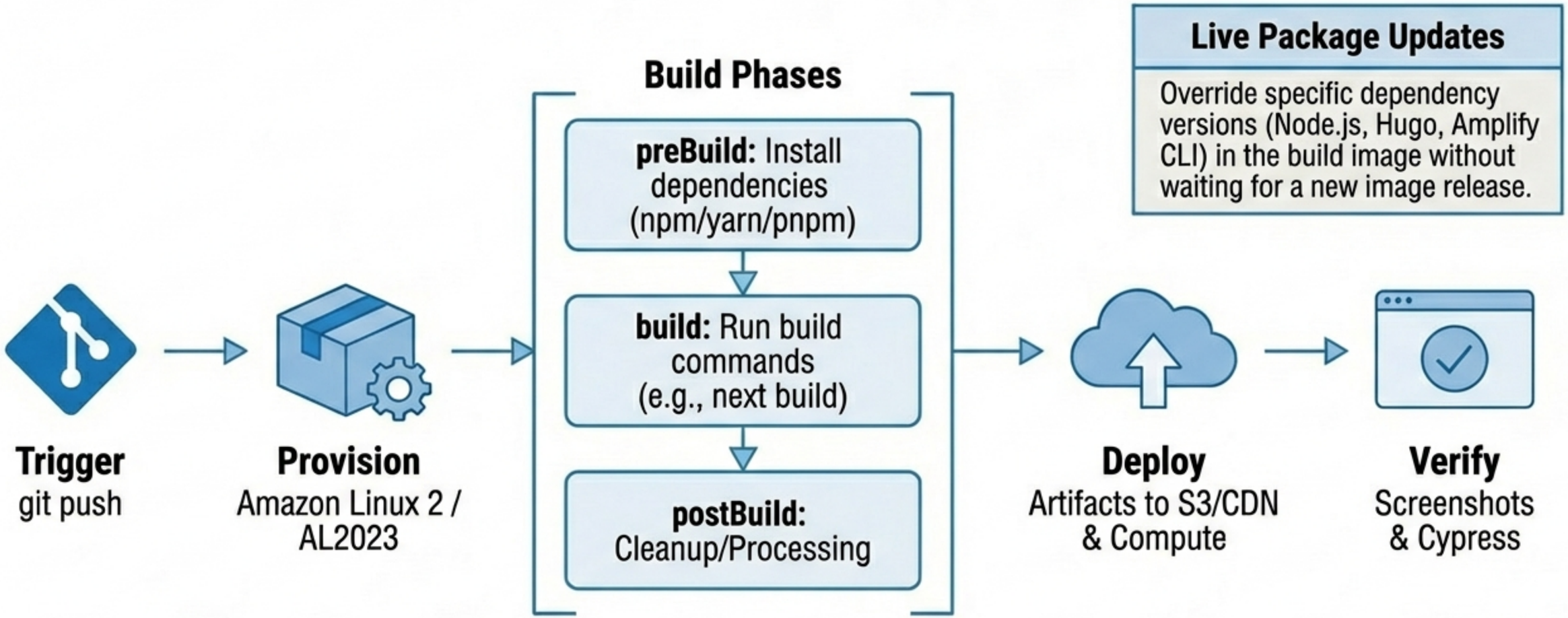
Ephemeral environments for code review.

Amplify Hosting abstracts the complexity of S3, CloudFront, and Lambda@Edge, providing a unified workflow for frontend and full-stack developers.

Framework Ecosystem & The Adapter Pattern



The Continuous Deployment Pipeline

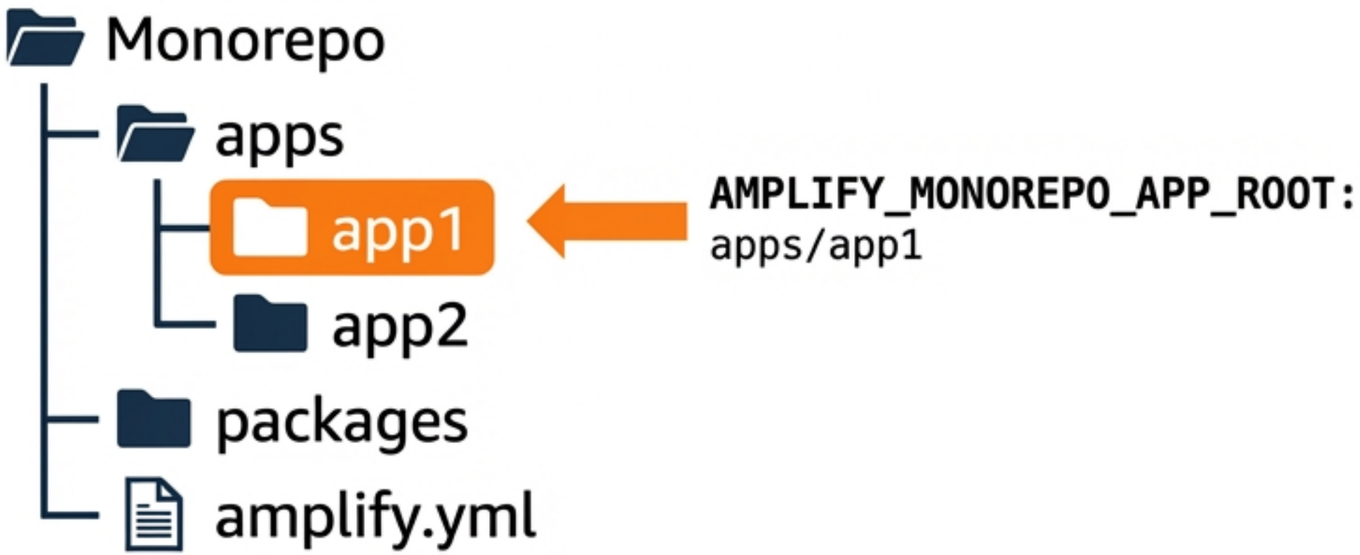


Scaling Workflows: Monorepos & Teams

The Challenge

Managing multiple apps (e.g., apps/react-app, apps/angular-app) in a single repository leads to complex build triggers and pathing issues.

The Solution



Pattern-Based Deployments: Automatically connect branches matching regex patterns (e.g., `feature/*`). Use **`AMPLIFY_DIFF_BACKEND`** to skip builds if folders haven't changed.

Configuring the Build: The amplify.yml Spec

```yaml
version: 1
frontend:
  phases:
    preBuild:
      commands: ['npm ci']
    build:
      commands: ['npm run build']
  artifacts:
    baseDirectory: .next
    files: ['**/*']
  cache:
    paths: ['node_modules/**/*']
```

Define custom build scripts here.

Critical: Set to .next for Next.js, "build" or "dist" for others.

Speed up builds by caching node_modules. Use "!" to exclude paths.

Technical Editorial

Environment Variables & Secrets Management

Variables

For standard configuration (e.g., API endpoints).

- System Variables: AWS_BRANCH, AWS_COMMIT_ID
- User Variables: API_ENDPOINT, THEME_COLOR
- Hierarchy: Branch overrides take precedence over App overrides.

Secrets (SSM)

For sensitive data (Keys, Passwords).

- Never store secrets in plain text.
- Use AWS Systems Manager (SSM) Parameter Store.
- Naming Convention: /amplify/{app_id}/{env_name}/{parameter_name}
- Access: Available in build via process.env, encrypted at rest.

Technical Editorial

Traffic Control: Redirects & Rewrites

If This -> Then That

Source	Target	Type	Use Case
/old-page	/new-page	**301** (Permanent)	SEO-friendly moves
/promo	/temporary-promo	**302** (Temporary)	A/B Testing
/<*>	/index.html	**200** (Rewrite)	SPA Routing (React/Vue)
/missing	/404.html	**404** (Not Found)	Custom Error Pages

SPA Regex Rule:

```
</^[^.]+$|\.(?!(css|gif|ico|jpg|js|png|txt|svg|woff|ttf|map|json)$)([^.]+$)/> → /index.html
```

Technical Editorial

Going Live: Custom Domains & SSL

Add Domain

root & www

Verification

Amplify issues validation CNAME

DNS Config

User adds CNAME to registrar

SSL Issue

ACM provisions certificate

DNS Record

Verify records in your domain registrar match these records.

Verification record

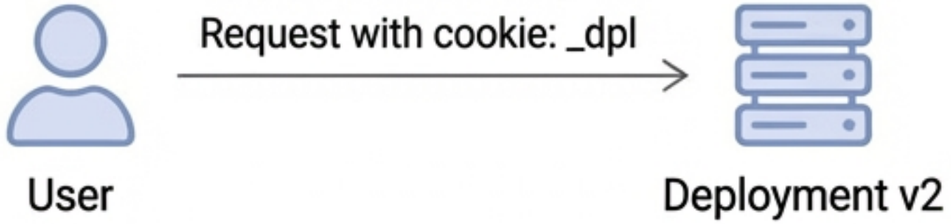
Hostname	Type	Data/URL
_39e1e8d7e0aedc8165cf52a176612124.testexample.com.	CNAME	_40404fb1d5a2a1bdec5b4ad98de4cfbb.mhbtsbpdnt.acm-validations.aws.

Technical Editorial

Performance Optimization: Caching & Skew Protection

Global CDN Caching

- **Directives:** `max-age` (browser), `s-maxage` (edge)
- **Optimization:** Tune `s-maxage` to override default 1-year TTL for dynamic content.



Skew Protection

Ensures clients requesting assets from an older session (v1) don't get 404s when a new deployment (v2) goes live.

Image Optimization: Built-in support for Next.js `next/image` (WebP/AVIF).

Technical Editorial

The Shield: Security & Access Control

Web Application Firewall (WAF)

Rate limiting, IP blocking, SQL injection protection, XSS defense. Managed via AWS WAF.

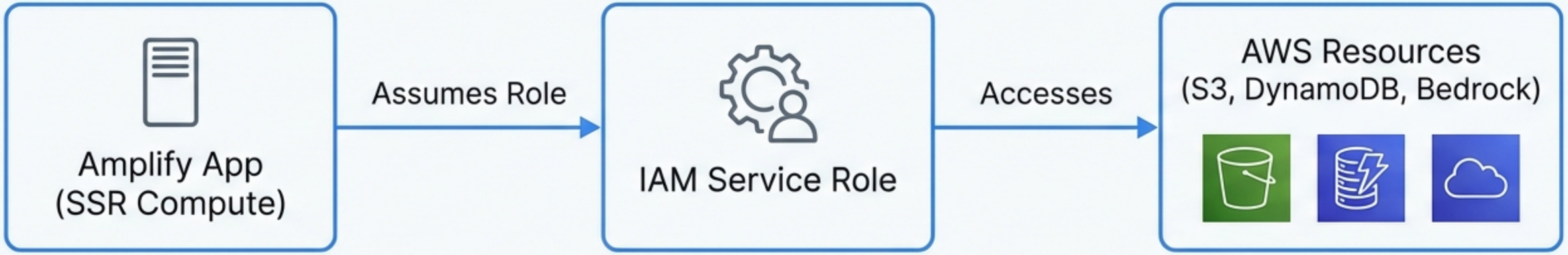
Access Control

Basic Auth (Username/Password) for dev/feature branches. Password protection prevents public access during development.

Web Application Firewall (WAF)

Rate limiting, IP blocking, SQL injection protection, XSS defense. Managed via AWS WAF.

IAM Integration & The “Confused Deputy”



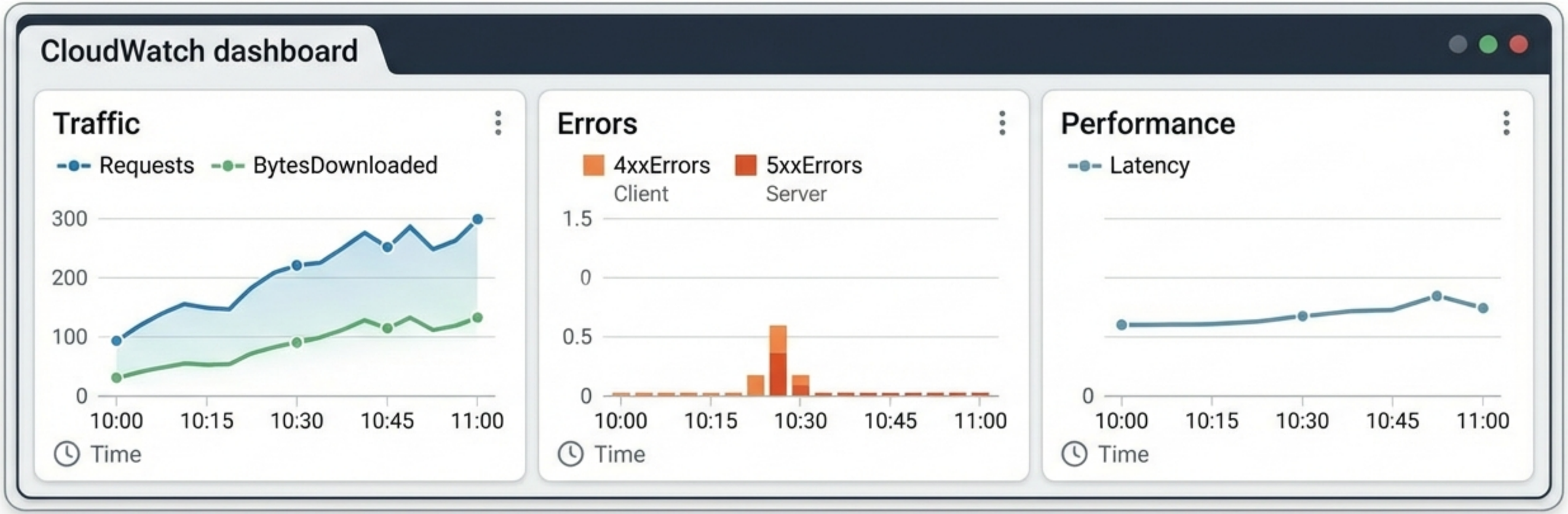
Preventing the Confused Deputy

```
{
  "Condition": {
    "ArnLike": {
      "aws:SourceArn": "arn:aws:amplify:region:account:apps/appId/*"
    }
  }
}
```

Trust policies must enforce aws:SourceArn to ensure only YOUR specific Amplify app branch can assume the role.

Technical Editorial

Observability: Monitoring & Logging



- **Access Logs:** Detailed request logs (IP, User Agent, Status).
- **SSR Logs:** Real-time streaming of console.log from Lambda@Edge/Compute.

Troubleshooting Common Pitfalls

Build Failed: Command not found

Fix: Check package.json engines vs Build Image (AL2 vs AL2023).

SSR Access Denied

Fix: Ensure SSR Compute Role has specific IAM permissions (e.g., s3:GetObject).

Domain Pending Verification

Fix: Verify CNAME resolution. If using Cloudflare, disable 'Orange Cloud' proxy during verification.

SPA Returns 404

Fix: Missing Rewrite rule. Map </^[^.]+$.../> to index.html.

Technical Editorial

Developer Toolkit & Next Steps

Ready-to-Deploy Resources

aws-samples/aws-cdk-examples
Infrastructure as Code patterns.

aws-samples/aws-serverless-airline-booking
Full GraphQL & CI/CD example.

aws-samples/amazon-sagemaker-generativeai
Integrating GenAI models.

Documentation Deep Dives

- Amplify Hosting Deployment Specification
- Fullstack Gen 2 Workflows (TypeScript-first)

Start Building: Connect a repository and deploy a ‘Hello World’ to the global edge today.