



# Web App Capabilities & Considerations

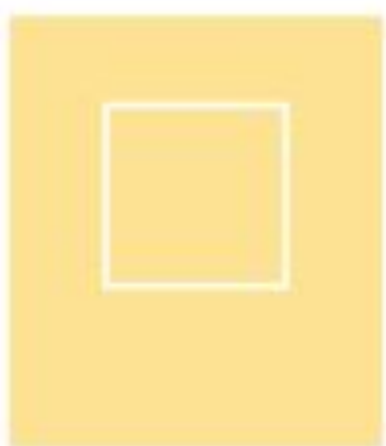
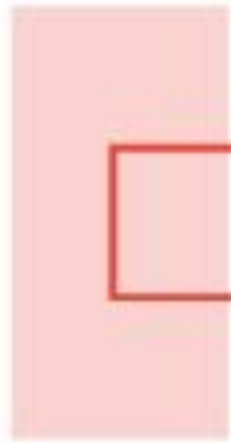
Speaker: Nicholas Mendez

Social: @snickdx

Website: <https://nicholasmendez.dev>

Event Website: <https://devfest.gdgpos.com>

# Web Capabilities





# Add Features to your Application

- Applications can do more than just store data
- Web applications can talk more aspects of the hardware via Standard Web APIs
- Examples
  - Web Bluetooth
  - Web USB
  - Camera Access
  - File System Access
  - Geolocation
  - Vibration
  - Gyroscope & Accelerometer



## What Web Can Do Today

Can I rely on the Web Platform features to build my app?  
An overview of the device integration HTML5 APIs

<https://whatwebcando.today/>



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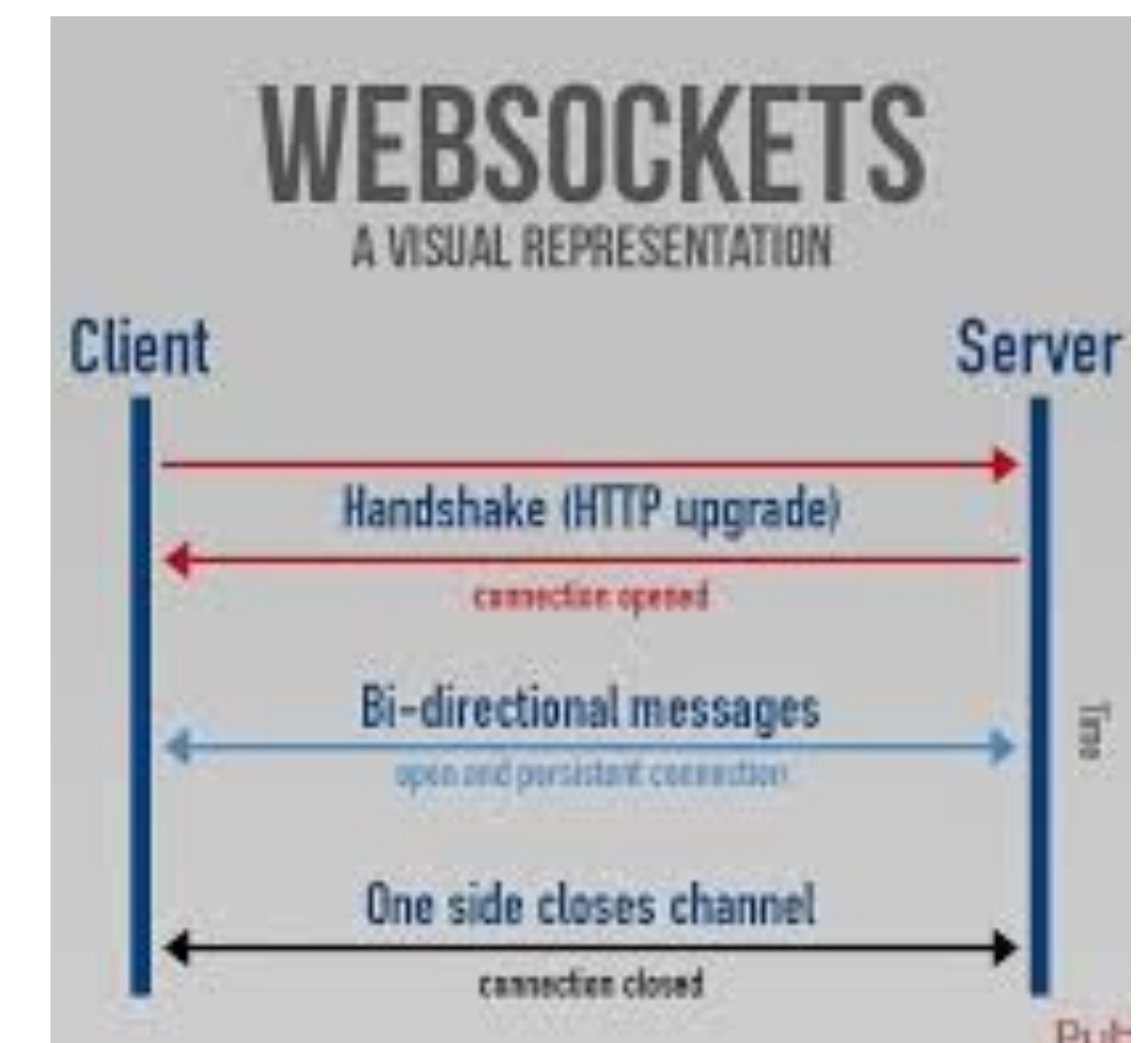


# More features you should consider

- Web Workers: Background Threads
- Web sockets: Real time client-server connection
- Web RTC: P2P communication & streaming
- Indexed DB: Local Database in the browser
- Web Cache: Cache assets and data in the browser
- Web Assembly: Byte code which allows native apps to run on the web
- Shape Detection API
- Speech Recognition API
- Web Bundles
- Web Portals
- Web Share



Web Bundle



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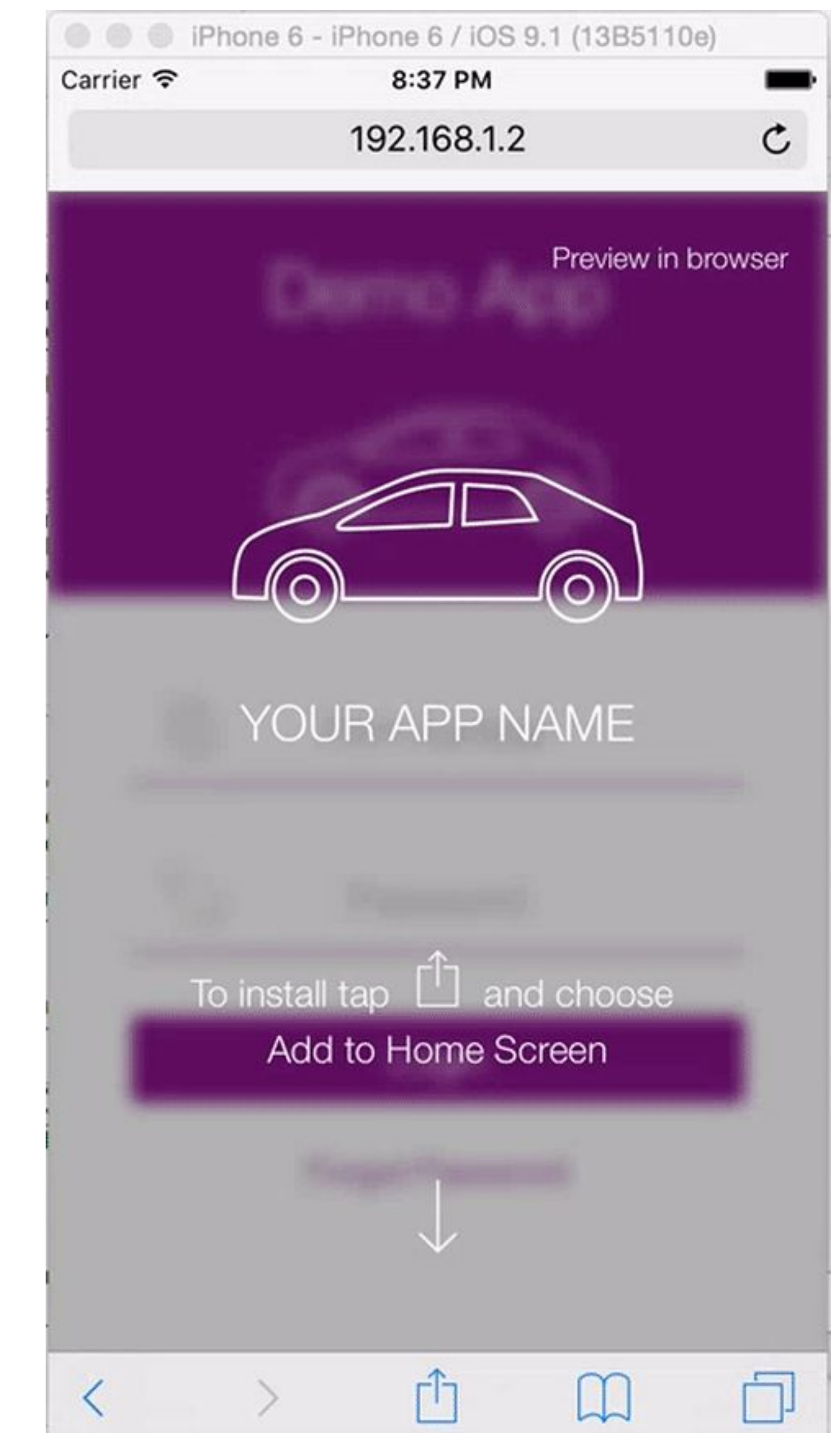
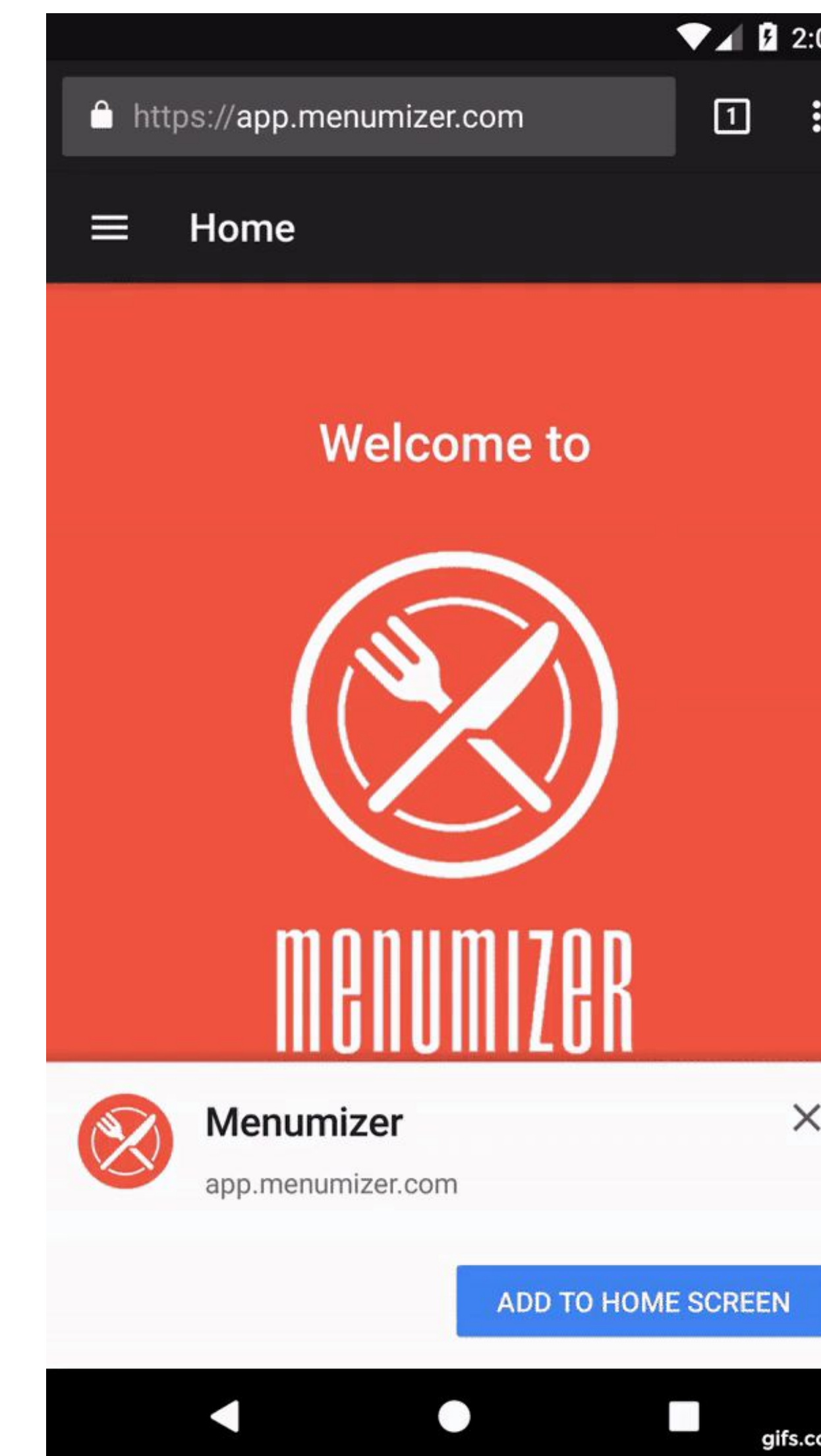


# Progressive Web Applications

- Web application which make use of the web manifest and the Service Worker API can become Progressive Web Applications

## PWAs

- PWAs unlock native like features for web applications such as :
  - Offline Mode
  - Background Synchronization
  - Push Notifications
  - Installation
- PWAs are a popular alternative to native apps because:
  - The larger reach of the web
  - Smaller Application size
  - Easier to development
  - Cross Platform



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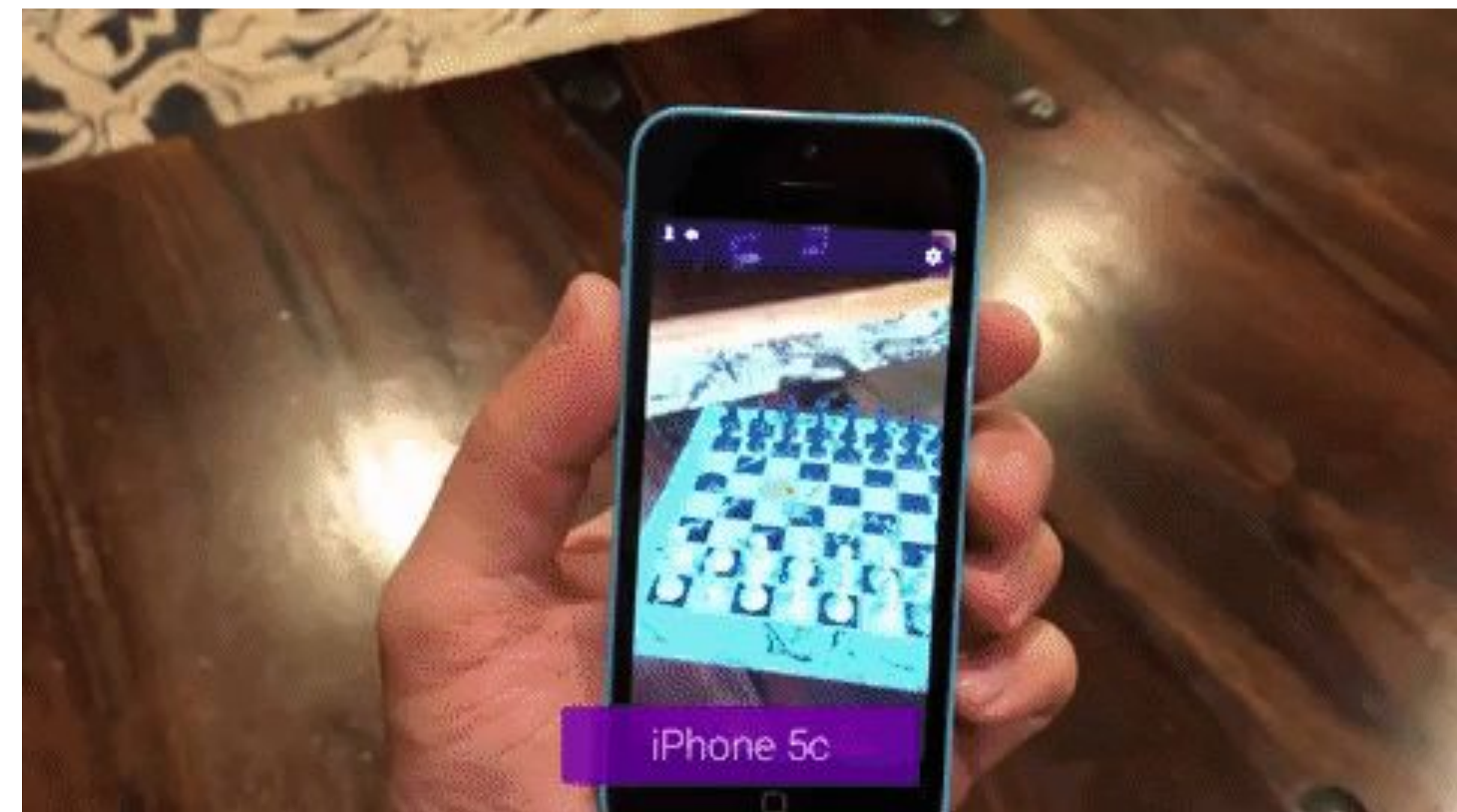
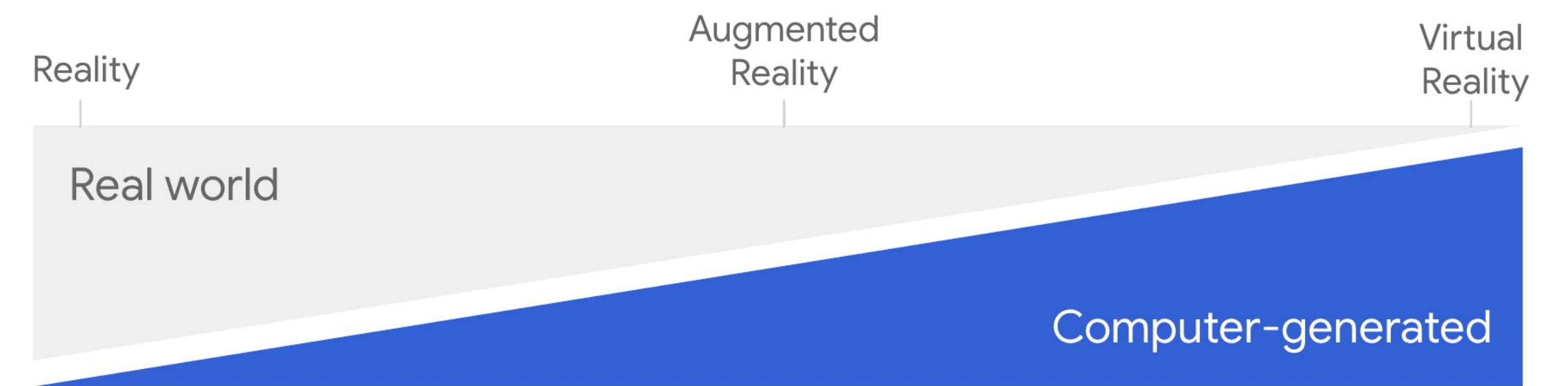


# Mixed Reality

- Augment Reality and Virtual Reality is also available in web applications
- The Web XR APIs are the building blocks of the immersive Web



<https://immersive-web.github.io/webxr-samples/>



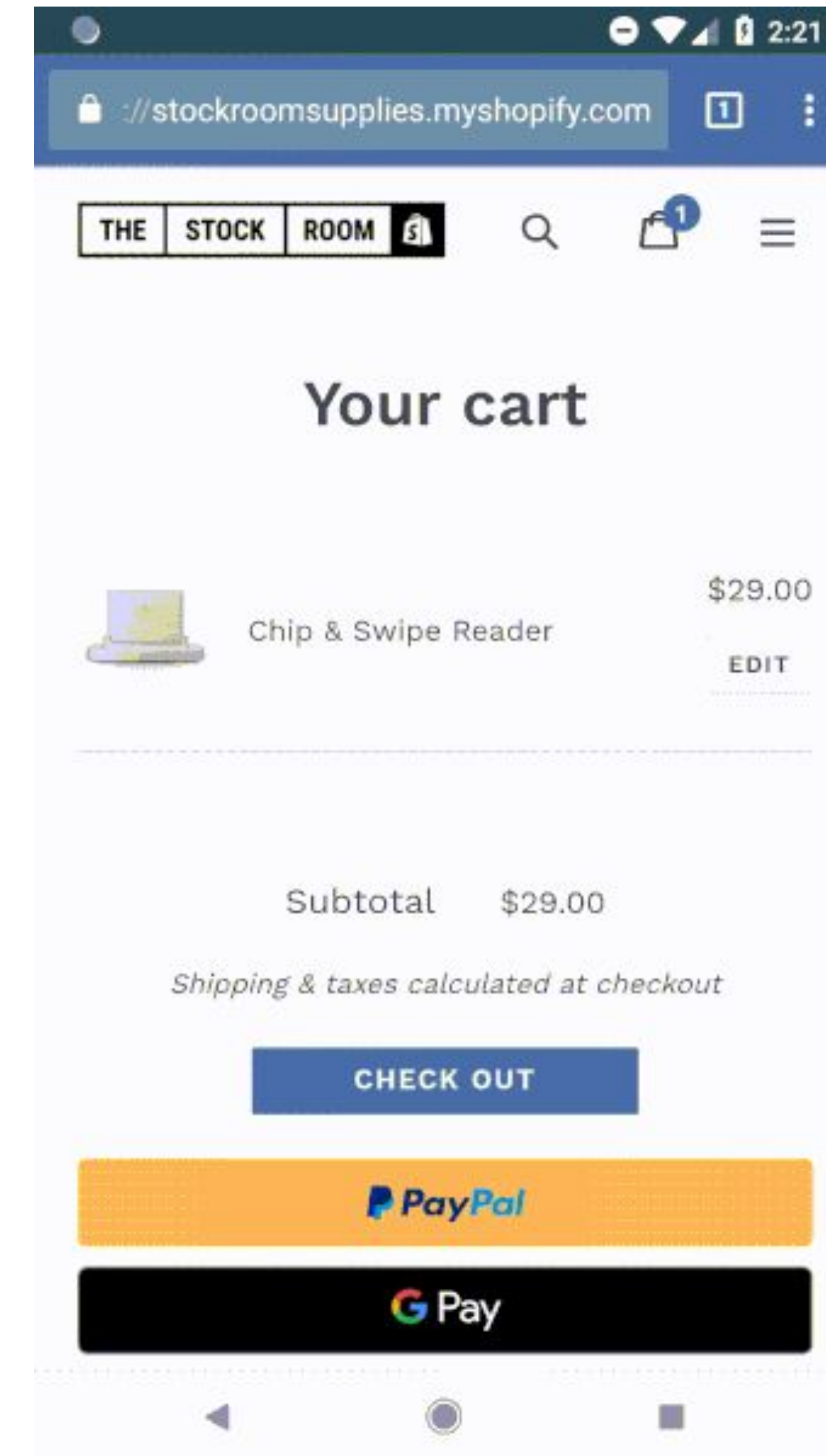
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# Web Payments

- The payment request API provides a streamlined standardized checkout flow on the web to be integrated with your payment processor.
- This provides a more convenient, secure and consistent experience for payments using
- Payment options can be saved to the browser removing friction on subsequent transactions



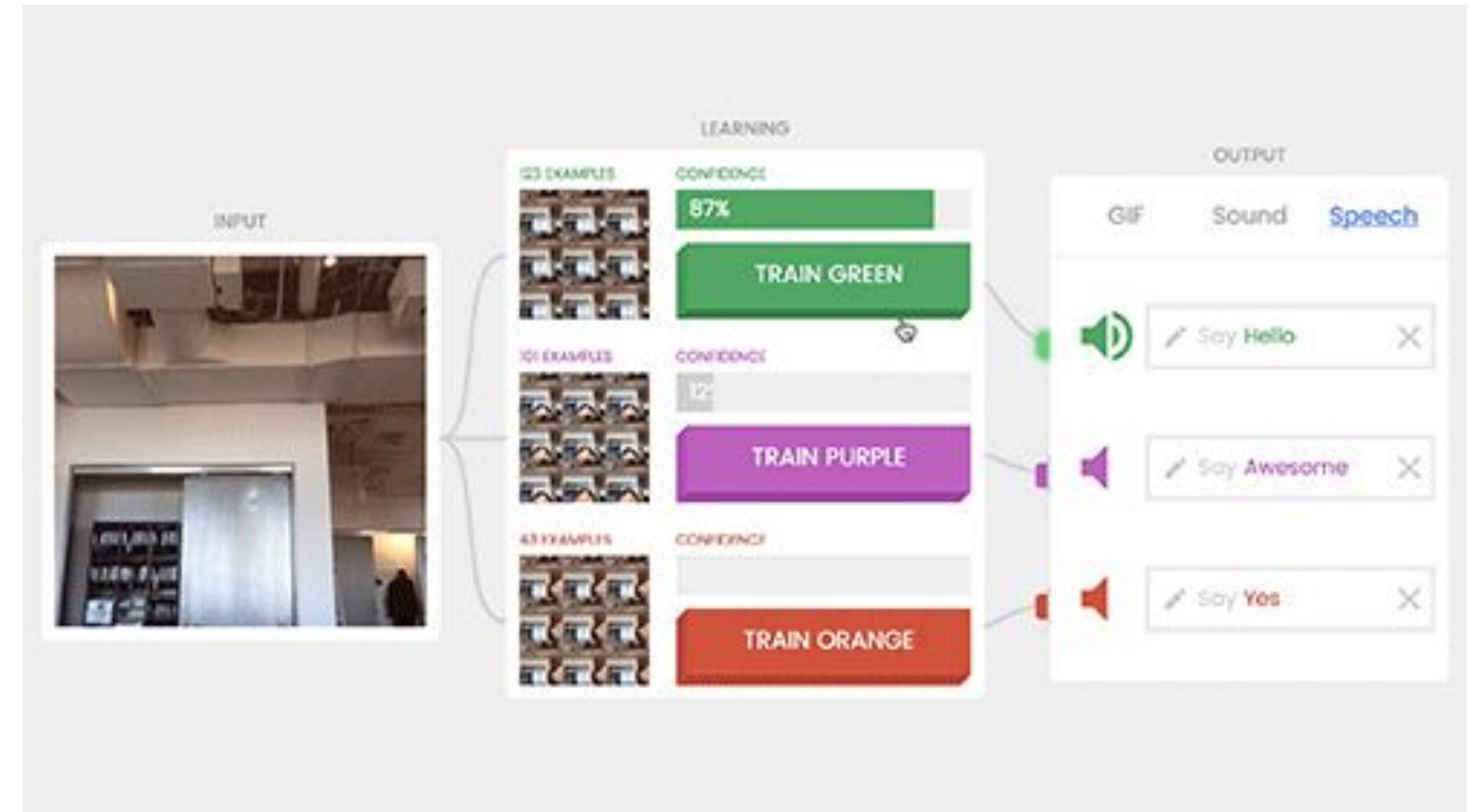
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# Machine Learning on the Web

- ML comes to the web, whether its on device or on the cloud you can have:
  - Text Recognition
  - Speech Recognition
  - Translation
  - Image Labelling
  - Barcode Scanning
  - Face Detection



<https://experiments.withgoogle.com/collections>

<http://incredible-spinners.glitch.me/>



**ML Kit**  
for Firebase



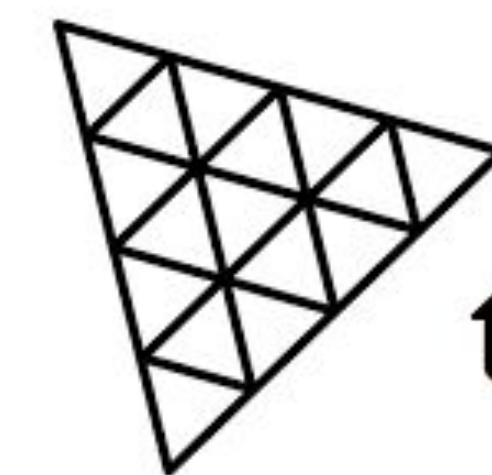
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# Gaming on the Web

- The emergence of WebGL has unlocked great gaming potential for the web.
- Webgames can provide a unique experience by making content shareable via urls
- There several libraries, frameworks or game engines you can use to build your game



three.js



PLAYCANVAS



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# 3rd Party Resources

- Supercharge your solution by integrating with enterprise level solutions
- Do not reinvent the wheel, rather use the best wheels to build a novel car
- APIs, Open Datasets, Services
- Example APIs:
  - Youtube
  - Facebook
  - Twilio (SMS)
- Example Services:
  - Mail Chimp
  - Survey Monkey
  - Zapier



<https://rapidapi.com/blog/most-popular-api/>



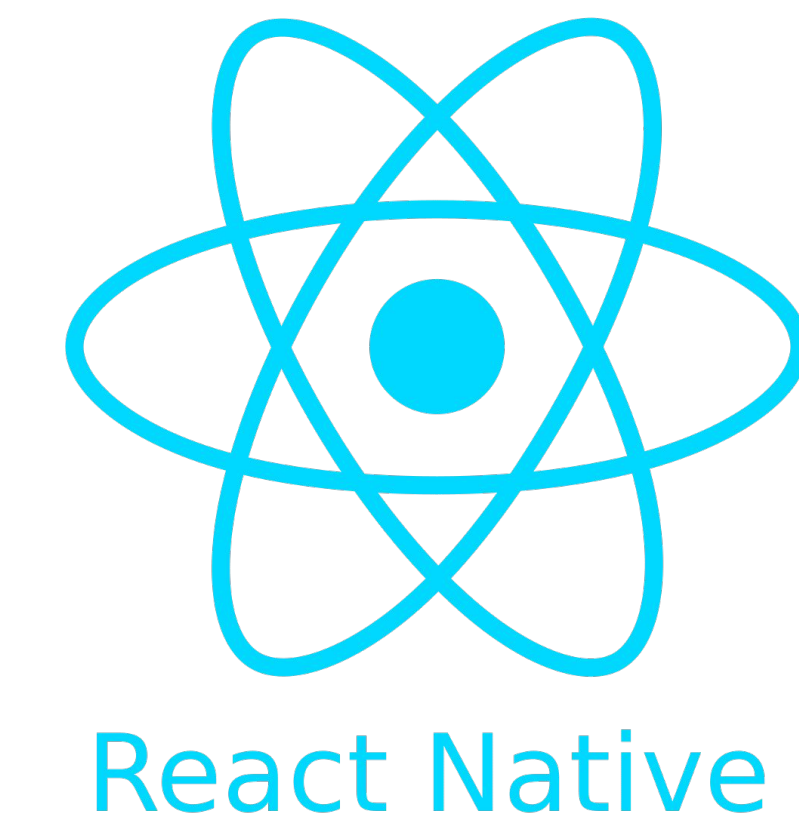
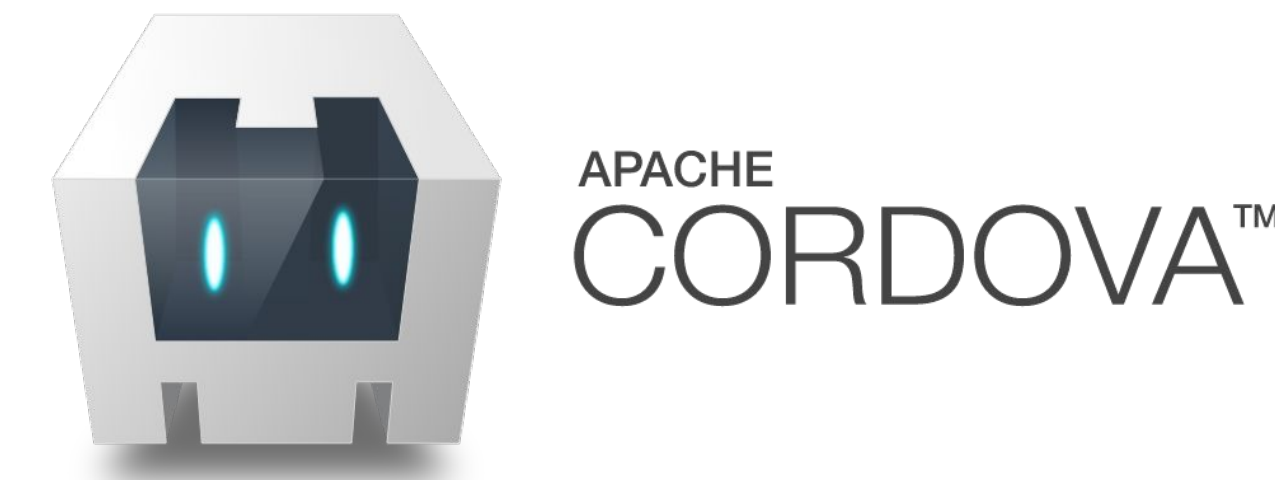
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# Breaking Out of the Browser

- Hybrid technologies allow us to port web applications to:
  - PC Applications (Windows, Mac OS, Linux)
  - iOS
  - Android
- Build once and deploy to multiple platforms or start building on a new platform using tools you already know well

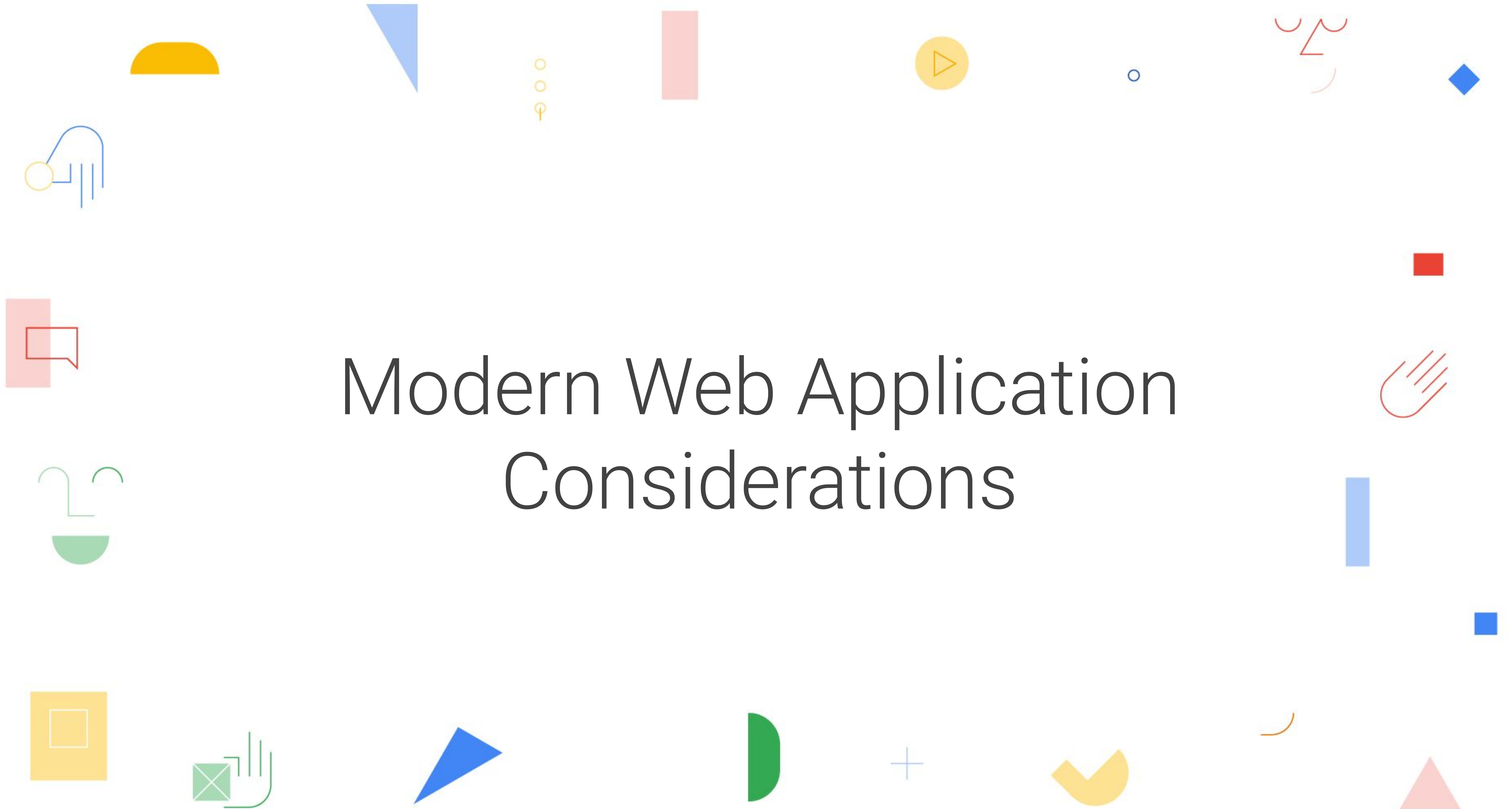


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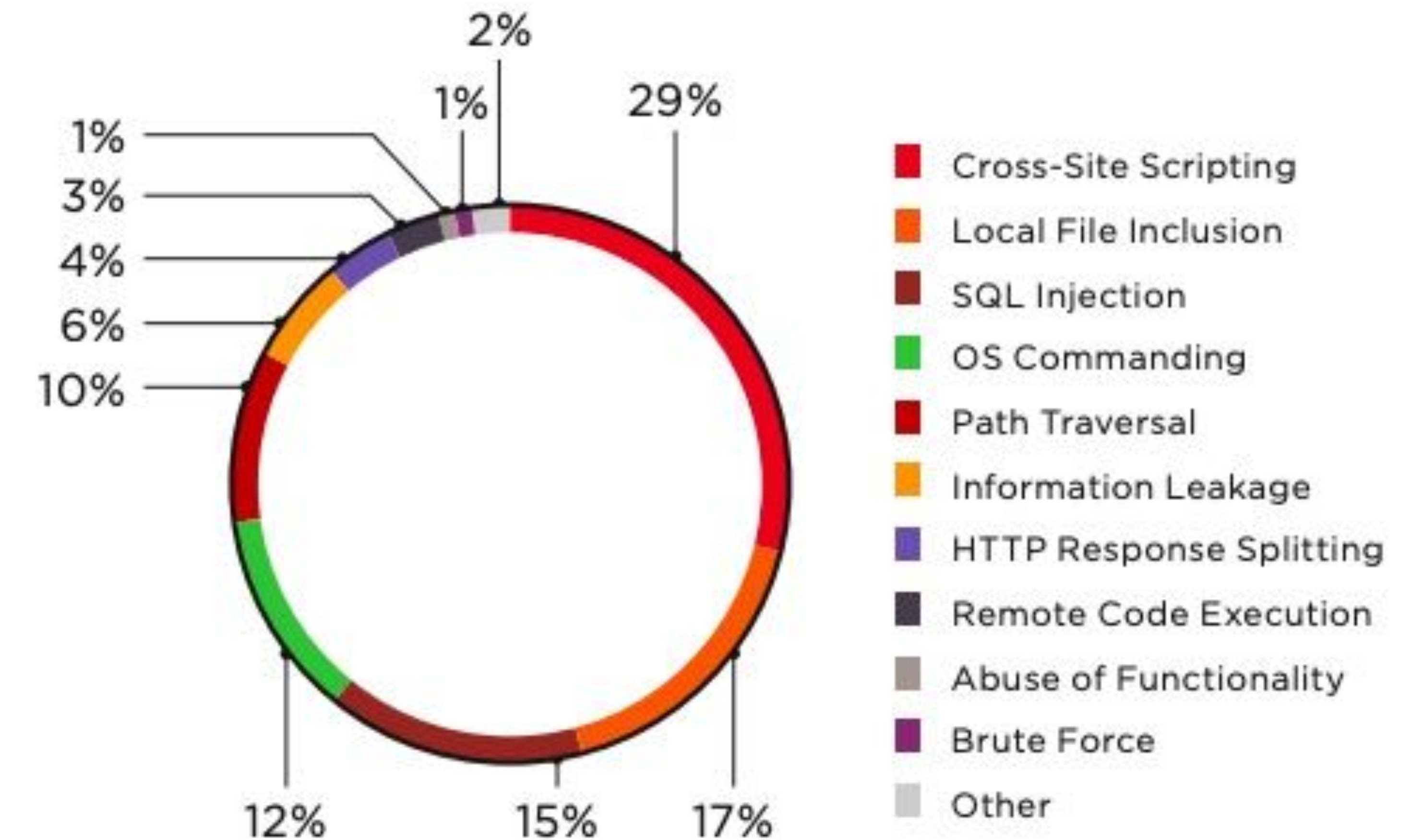
# Modern Web Application Considerations





# Security & Privacy

- Cannot be an afterthought, applications should be secure by design
- Know your web application attacks, sanitize and validate all user input,
- Implement Authorization and Authentication holistically
- Use security features of 3rd party services eg firebase rules
- Look into end to end encryption, hashing and salting
- Use https always
- Perform risk management and consider any possible security issues



<https://www.thesslstore.com/blog/difference-encryption-hashing-salting/>

<https://developers.google.com/web/fundamentals/security>

<https://www.castsoftware.com/research-labs/risk-management-in-software-development-and-software-engineering-projects>



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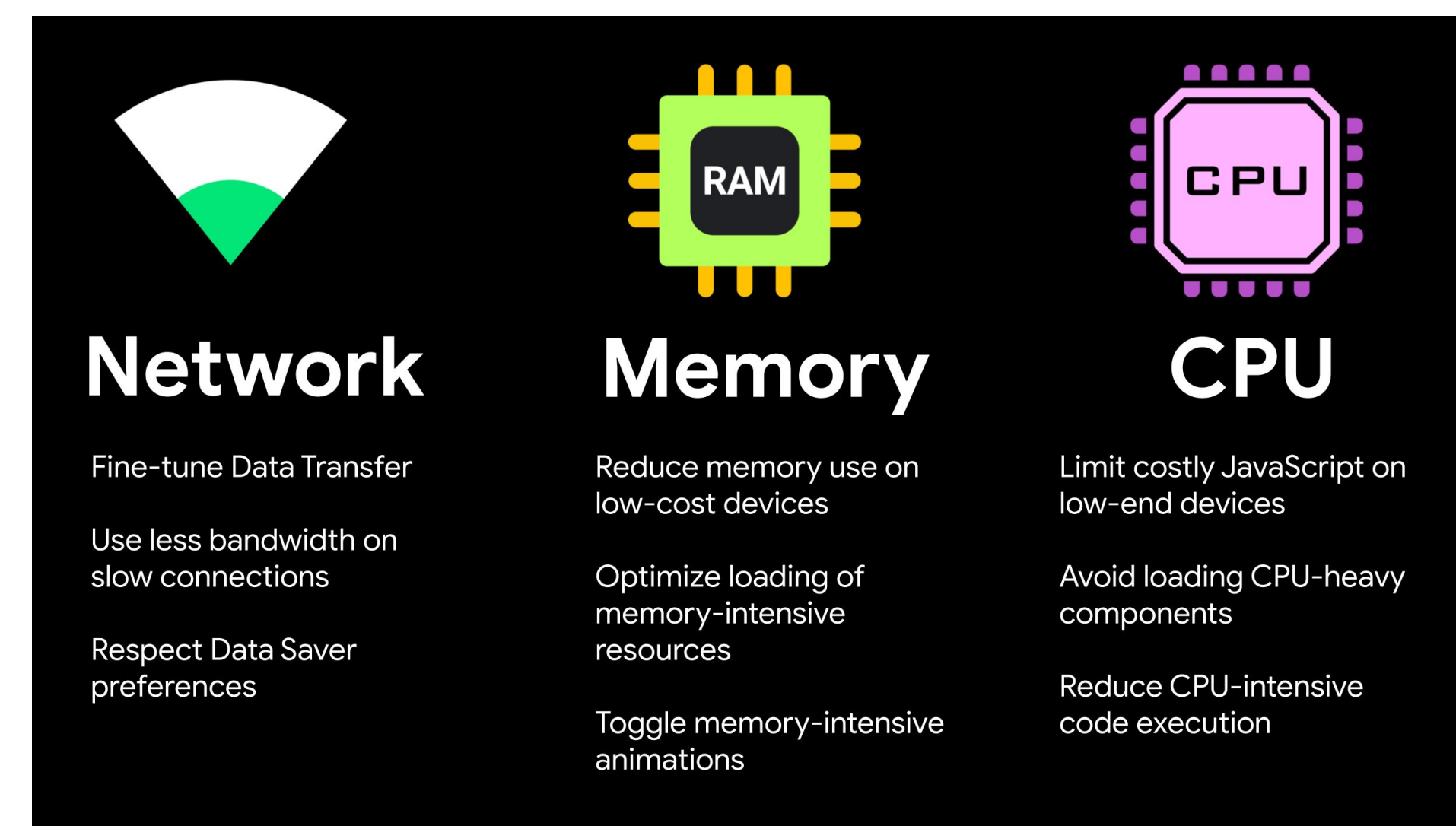


# Performance

- In the Caribbean and Emerging markets it is crucial to build performant web applications to maximize your potential audience
- There are well established guidelines for performance optimization
- Tooling and resources for measuring performance is freely available
- Consider Techniques such as:
  - Bundling
  - Lazy Loading
  - Adaptive Loading
  - Caching

<https://developers.google.com/web>

<https://thepracticaldev.s3.amazonaws.com/i/f9jc248z5x8sw1q78z0o.png>



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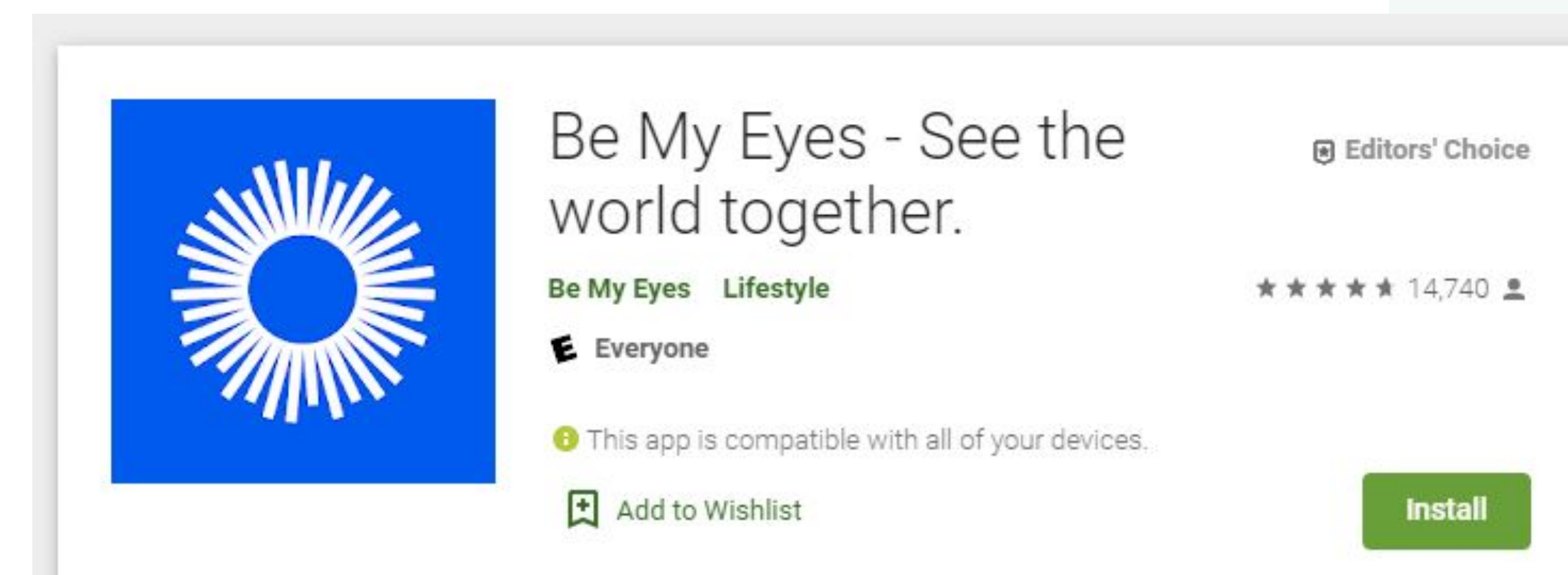
# Accessibility

- There's been an increased advocacy for accessibility in modern web applications
- Accessibility cannot be an afterthought, must be included in the design process
- When we build for accessibility we build a web which is inclusive of everyone
- There are easy guidelines available to make a webpage readable with screen readers for users who suffer from motor control disabilities.

<https://www.w3.org/WAI/perspective-videos/keyboards/>



## Accessible Rich Internet Applications



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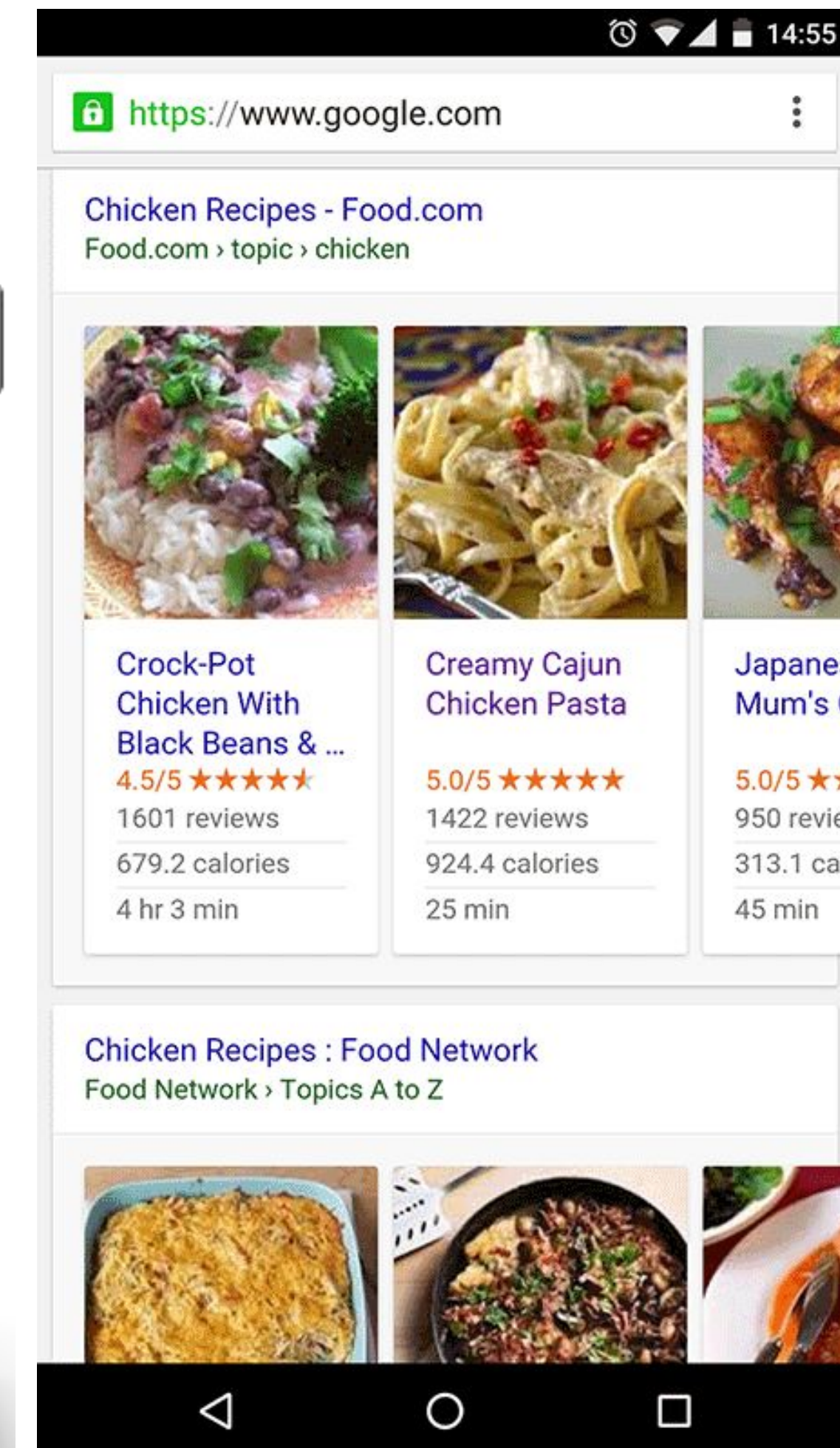
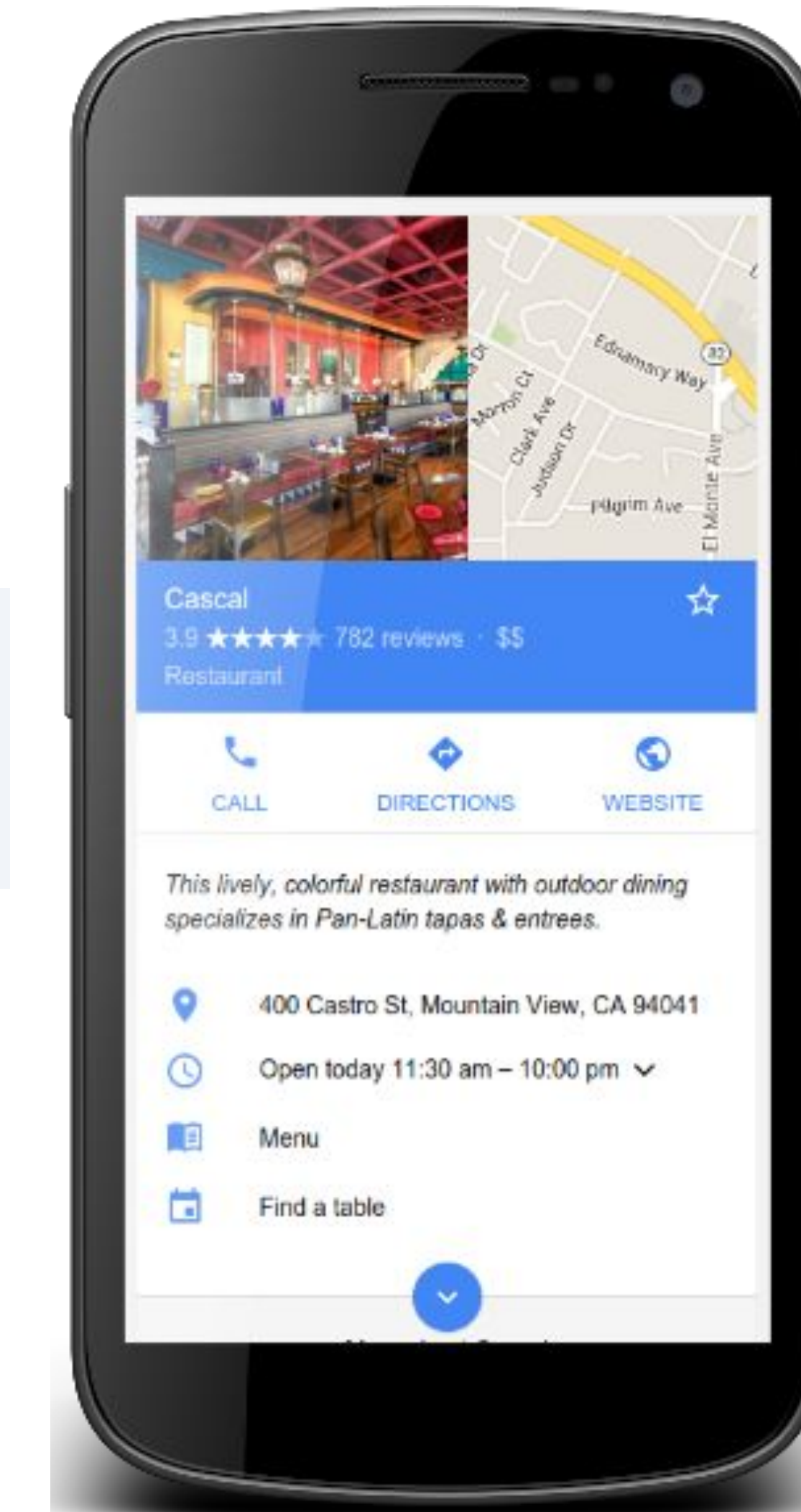
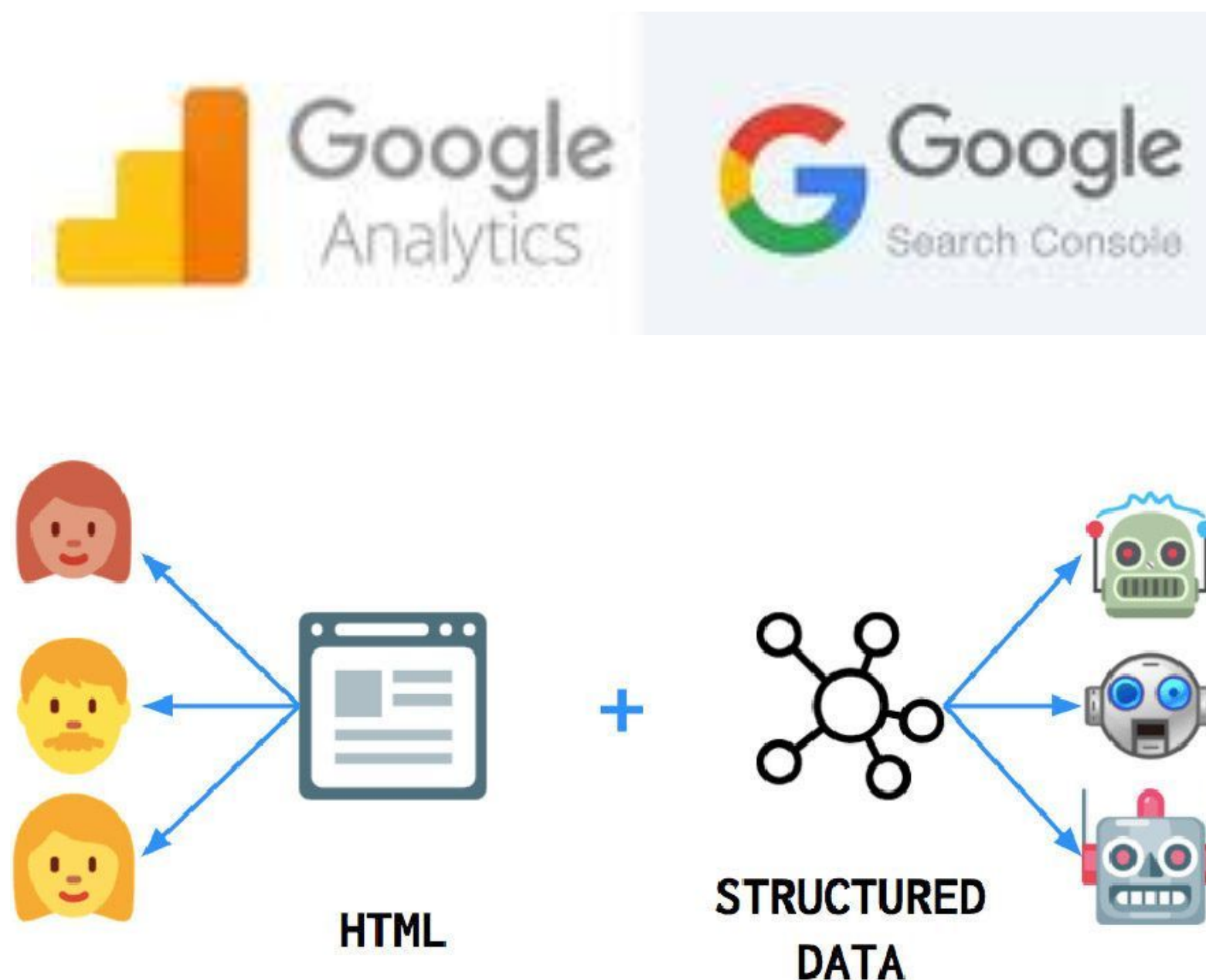




# Reachability: Search Engine Optimization

- SEO brings visibility to a web application
- Users should organically find your solution when they search your problem
- Increase your site's indexability by using features like:
  - Structured Data for Rich Cards on search
  - Actions on Google
  - Meta tags
  - Robots.txt for web crawlers
- These make your application machine readable which increases your search ranking

<https://backlinko.com/hub/seo/snippets>



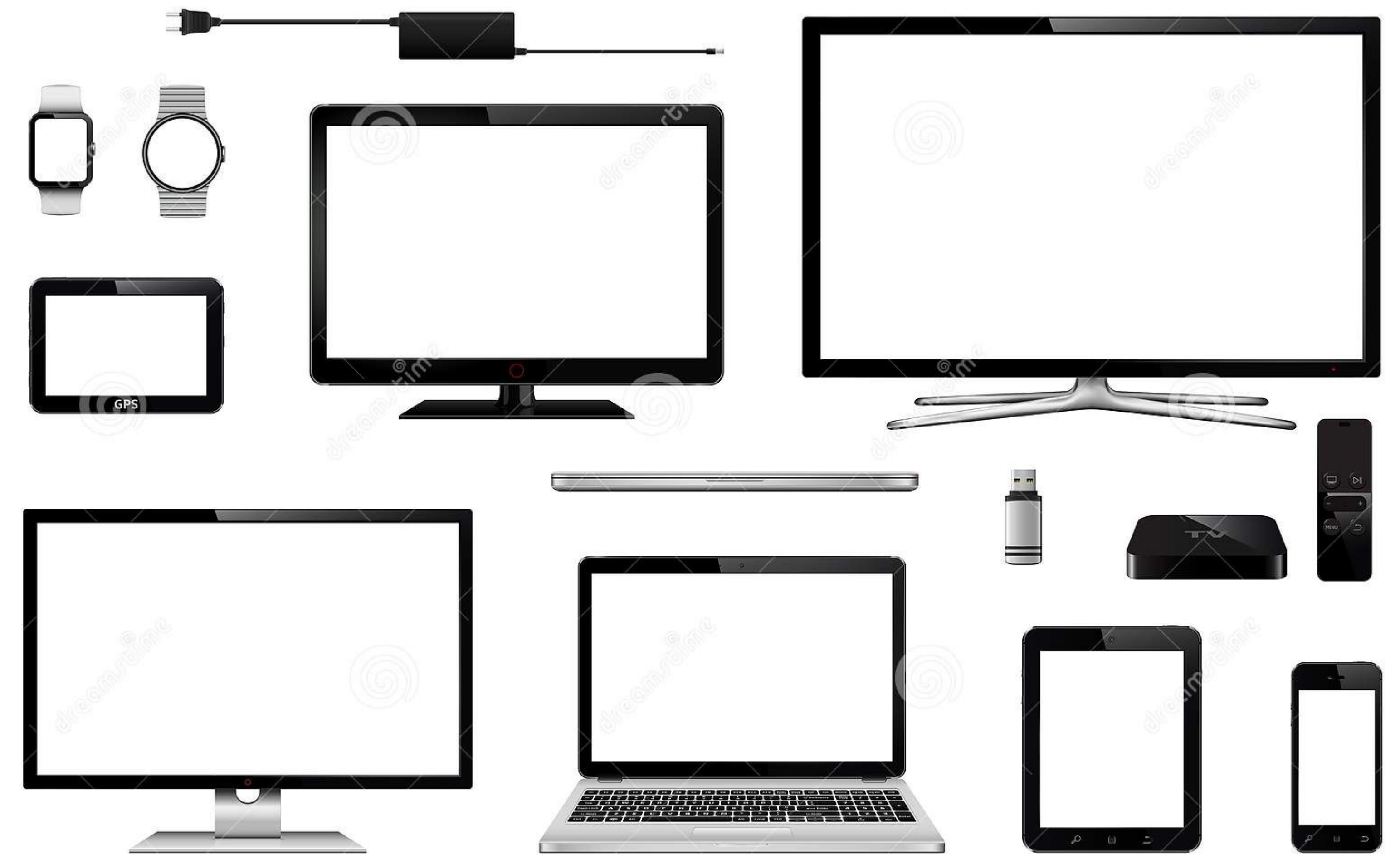
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# Portability: Design for Multiple User Agents

- There are many user agents which can access the web.
- To maximize your audience you want to ensure you deliver a Great UX on all devices
- Performance is crucial
- Responsive & Adaptive Design
- Progressive Enhancement



<https://addyosmani.com/blog/adaptive-loading/>



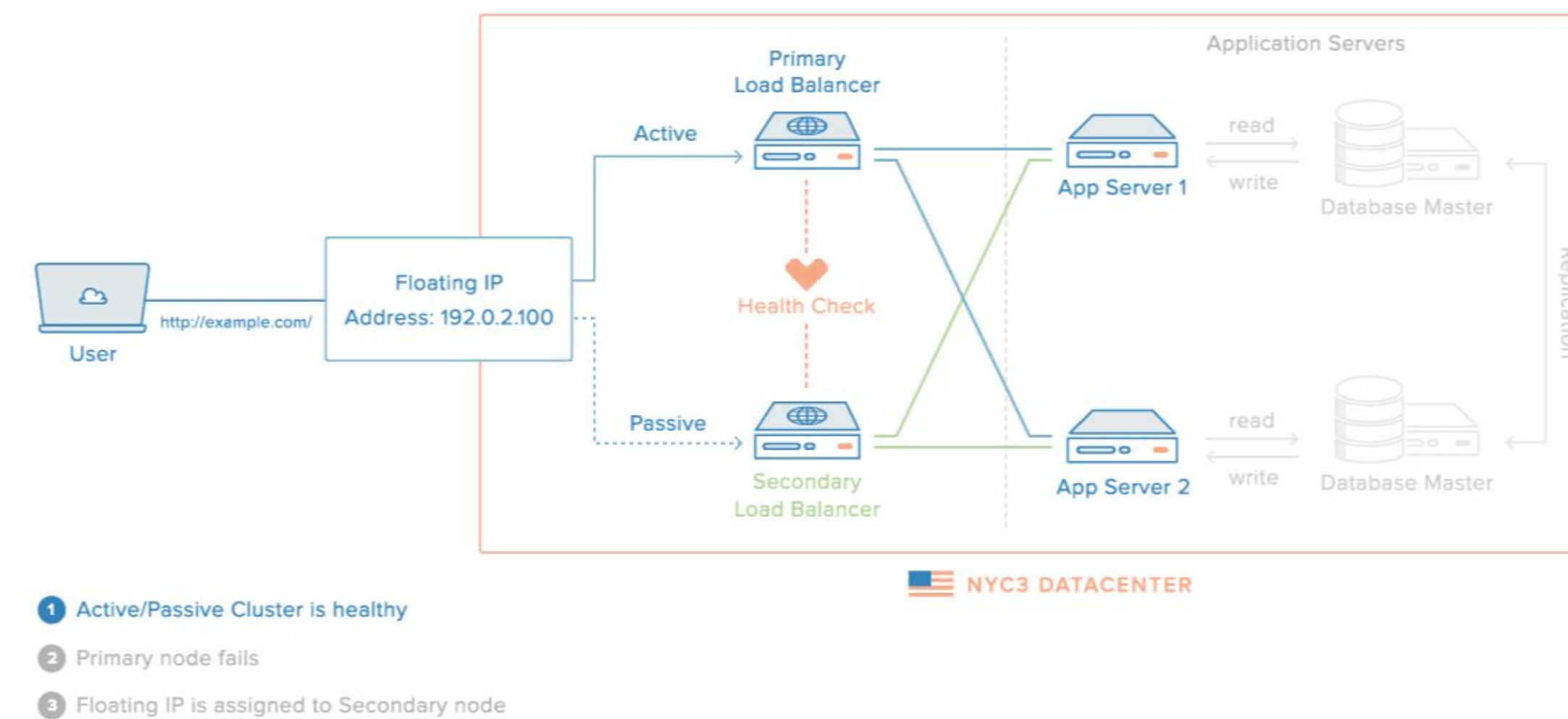
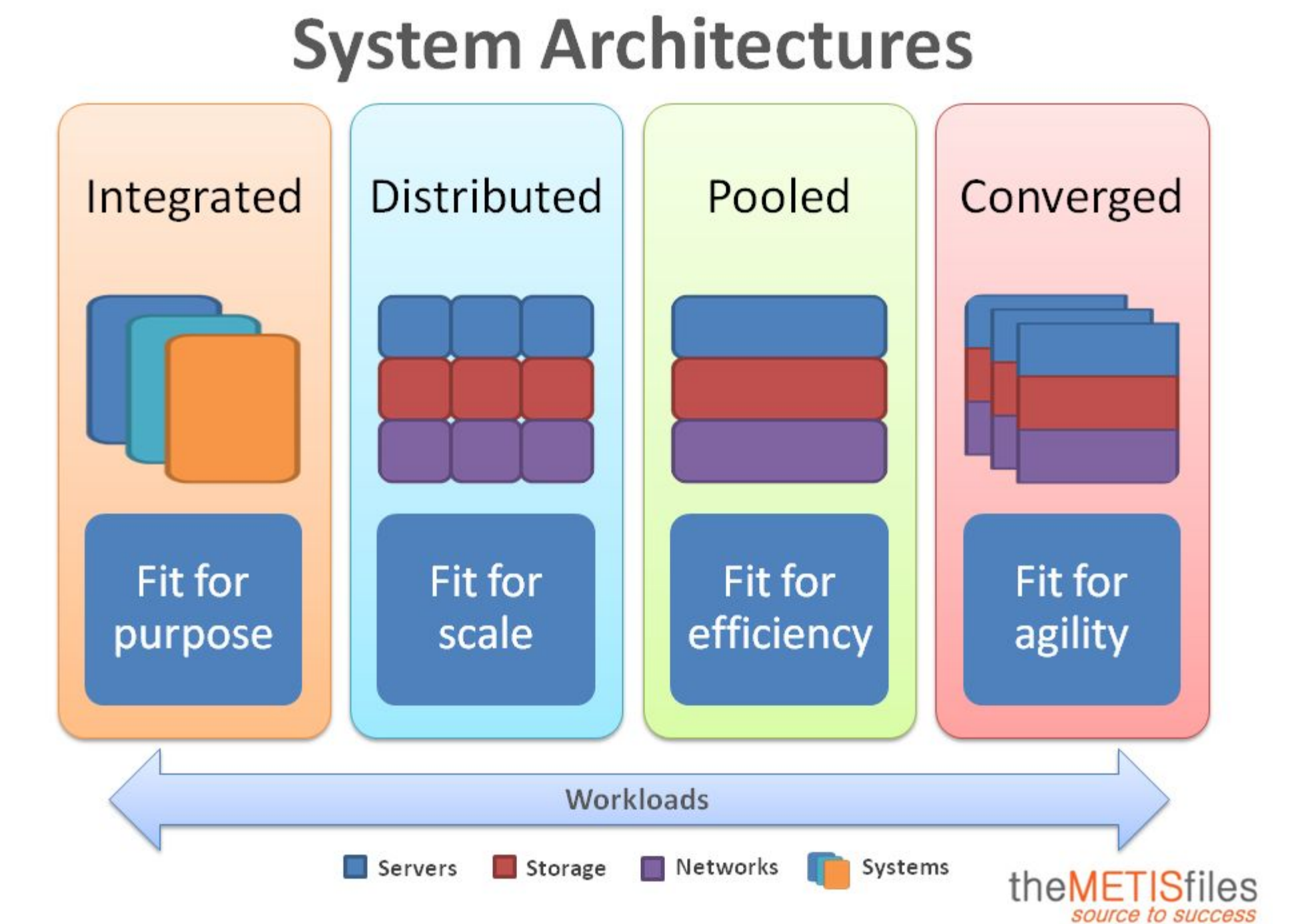
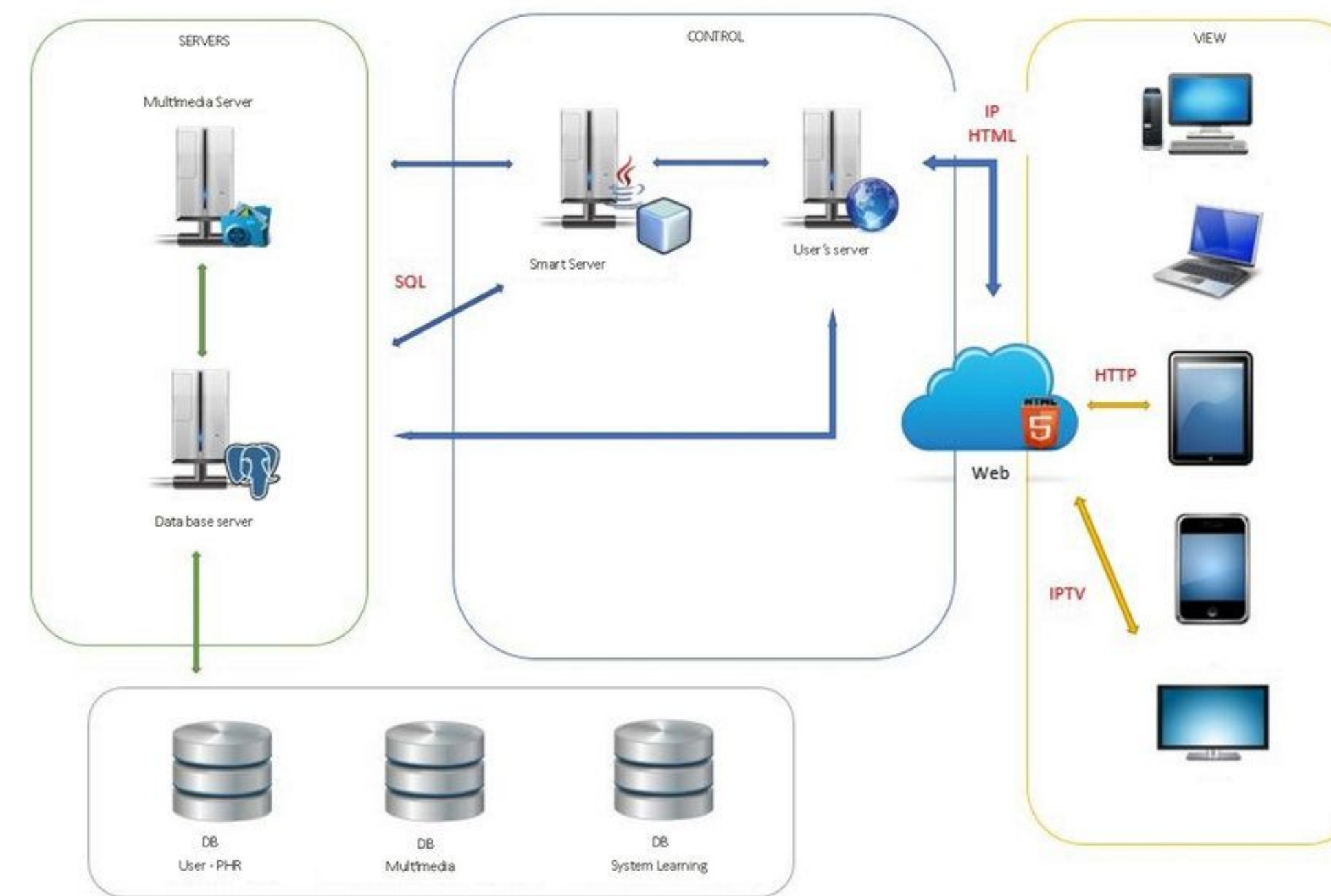
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# Reliability

- How are you deploying?
- How much thought have you put into scaling?
- Do you have any fault tolerance?
- Are you linking your components, 3rd party services, cloud resources in a meaningful way?
- Are you utilizing the necessary middleware or cloud resources for your solution?
- Your system architecture must tackle these questions.
- Look into concepts such as:
  - Load balancing; apache, nginx
  - Redundancy; high availability clusters
  - Caching; redis, memcached
  - Message Queues; rabbitmq
  - CDNs: Cloudflare



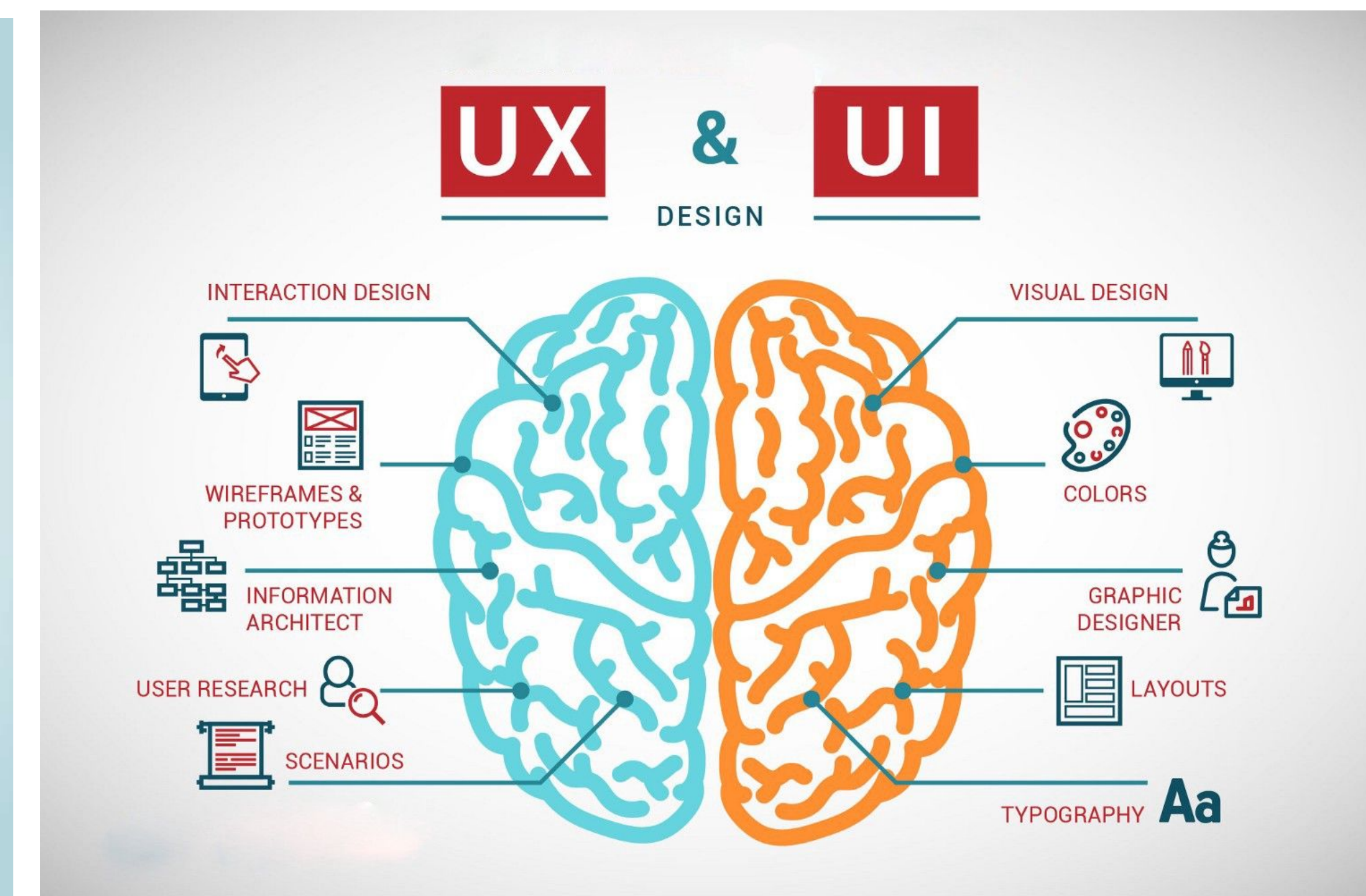
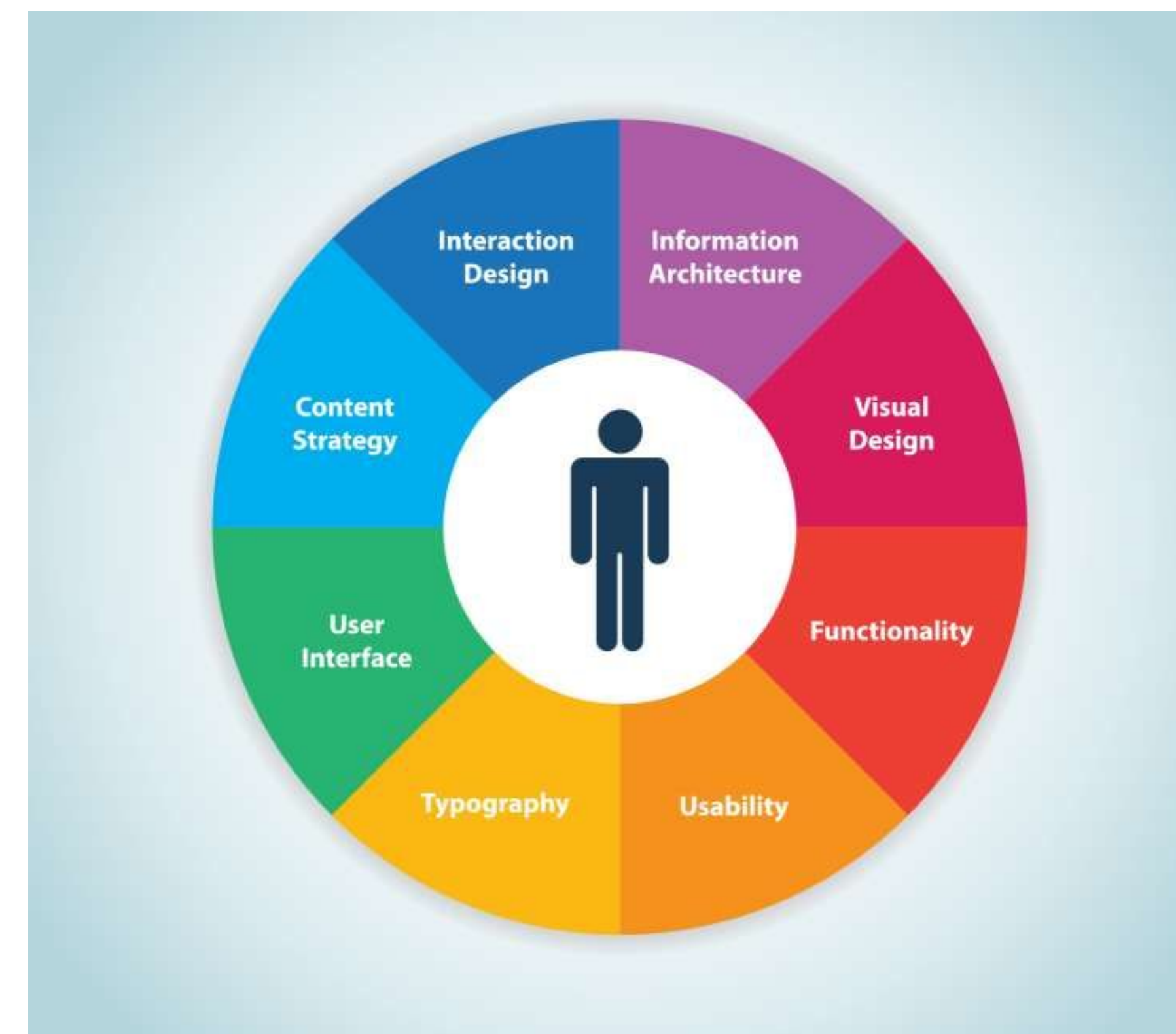
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# User Interface/User Experience

- There may be competitors but what do you do better?
- Is your implementation easier to use?
- Does it delight users more
- Does it have integrations which provide more functionality than your competitors?



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# Resources Cheat Sheet

<https://free-for.dev/#/>



**FREEHOSTING**



**GitHub**  
Student Developer Pack



**Firebase**



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Questions?