Innovative standards for a new web

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Open Web Platform

Moving up the layers

- With the completion of HTML5 (2014) the focus in web standardization shifted to upper layers.

- Rather than an architecture for browsing web pages, the design point was to build a broader platform (sometimes called a Web OS) to support distributed applications.

- At the time we called it Application Foundations for the Web
  - https://www.w3.org/blog/2014/10/application-foundations-for-the-open-web-platform/

- We no longer call it that – but this is an update on progress and what to expect
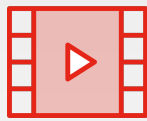
Application Foundations
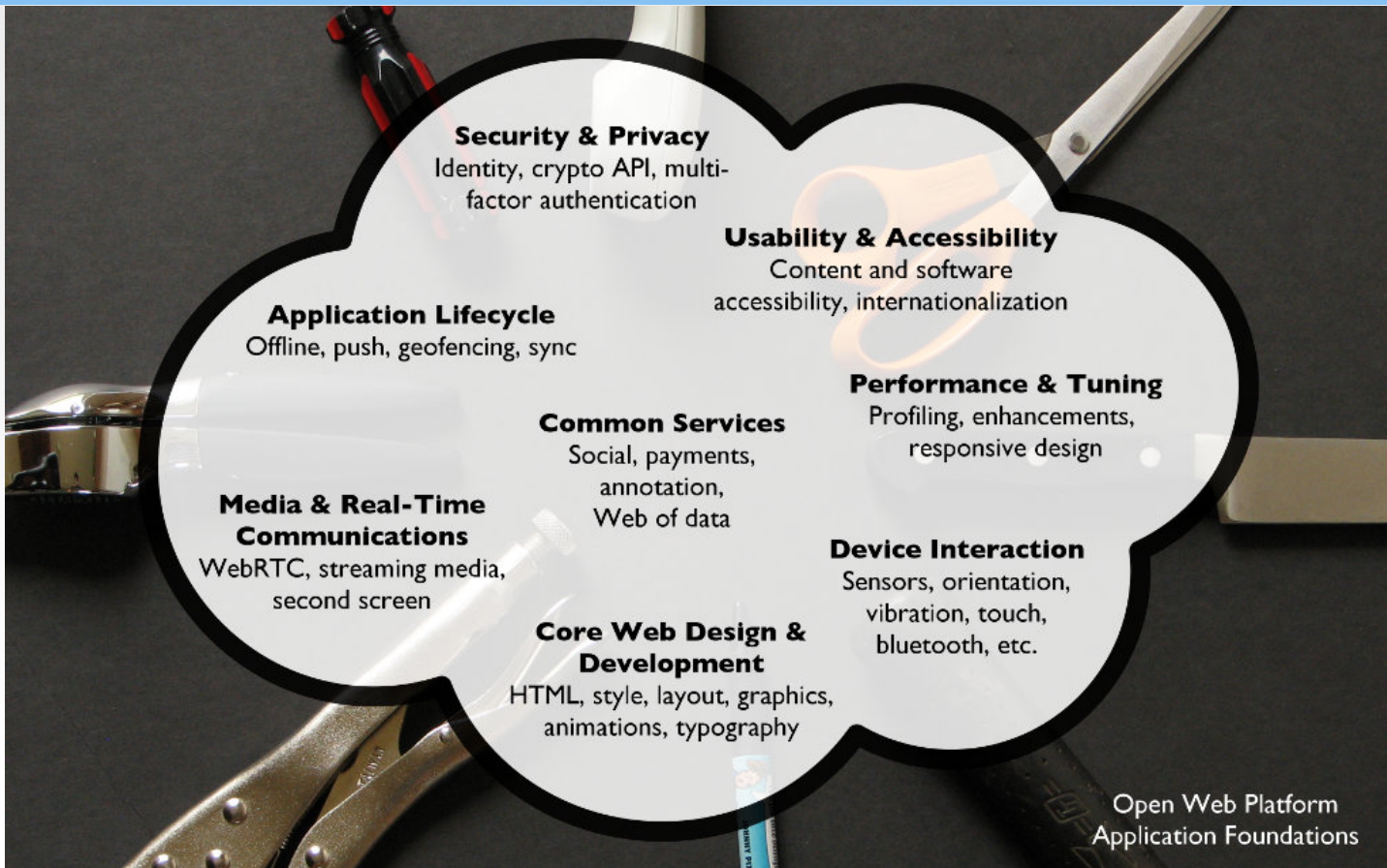
Roadmap of Web applications on Mobile

Describes Web technologies that apply to the mobile context

Graphics & Layout

Media

Application lifecycle

Device Adaptation

User Interaction

Payment & Services

Forms

Sensors

Performance & Tuning

Data Storage

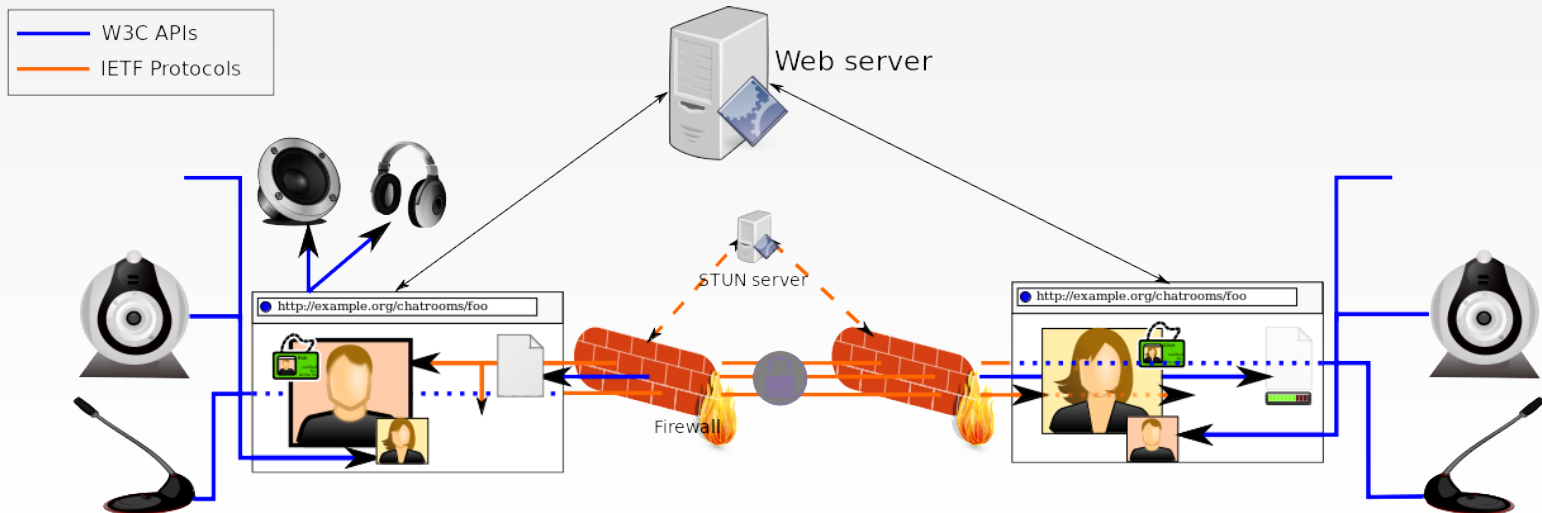Network & Comm.

Security & Privacy

https://www.w3.org/Mobile/roadmap/

Entertainment and Media

- WebRTC

- Streaming video

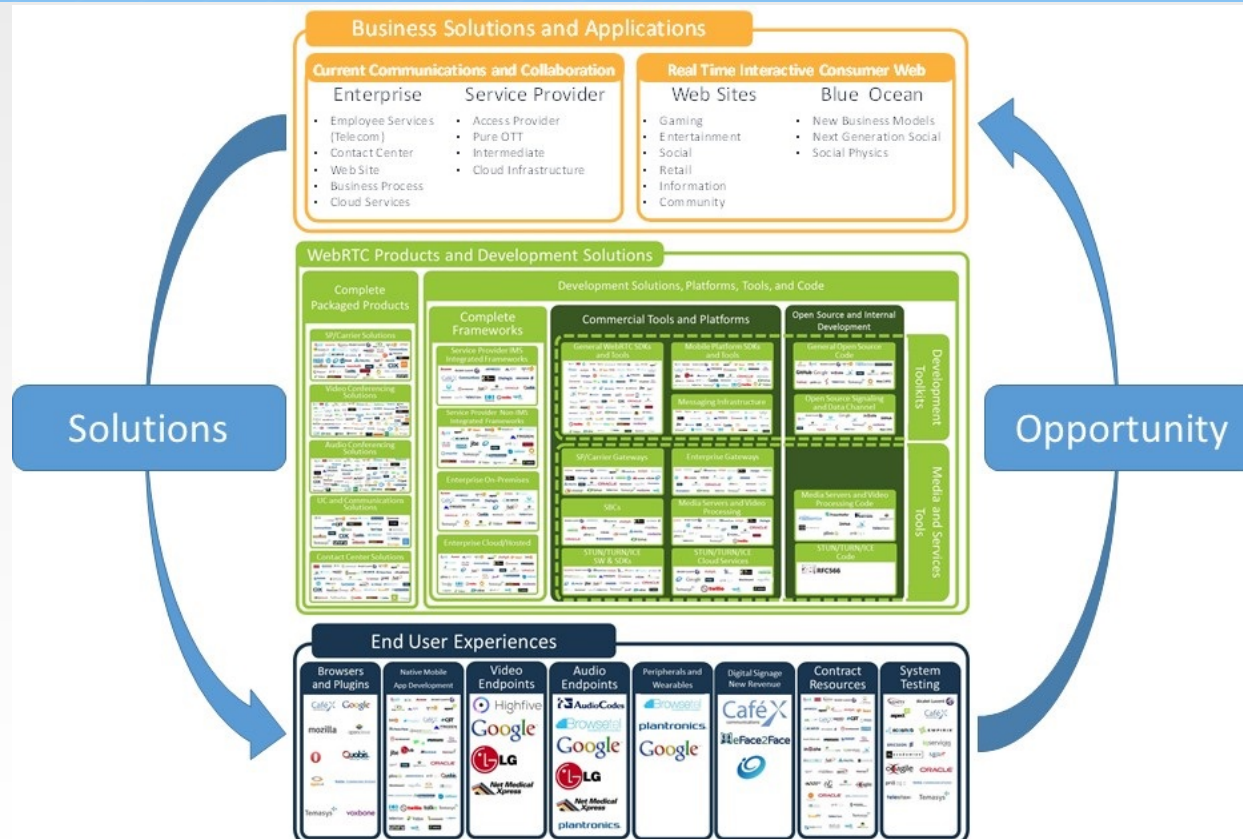- Streaming video next steps (e.g. ad insertion)

- Immersive Web

Web Real-Time Communications (WebRTC)

- IETF protocols and W3C APIs combine to make audio/video communication available to any Web app

- Planned for Recommendation status by the end of this year

WebRTC: Spawning a new ecosystem


Credits: WebRTC ecosystem report

WebRTC Next Version

- Identifying needs for new features or performance improvements emerging from existing usage of the WebRTC Stack, incl.:

    - Video stream processing

    - Object recognition and machine-learning on audio and video streams

    - End-to-end encryption in multi-party calls
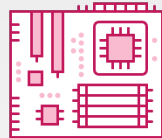
    - Low-latency cloud-based gaming

Full Video experience

Web technologies at the core of the **media pipeline**
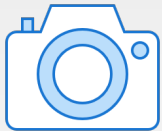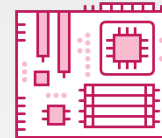
Capture	Processing	Distribution	Processing	Rendering
Ex: getUserMedia	Ex: TTML, EME	Ex: WebRTC	Ex: MSE	Ex: <video>

Server-side / *Client-side*   **Broadband /** *Broadcast*   **Client-side /** *Cloud-based*

**2018 Emmy® Award – Standardization of a Full TV Experience**

Media streaming

- Media Source Extensions (MSE) is the core enabler of **adaptive streaming** experiences on the Web

- Allows apps to generate media streams for playback, independently of how the media is fetched

- Integrates with EME for encryption and the <video> tag for rendering

- Splicing and buffering model also facilitates time-shifting scenarios
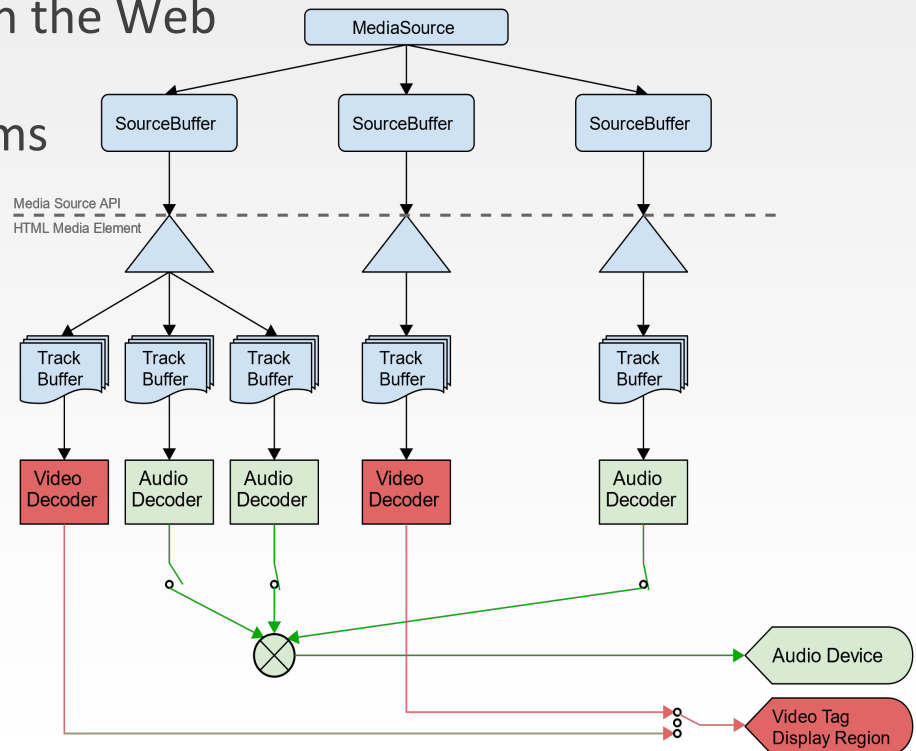
Media streaming NV

- New Media Working Group to standardize improved client-side media processing and playback features on the Web, including:
  - Support for real-world **ad-insertion use cases**
    through new codec switching feature in MSE
  - Exposure of **decoding, encoding, and encryption capabilities**
    to select optimal media content
  - Measurement of **user perceived playback quality**
    to improve adaptive streaming algorithms
  - Detection of the **autoplay policy**
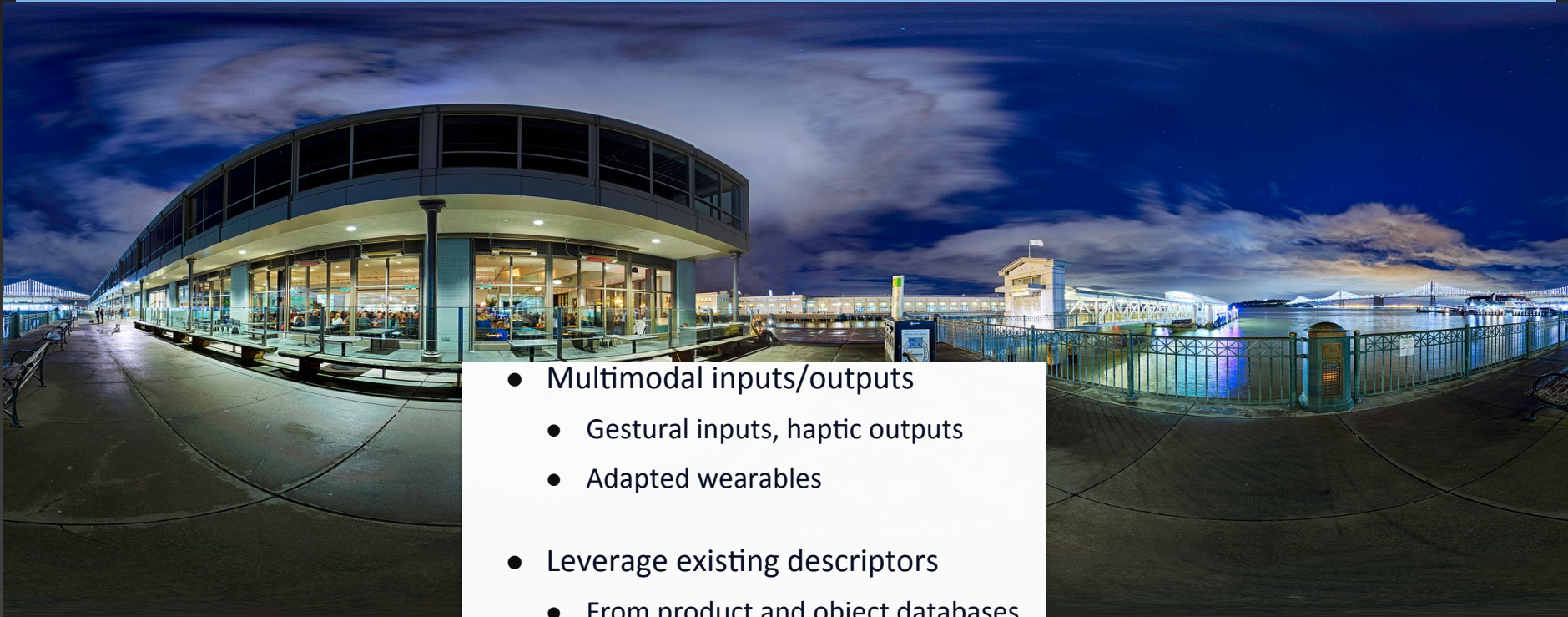 - Support for **picture-in-picture** scenarios

Immersive Web

- Virtual Reality (VR) and Augmented Reality (AR) opens the door to fully immersive experiences and spatial computing

- WebXR enables **both** VR & AR in Web browsers, creating low-friction entry points for immersive experiences
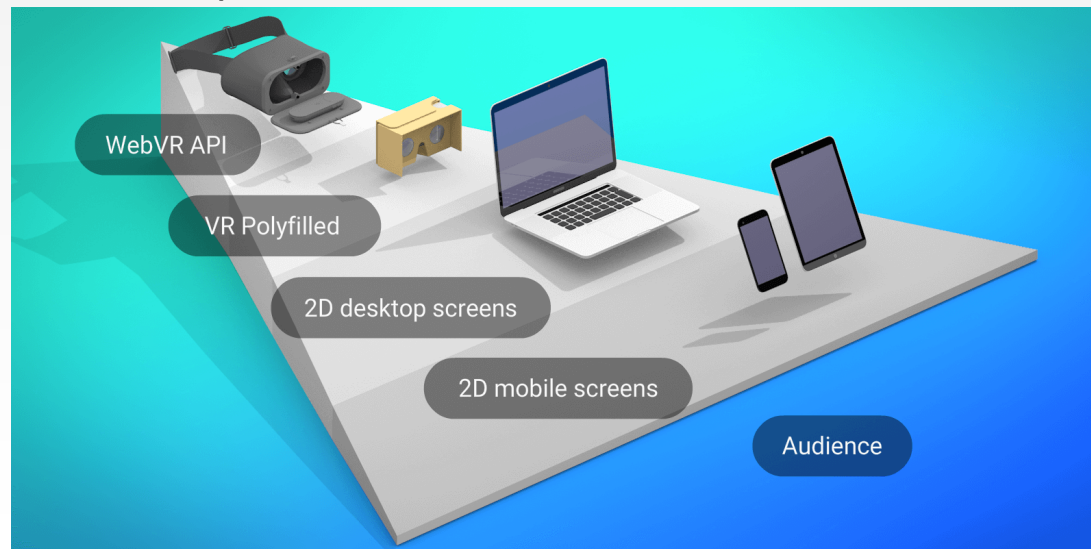
Accessibility solutions for AR/VR

- Multimodal inputs/outputs
  - Gestural inputs, haptic outputs
  - Adapted wearables

- Leverage existing descriptors
  - From product and object databases
  - From customized elements

- Interoperable with assistive technologies

Payments, e-commerce, and security

- Payment Request API

- Payment Handler API

- Web authentication

- WebAppSec

- Payment security

Payment Request API

- Streamlines checkout through re-use of stored data.

- Creates a consistent checkout experience across the Web to speed up conversions.

- Reduces merchant integration costs; use one API instead of multiple API integrations.

- Browser support today in Chrome, Safari, Edge, Samsung Internet Browser.

- SDK support today in Stripe, Braintree, Facebook, WePay, Bluesnap, Paysafe, BS Payone.
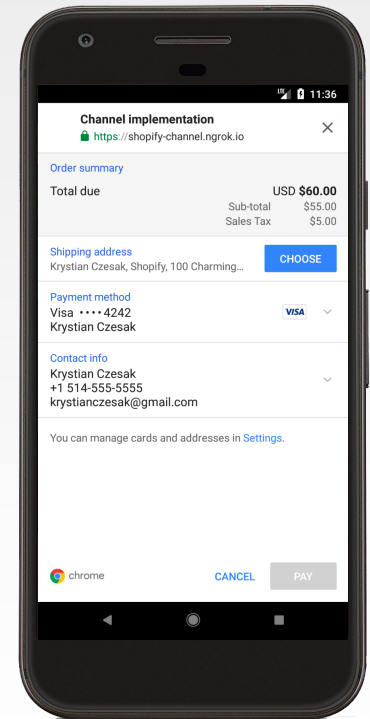
Web Payments Working Group

Merchants

- Airbnb
- Alibaba
- Rakuten
- Wiley

Browsers/Platforms/Services

- Apple
- Brave
- Facebook
- Google
- IBM
- Intel
- LGE
- Microsoft
- Mozilla
- Opera
- Oracle
- Samsung
- Seeroo
- Tencent
- Verizon

Networks

- American Express
- Carte Bancaire
- Clearing House
- Discover
- JCB
- Mastercard
- NACHA
- Visa

Gateways/PSPs

- BlueSnap
- Klarna
- PayGate
- Reach
- Ripple
- Shopify
- Stripe
- Worldpay

Payment Handler / Wallet Providers

- Abine
- Amazon
- Apple
- Beem It
- Bread
- Coil
- Digital Bazaar
- Google
- Klarna
- Microsoft
- Samsung

Associations / Regulators / Bodies

- MAG
- Conexxus
- IFSF
- ISO 20022
- GS1
- GSMA
- HM Government
- PayCert
- Payments Canada
- US Fed

Acquirers/Processors

- Lyra Networks
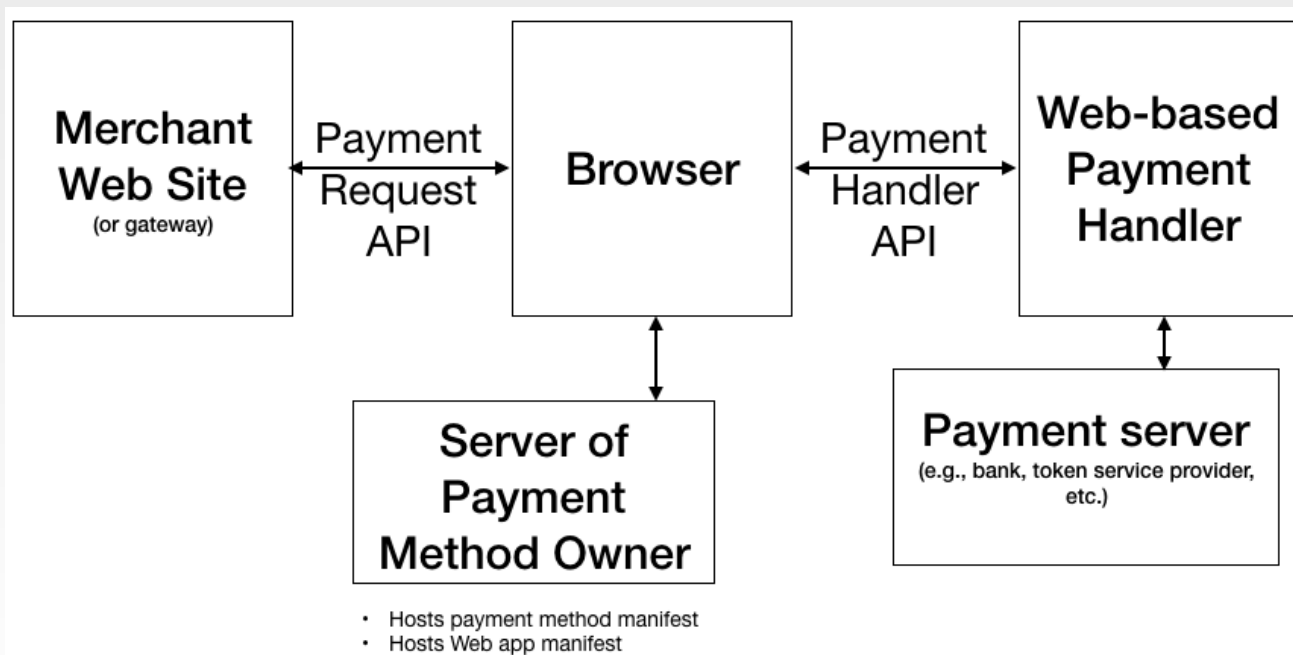- Worldpay

Issuers

- American Express
- Bank of America
- Barclays
- Capital One
- Wells Fargo

Telcos

- China Mobile
- Deutsch Telekom
- Telenor

Payment Handler API

- Innovation through Web-based payment handlers ("digital wallets").
- Banks and other payment service providers maintain customer facing relationships.
- Fast, harmonized user experience through browser-based UX.

Payment Security

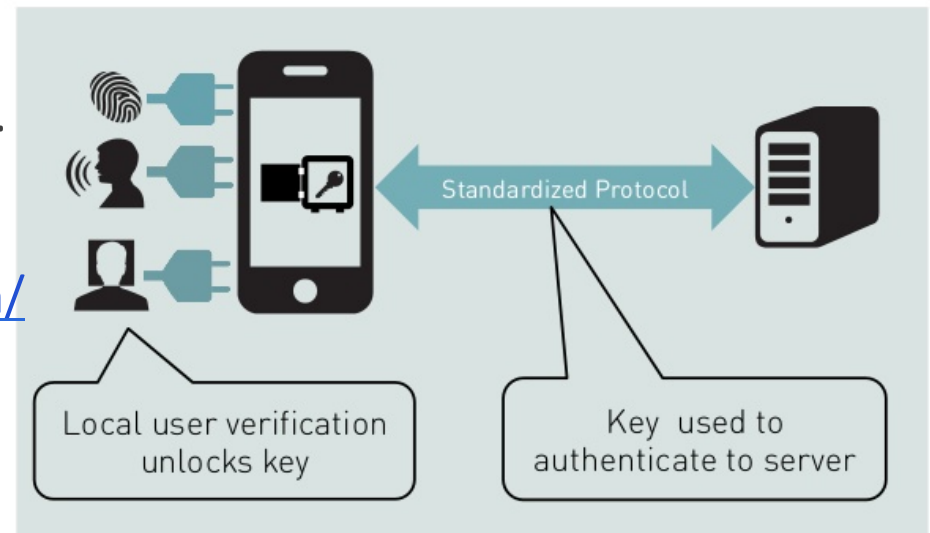- April 2019: W3C, EMVCo, and FIDO launched the [Web Payment Security Interest Group](#).

- We will articulate a vision for payment security on the Web.

- We expect to do a gap analysis between existing technical specifications in order to increase compatibility.

- As the Web supports new services —streaming video, real-time communications, augmented reality, etc.— we need to ensure the security of emerging payment models.

WebAuthn: Unphishable Sign-on Credentials

- WebAuthn, a Web API for FIDO 2.0, uses a cryptographic challenge **unique** to each website and **bound** to its origin.

- Local authentication such as biometrics never leaves the device.

- Level 1 is a REC: https://www.w3.org/TR/webauthn/

HOW THE FIDO ARCHITECTURE WORKS

Standardized Protocol

Local user verification unlocks key

Key used to authenticate to server

Web Authentication Deployment

Credit: Adam Powers

WebAppSec: Encryption Everywhere

- **Standardizing and Enabling HTTPS for confidentiality, integrity, and authentication**
- Secure Contexts
- Upgrade Insecure Requests
- Mixed Content
- Referrer Policy
- Subresource Integrity

Security Related APIs
- Permissions API
- Credential Management
- Clear Site Data

Enlisting the User Agent in Cooperative Policy Enforcement
- Content Security Policy
  - Level 2 is Recommendation; Level 3 in development (Editor's Draft)
- Secure Contexts
- Subresource Integrity (Rec), Mixed Content
- Feature Policy

Web for all

- Internationalization

- Web Content Accessibility 2.1

- Accessibility conformance testing

Internationalization

- Encouraging experts around the world to ensure that their language is well supported on the Web.

- Tracking issues.

- Documenting gaps & requirements.

Typographic features
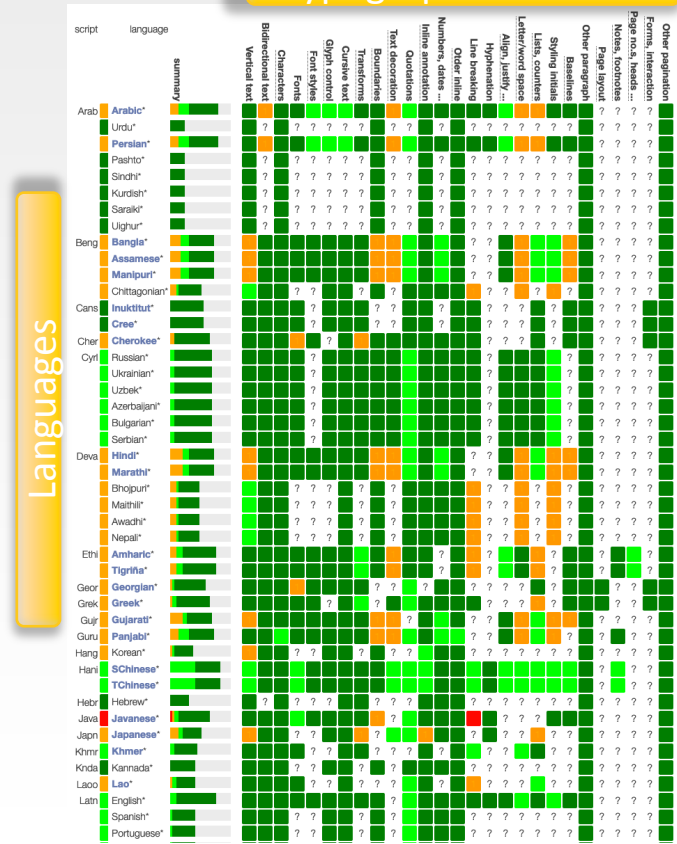
Languages

▮	33	languages need work for advanced publishing
▮	27	languages need work for basic features
▮	1	languages don't work well on the Web
?	41%	of cells still need investigation.

WCAG 2.1

- [Web Content Accessibility Guidelines 2.1](#) update published June 5, 2018
  - 17 new success criteria: [What's new in WCAG 2.1](#)
  - Expands success criteria for low vision, cognitive and learning disabilities
  - Expands coverage for mobile and other touch-screen devices
  - Updates to [WCAG Techniques](#) and [Understanding WCAG](#) in progress

- Already taken up in Europe through an update to EN 301-549

- Next steps for accessibility guidelines:
  - Planning WCAG 2.2, to address additional user needs
  - Prototyping "Silver," restructured to increase usability and broaden scope

Accessibility Conformance Testing (ACT)

Objective: Transparent and more uniform conformance test results

- ACT Rules Format 1.0 specification defines how "ACT Rules" are written

- ACT Rules Community Group develops rules according to specifications

- Accessibility Guidelines Working Group (AGWG) may approve rules with adequate community support, as part of the WCAG support documents

MANUAL (HUMAN)	**SEMI-AUTOMATED**	**FULLY-AUTOMATED**
Qualitative	Requires human judgement	Quantitative
Low-scalability	Medium-scalable	Highly-scalable

Web publications

- Current status

- Future of Web publications

- Audiobooks as first instance of the future

Web Publications: EPUB3

- Electronic publishing is currently using EPUB3
  - *the* e-Publication standard
  - originally developed at IDPF, currently maintained at W3C
  - widely used in e-book publishing as an interchangeable book format
    - format used directly in iBooks, Kobo, Bluefire, Google Play,…
    - submission format for Kindle
    - export format for Google docs, Apple Pages, …
  - *largely based on W3C standards for content*: HTML, CSS, SVG,…

However…

- EPUB 3 is not really used "on" the Web; content lives only in packages

- Some publishers are *not* really interested in packaged the content, "just" want to publish on the Web (e.g., scholarly publications

- Though a booming area, audiobooks or sequential art cannot be published easily as EPUB 3
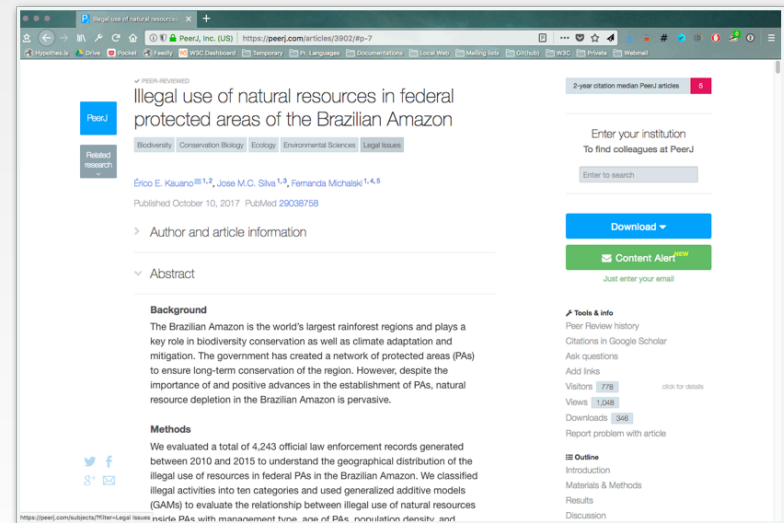
"Web Publications": what is the goal?

Publications—with all their specificities and traditions—should become first class entities on the Web.

- This means:
  - it should be possible to load the publication content into a browser or a specialized reader, whatever the user prefers;
  - it should be possible to read the book either offline or online, whatever the circumstances dictate;
  - it should be possible to rely on browser core engines to implement any reading system for packaged content;
  - contents could be authored regardless of where they are used.

First incarnation of Web Publications: audiobooks

- Currently: many different formats, packages, distribution approaches
  - there is a real need for standardization!

- Relatively simple compared to, say, scholarly publications, textbooks or magazines: good first case

- Others (e.g., educational publications) would follow later, defining specialized Web Publication "profiles"

Defragmenting the Internet of Things

- The Internet of Things refers to connected sensors and actuators

- But *highly* fragmented with myriad technologies and a lack of interoperability for devices and platforms

- W3C is defining Web standards to unlock the potential

- Web of Things
  - Services decoupled from underlying communications
  - Things as software objects with properties, actions and events
  - Linked Data as basis for describing things and their relationships

- https://w3c.github.io/wot-thing-description/

Green shoots in a parched environment

Summary: Wide growth in web tech

- Roadmap for mobile apps
- WebRTC
- Streaming video
- Ad insertion
- Immersive
- Payments
- Web authentication
- Web of Things

- Web App Sec
- Internationalization
- Accessibility guidelines
- Accessibility testing automation
- E books
- Audiobooks