The JAMstack

Matt Biilmann, 2017
Matt Biilmann
CEO, Netlify
Publishing for the modern web
Building thousands of websites

7 years in Spain, 2 CMSs, 10k+ websites
Building a fully hosted CMS

Moved to the Bay Area, built a managed CMS for the legacy stack
Trends: Git, MicroServices, JS

- Git vs FTP
- Microservices
- Modern Javascript (ES6)
The Web Needs a Paradigm Shift

For the last 15 years the web has been built on the fly, causing ever increasing issue with:

- **Security**
  7% of all legacy sites hacked

- **Performance**
  Single origin, builds for every visitor, low conversion

- **Scalability**
  Infrastructure needs scaling up front
Security

In February, 1.5 million web pages across about 40,000 websites got defaced on a single day.

In April a separate attack left 120,000 sites vulnerable.

Last month, a vulnerability in a plugin left more than 300,000 legacy sites open to attacks.
4% of people have *thrown their phone* while using a slow mobile site.
Reliability

Database missing!

Looks like the database got lost somewhere....
Don't worry though! We'll recover it!
In the mean time, you can read the last 10 posts here on FeedBurner.

SumTips.com
The Evolution of the Web

Unix Model
~1970-1997

Legacy Web
(The site needs to be built EVERY time it’s served)
~1997-Today

Modern Web
Now
A New Stack

Decoupled Architecture + Git Centric Workflow = A Better Web

10x Faster
No more malware
Infinitely scalable
JavaScript
Any dynamic programming during the request/response cycle is handled by JavaScript, running entirely on the client. This could be any frontend framework, library, or even vanilla JavaScript.

APIs
All server-side processes or database actions are abstracted into reusable APIs, accessed over HTTP with JavaScript. These can be custom-built or leverage third-party services.

Markup
Templated markup should be prebuilt at deploy time, usually using a site generator for content sites, or a build tool for web apps.
MATHIAS BIILMANN
THE NEW FRONT-END STACK: JAVASCRIPT, APIs AND MARKUP

SMASHING CONFERENCE
SAN FRANCISCO
Building an Open-Source Eco-System

**NetlifyCMS**
Netlify CMS is the first CMS for the new age of Git-centric web development. It is completely build tool agnostic and works with storing structured content in Git. A CMS for site generators. Netlify-CMS gives non-technical users a simple way to edit and add content to any site built with a site generator.
https://www.netlifycms.org

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Contribute on GitHub ➔
A Smashing Architecture

- Netlify CMS
- Front-end
- Hugo + Webpack
- GitHub
- Browser
- Micro Services
Vitaly Friedman wrote —— ABOUT 1 MONTH AGO

A Little Surprise Is Waiting For You Here — Meet The Next Smashing Magazine

# Smashing Magazine ³  # Redesign ⁶

Anastasia Shevchuk wrote —— ABOUT 2 MONTHS AGO

The Art Of Calligraphy: Getting Started And Lessons Learned

# Inspiration ⁴⁰⁹  # Typography ¹²¹  # Fonts ⁹⁵
Authentication Microservice

Meow in!
You know that feeling when you miss sunshine? Yep, *that* is how much we missed you. *Welcome back.*

Your (smashing) email

Memorable password (no restrictions!)

Keep me meowed in (argh, signed in!)

Sign into your dashboard →

FORGOT PASSWORD? • SIGN UP! I LIKE CATS, TOO!
A self-standing API service for handling user registration and authentication, accessible with client-side JavaScript using the **GoTrue JS** library.

- Handles user signup, authentication, and custom user data
- Based on OAuth2 and JSON Web Tokens (JWT)
- Built in Go, accessible via client-side JS
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~1970-1997

Legacy Web  
(The site needs to be built EVERY time it’s served)  
~1997-Today

Modern Web  
Now
Authenticating - Client <-> Server

Unix Model

Stateful Protocol
Authenticating - Client <-> Server

Unix Model

Modern Web

~1970-1997

~1997-Today

Now
Authenticating - Web Monolith

Legacy Web
(The site needs to be built EVERY time it’s served)

CLIENT

WEB SERVER

APP SERVER

DATABASE

HTTP - Stateless Protocol
Authenticating - Web Monolith

Legacy Web
(The site needs to be built EVERY time it's served)

CLIENT

WEB SERVER

APP SERVER

DATABASE

Browser

Server

DB

user/pw

Session ID (Set-Cookie)

Request (Cookie)

Response (HTML)

User Lookup

Create Session

Lookup Session
Authenticating - Micro Services

Modern Web

CLIENT

CDN

SERVICES

?
How do we get an access token?
API Authentication

SPA

| BROWSER | CDN | API |

OAuth2

Auth flow options:

- Resource Owner Password Credentials
- Implicit Grant
- Authorization Code
API Authentication

SPA

Browser

Request (Token)

Response (JSON)

Server

Lookup Session

DB

BROWSER

CDN

API
Authenticating - Micro Services

Modern Web

 CLIENT

 CDN

 SERVICES

 ?
Authenticating - SPA
Authenticating - JAMstack
Authenticating - JAMstack
Authenticating - JAMstack

- Tight Coupling
- Single Point of Failure
- Slow Performance
Authenticating - Micro Services

Modern Web

CLIENT

CDN

SERVICES

JWT
Authenticating - Micro Services

Modern Web

What is a JWT?

• A JWT is just a string
• It has 3 parts: **header**.**payload**.**signature**
• It is signed with a secret and can be verified
What is a JWT?

```
eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJzdWIiOiIxMjM0NTY3ODkwIiwibmFtZSI6IkpvaG4gRG9lIiwiaWQiOiAiYWRtaW4iOnRydWV9.TJVA95OrM7E2cBab30RMHrHDcEfXjoYZgeFONFh7HgQ
```
Authenticating - Micro Services

Modern Web

CLIENT

CDN

SERVICES

HEADER: ALGORITHM & TOKEN TYPE

```json
{
    "alg": "HS256",
    "typ": "JWT"
}
```

PAYLOAD: DATA

```json
{
    "sub": "1234567890",
    "name": "John Doe",
    "admin": true
}
```

VERIFY SIGNATURE

```javascript
HMACSHA256(
    base64UrlEncode(header) + "." +
    base64UrlEncode(payload),
    secret
)
```

secret base64 encoded
What is a JWT?

- Token identifies user (“sub” claim)
- Token can authorize the user (“trust”)
- Token can include display data
Authenticating - JAMstack
JWT Authentication

SPA

Browser

API

Request (JWT)

Verify Signature + Claims

Response (JSON)
Authenticating - Micro Services

Modern Web

API Gateways

Kong
Gotiator
AWS API Gateway
Netlify Microservice Gateway
API Authentication

SPA

Browser

Gateway

API

Request (JWT)

Verify Signature + Claims

Response (JSON)

Proxy (token)
Netlify Identity

User roles:
- User
- Editor
- Writer
- Admin

Account metadata:
- Name: Ellen Ripley
- Email: allenkilla@wallencorps.com
- Connected accounts: GitHub, Facebook
- Avatar:

Identity
Auth and user management
## Content Management

<table>
<thead>
<tr>
<th>TITLE</th>
<th>Firebreathing Dragons</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHORT TITLE</td>
<td>Inclusive Design Patterns</td>
</tr>
<tr>
<td>SUBTITLE</td>
<td>Bulletproof accessible HTML/CSS components</td>
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<tr>
<td>SKU</td>
<td>inclusive-design-patterns</td>
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<td>EBOOK SKU</td>
<td>inclusive-design-patterns-by-heydon-pickering-ebook</td>
</tr>
<tr>
<td>AUTHOR</td>
<td>Heydon Pickering</td>
</tr>
</tbody>
</table>

We might not realize it, but as developers, we build inaccessible websites all the time. It’s not for the lack of trying, though — it’s a
An open-source CMS for your Git workflow

- Content management in a single-page app
- Built in React.js with extensible components
- Integrate with any build tool
- Plug in to any static site generator

Find out more ➔
Try it out ➔
Make it better ➔

As seen on...

SMASHING MAGAZINE
Decoupled E-commerce

Shipping Address — You are entitled for FREE shipping!

First name

Last name

Country

Postal code

City

App/Suite (optional)

Company (optional)

☑️ Use my shipping address as my billing address.

☐ I just like ticking off large checkboxes!

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Smashing Book #5: Real-Life Responsive Web Design

Book

1 × $39.00

Discount code

Cash in!

SUBTOTAL

$39.00

SHIPPING

FREE

PAY BY CARD OR PAYPAL

FREE

EXP. DELIVERY

MAR 22

TOTAL USD

$39.00

Continue to Payment Details →
A headless e-commerce API with client-side JavaScript integration using the GoCommerce JS library.

- Handles orders and payments
- Integrates with Stripe or PayPal
- Supports international pricing and VAT verification
- Built in Go, accessible via client-side JavaScript
Handle 200,000 comments!

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Let’s Continue The Talk!

#JAMstack
jamstack.org
gitter.im/jamstack/community

@biilmann