

# Improving Web Payments

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# Overview

- Who is involved
- Benefits of Web payments standards
- What we are doing
- Status of implementation and standardization
- More W3C Activities to enhance commerce on the Web

# Who is W3C



The World Wide Web Consortium (W3C) is an international community that, since 1994, develops open standards to ensure the long-term growth of the Web.

# Web Payments Working Group



- Abine
- Airbnb
- Alibaba
- American Express
- Apple
- BarrierBreak
- Blockstream
- Bloomberg
- Bluesnap
- Bread
- Capital One
- Canton Consulting
- Carte Bancaires (CB)
- CDT
- China Mobile
- Department of Human Services
- Deque Systems
- Deutsche Telekom
- Digital Bazaar
- Discover
- ETRI
- Facebook
- Federal Reserve Bank of Minneapolis
- FIME
- Google
- GROUPE BPCE
- GS1
- GSMA
- HM Government
- IBM
- INRIA
- Inswave
- Intel
- IFSF
- ISO 20022 Registration Authority
- JCB
- Klarna
- Knowbility
- KPN
- LGE
- Lyra Network
- Mastercard
- MAG
- Microsoft
- Mozilla
- NACS
- [NIC.br](http://NIC.br)
- Open Banking LTD
- Opera
- Oracle
- Orange
- Paciello Group
- PayCert
- PayGate
- Ripple
- Samsung
- Seeroo
- Shift4
- Shopify
- Spec-Ops
- Stripe
- Telenor
- Tencent
- Unify
- Visa
- Wiley
- Worldpay

# Benefits of Web Payments Standards

Faster, easier user experience

Increased conversions

Lower cost of front end development

Reduced PCI DSS exposure

Strong consumer authentication

Reduced fraud risk

Payment innovation built on standards

Interop =

Write once,  
run in any  
browser on  
any form  
factor

W3C<sup>®</sup>

# Why Important Now

- Mobile (hardware capabilities, device connectivity, etc.)
- Regulation (e.g., 3DS2, PSD2)
- Payment innovation (digital wallets, blockchain, faster payments)
- EMV migration (fraud moves online)

**W3C is enhancing the Web platform to meet evolving payments industry needs.**

# What We Are Doing

1. Streamlined user experience
2. Secure payments
3. Strong authentication
4. Payment app innovation



W3C, Airbnb, Google, MasterCard session at Money 20/20 2017  
Photo credit: Manash Bhattacharjee

# Before

## Bighorn Canyon NRA Annual Pass

Before You Begin 1 Complete Agency Form 2 Enter Payment Info

Paying online with Pay.gov is safe, secure, and the preferred method of payment using one of the below accepted payment methods, please click on the method you wish to use.

### Accepted Payment Methods:

- ▶ Bank account (ACH)
- ▶ Amazon account
- ▶ Dwolla account
- ▶ PayPal account
- ▶ Debit or credit card

[Preview Form](#)

[Cancel](#)

This is a secure service provided by United States Department of the Interior. All information you provide will remain private. [Please review our privacy policy](#) for more information.



## Bighorn Canyon NRA Annual Pass

Before You Begin 1 Complete Agency Form 2 Enter Payment Info

### Payment Information

Payment Amount: \$30.00

\* I want to pay with my:

- Bank account (ACH)
- Amazon account
- Dwolla account
- PayPal account
- Debit or credit card

[Previous](#)

[Return to Form](#)

[Cancel](#)



## Bighorn Canyon NRA Annual Pass

Before You Begin 1 Complete Agency Form 2 Enter Payment Info

Please provide the payment information below. Required fields are marked with an asterisk (\*).

\* Payment Amount:

\$30.00

\* Cardholder Name

Ian Jacobs

\* Cardholder Billing Address:

1600 Pennsylvania Ave NW



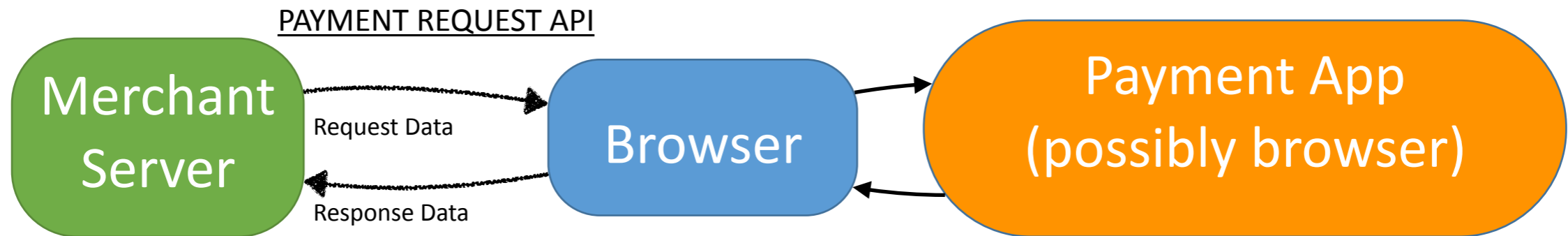
# After



The screenshot shows a webpage for purchasing an annual park pass at Bighorn Canyon. At the top left is the National Park Service logo. The main heading is "Bighorn Canyon" in large white text, with the subtitle "Purchase an annual park pass" in green italicized text below it. A prominent yellow button with rounded corners says "Buy Passes". Below the button, the price is listed as "\$10 Each. Total: \$20". To the right of the button is a vertical quantity selector box containing the numbers 1, 2, and 3, with the number 2 currently selected.

**What happens when you click the “Buy” button?**

# Payment Request Ecosystem



## Payment method

***Data** exchanged between merchant and payment app via the browser.*

*Example: Basic Card Payment Method describes card data returned to merchant.*

## Payment app (aka digital wallet)

***User software** to make a payment, implementing one or more payment methods.*

*Three types of payment apps: browser, native mobile app, Web site.*

# 1. Streamlined User Experience

## MERCHANT-SIDE FORMS

### Bighorn Canyon NRA Annual Pass

Before You Begin

1 Complete Agency Form

2 Enter Payment Info

3 Review & Submit

4 Confirmation

Please provide the payment information below. Required fields are marked with an \*.

\* Payment Amount:

\$30.00

\* Cardholder Name

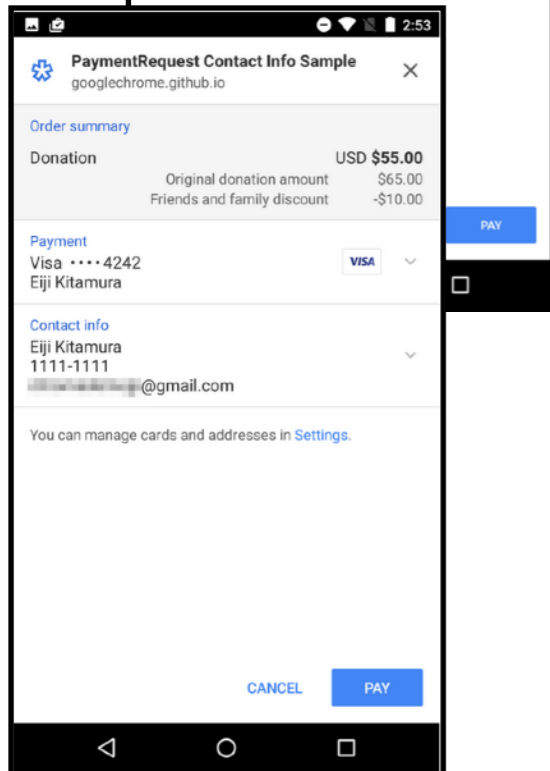
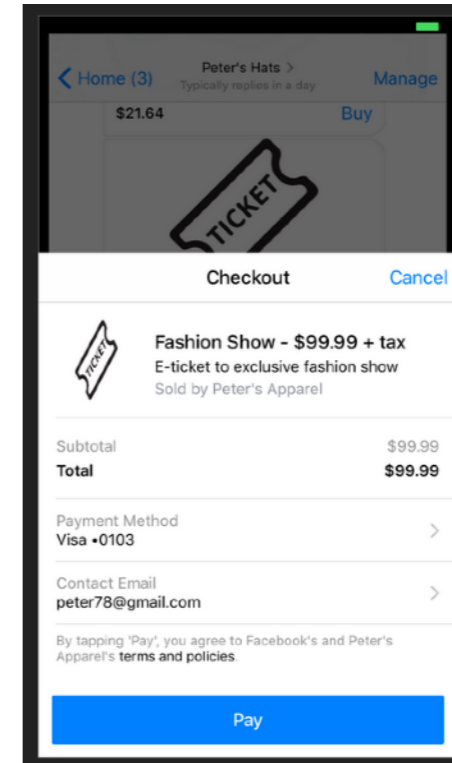
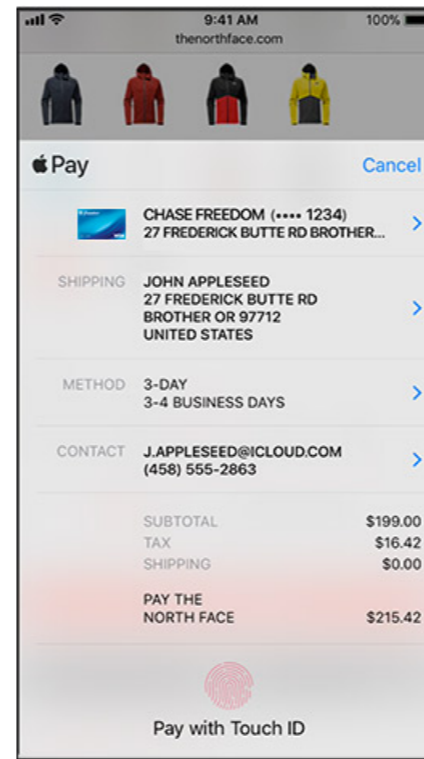
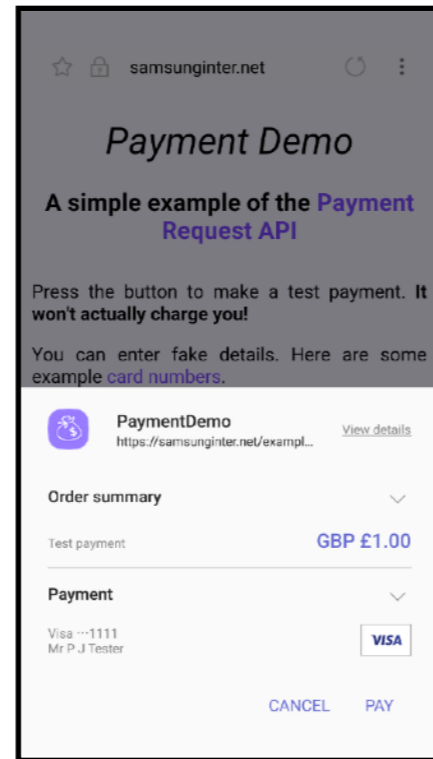
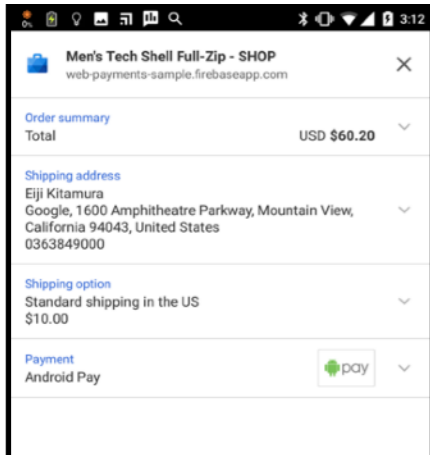
Ian Jacobs

\* Cardholder Billing Address:

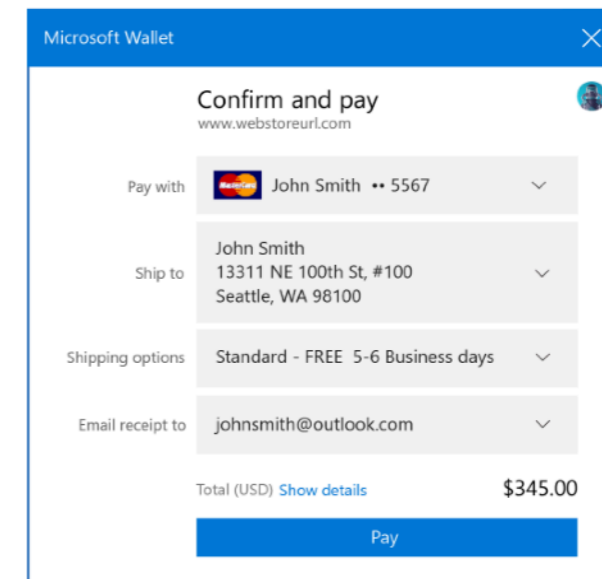
1600 Pennsylvania Ave NW

## Streamlined User Experience

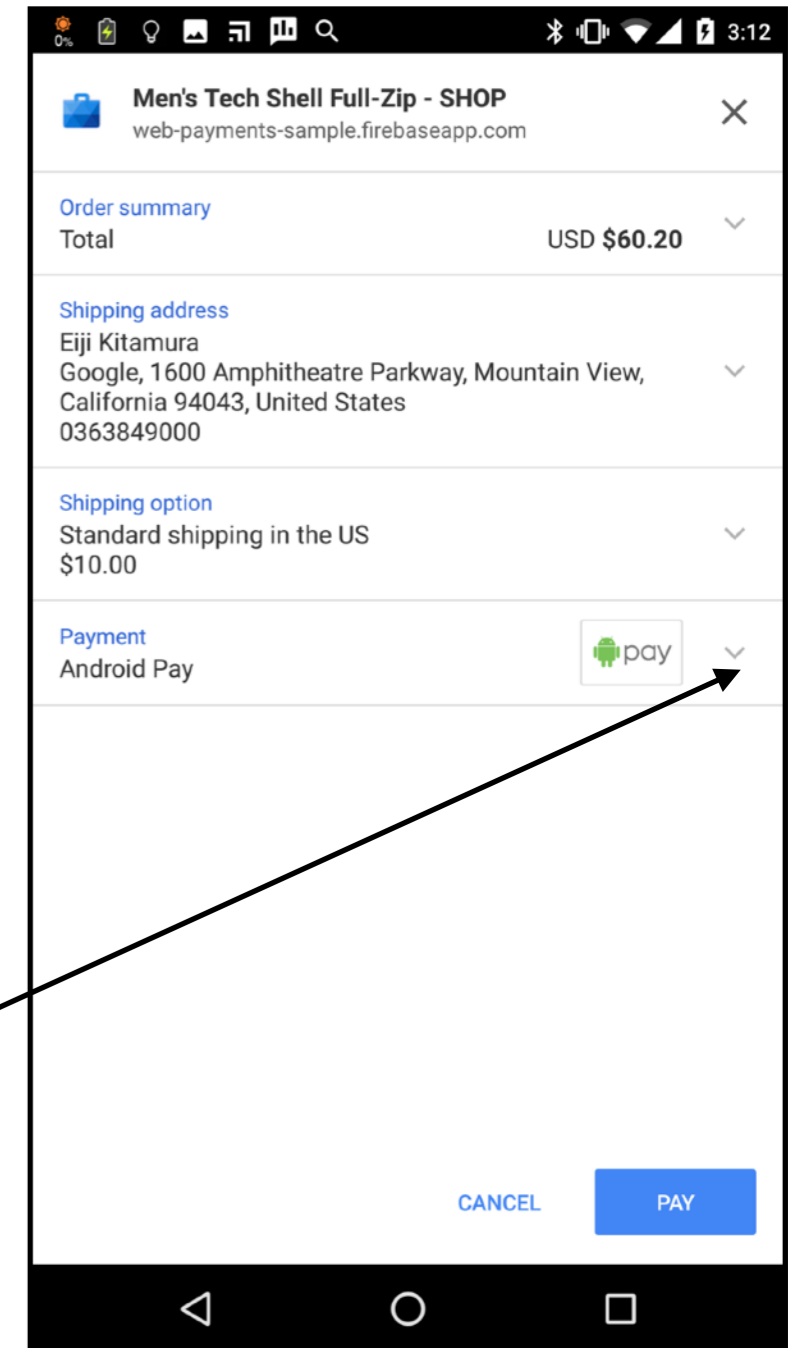
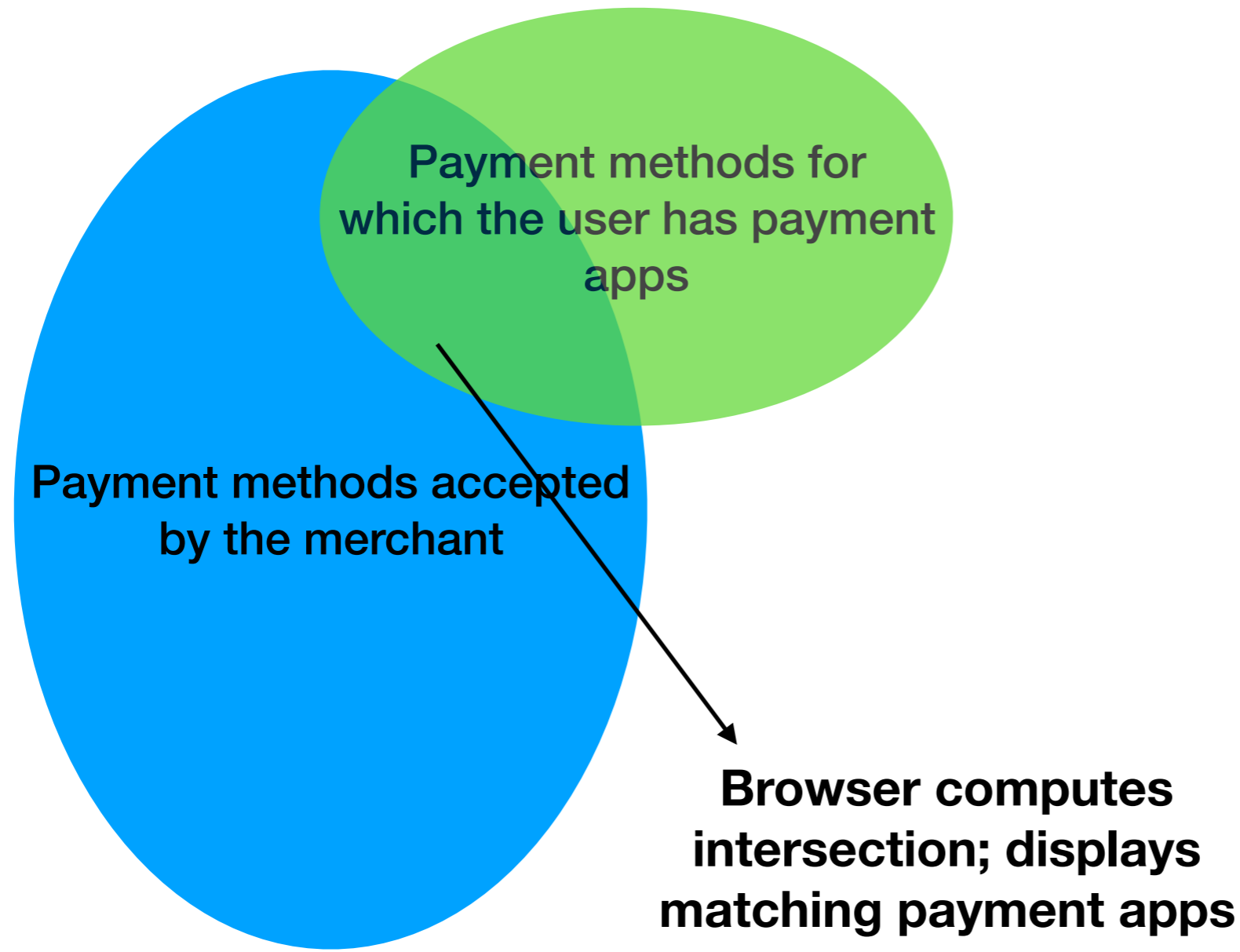
# Reuse Stored Information



**NEW native browser UI.**  
**Note: how data stored is an implementation detail.**

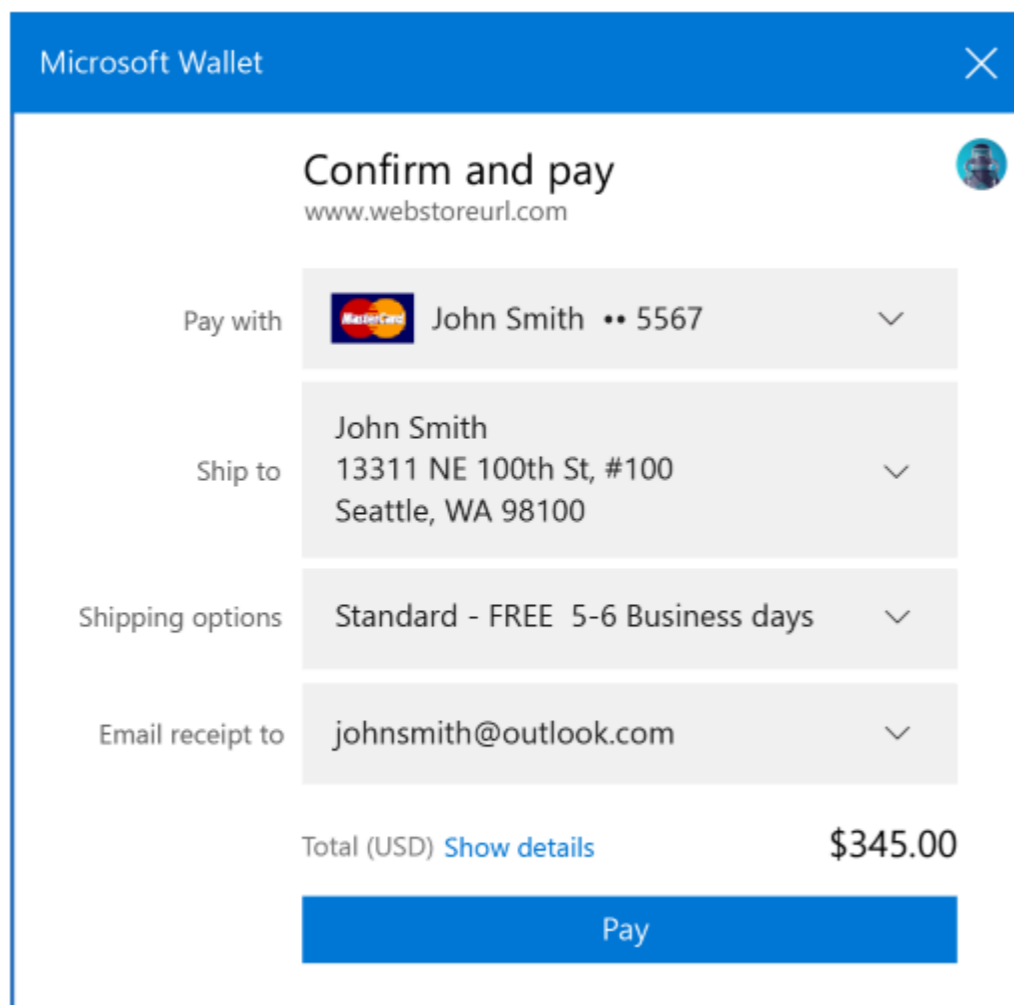


# Reduce Complexity



# Web-Wide Consistency

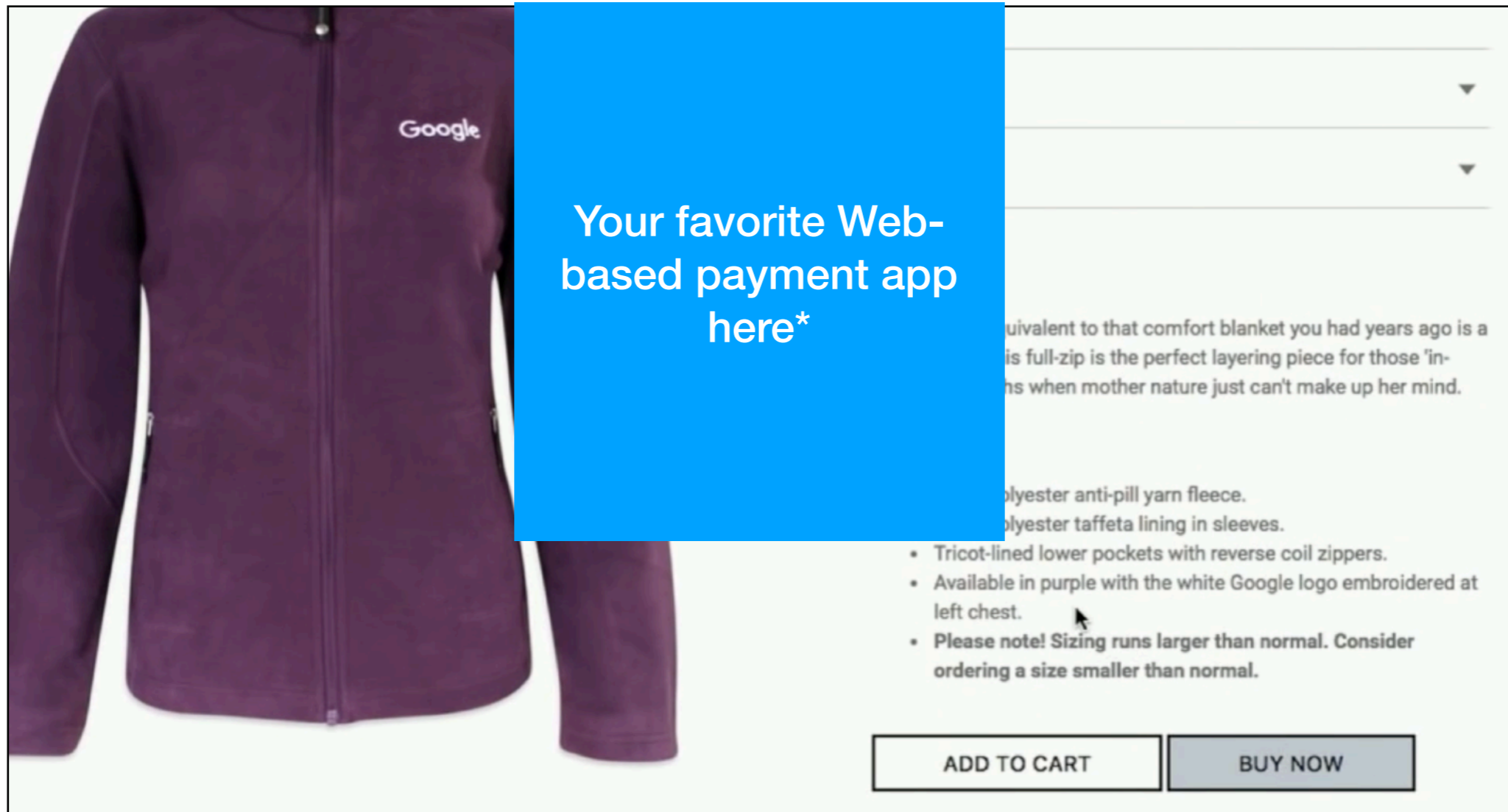
- Predictable, harmonized user experience across sites
- Easier for user to access preferred payment method



The screenshot shows a 'Microsoft Wallet' window titled 'Confirm and pay' for the website 'www.webstoreurl.com'. It features a clean, consistent layout with a blue header and a white background. The payment method is set to a MasterCard for 'John Smith' with the last four digits '5567'. The shipping address is 'John Smith, 13311 NE 100th St, #100, Seattle, WA 98100'. The shipping option is 'Standard - FREE 5-6 Business days'. The email receipt is sent to 'johnsmith@outlook.com'. The total amount is '\$345.00' with a 'Show details' link. A prominent blue 'Pay' button is at the bottom.



# Stay Near Merchant Site



We anticipate that Web-based payment apps will run within modal windows, superior to today's redirects.

*\*Not shown yet because Payment Handler API is in development*

# 2. Secure Payments

~~EXPOSED PANS~~

~~4111111111111111~~

~~5555555555554444~~

~~378282246310005~~

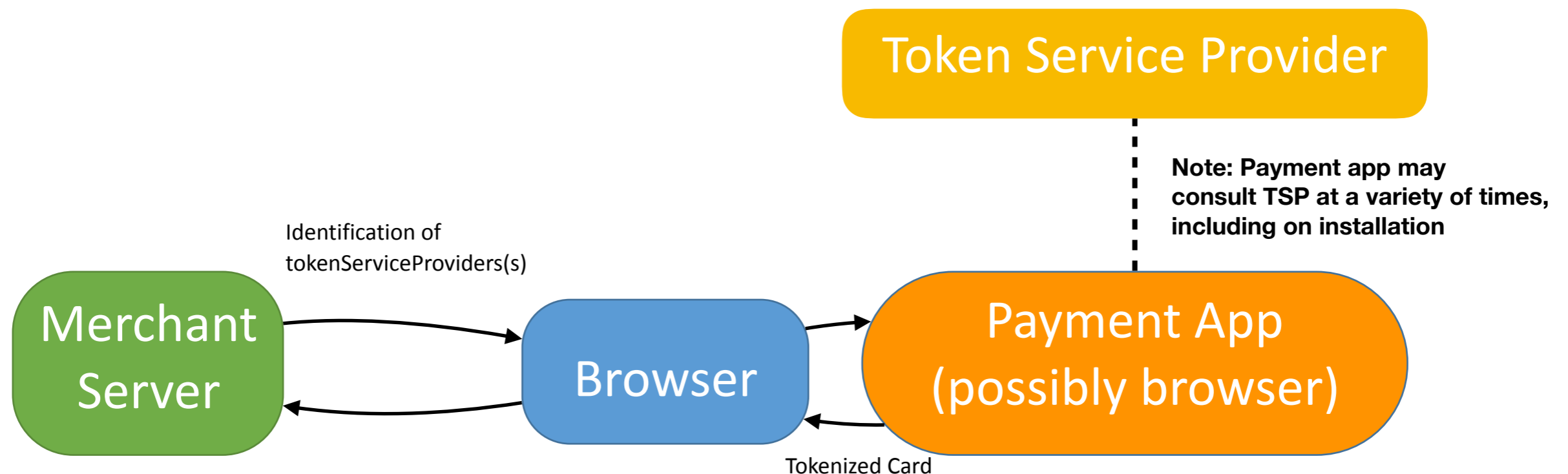


# Tokenization

- Goal: Lower the cost of leveraging existing tokenization mechanisms.
- In discussion: a payment method to make it easier to build a front end that can receive tokens.

*Note: this does not change backend handling of tokens.*

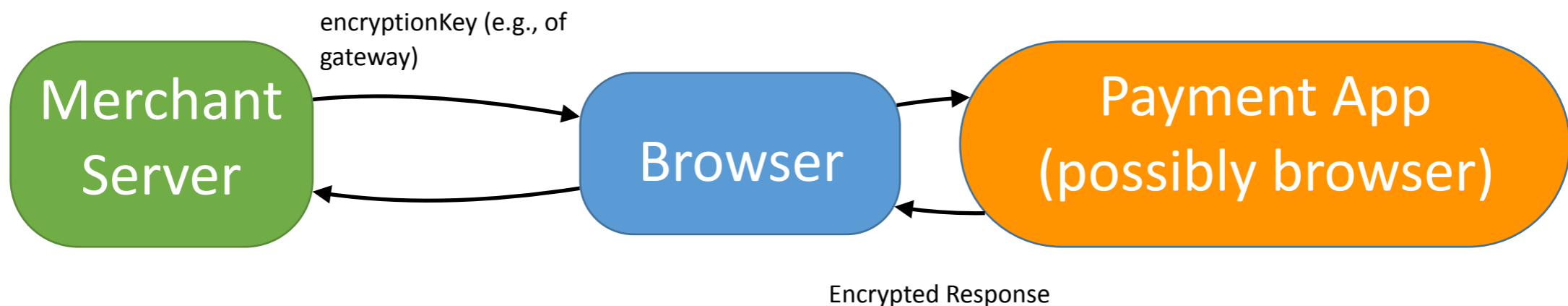
- EMVCo Tokenization WG reps participate directly in this work.



## Secure Payments

# Encryption

- Goals of encryption of response data: lower PCI DSS assessment burden and risk of man-in-the-browser attacks.
  - *Encryption likely to be used by tokenization and other payment methods.*
  - *Current work is understanding how to leverage JOSE JWE (from the IETF)*



# 3. Strong Authentication on the Web

PASSWORDS

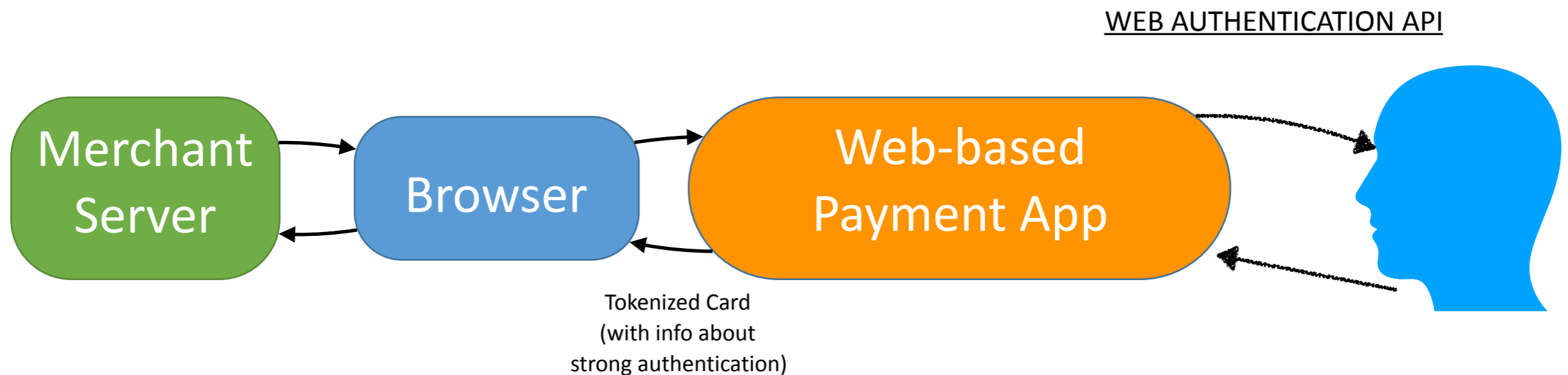
“123456”

“myexgirlfriend”

## Strong Authentication on the Web

# FIDO / W3C Collaboration

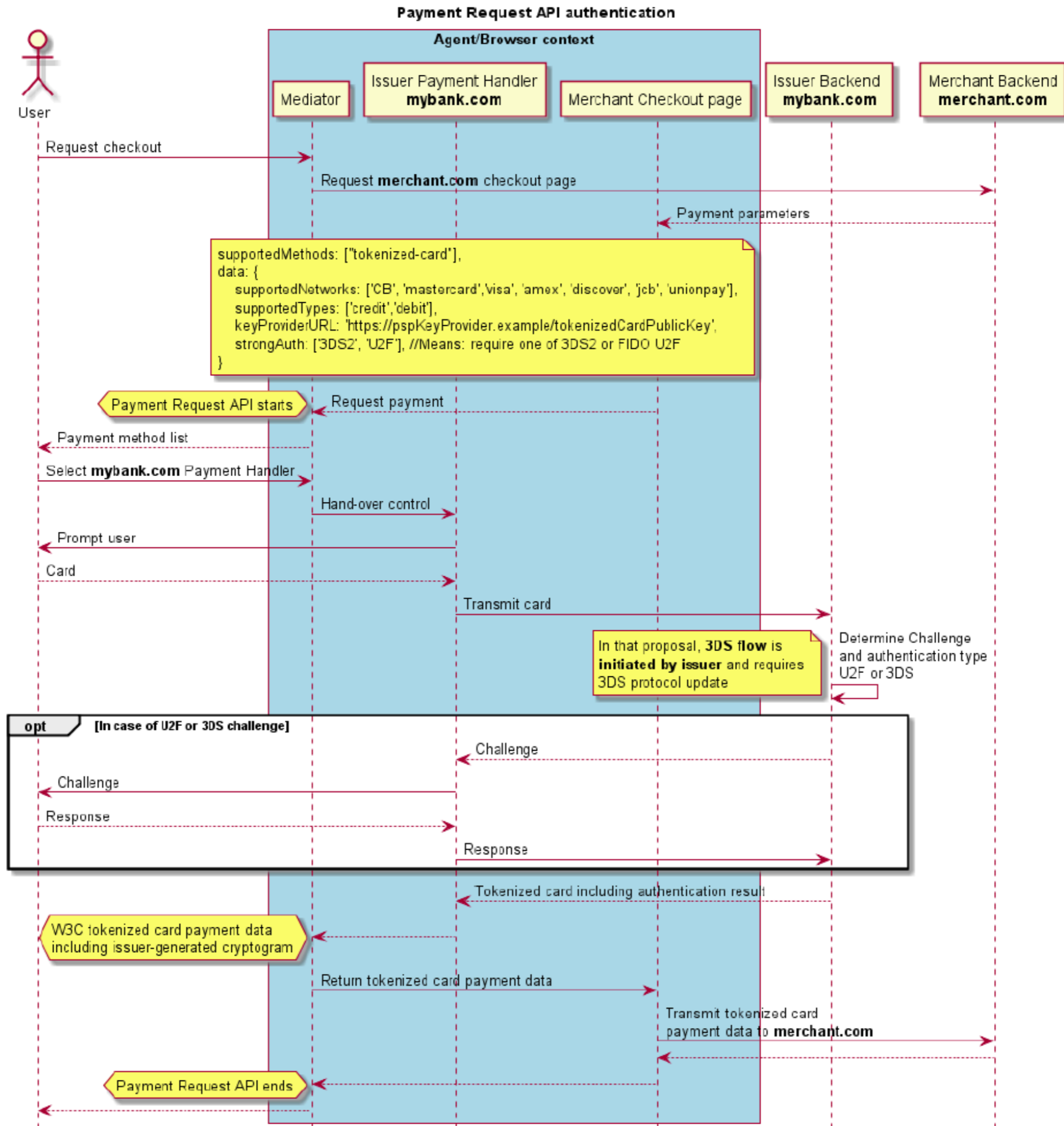
- Passwords are weak, leading to phishing, data loss, liability
- FIDO Alliance and W3C members are working at W3C to enable the creation and use of strong, attested, scoped, public key-based credentials by Web applications
- Benefits:
  - Usability: “one person, one device”, single gesture, no memorization
  - Security: keys stay on device, no server-side secrets, anti-phishing, no linkability between services



# EMVCo / W3C Collaboration

- There are several reasons a merchant may wish to support 3-D Secure 2.x, including (but not limited to):
  - To reduce CNP-related fraud.
  - To increase approval rates.
  - It is required by Central Bank mandate (e.g., in India).
- In January 2017 the Web Payments Working Group launched a task force to understand how to integrate 3-D Secure 2 and new Web Payments APIs.

# Strong Auth Flow

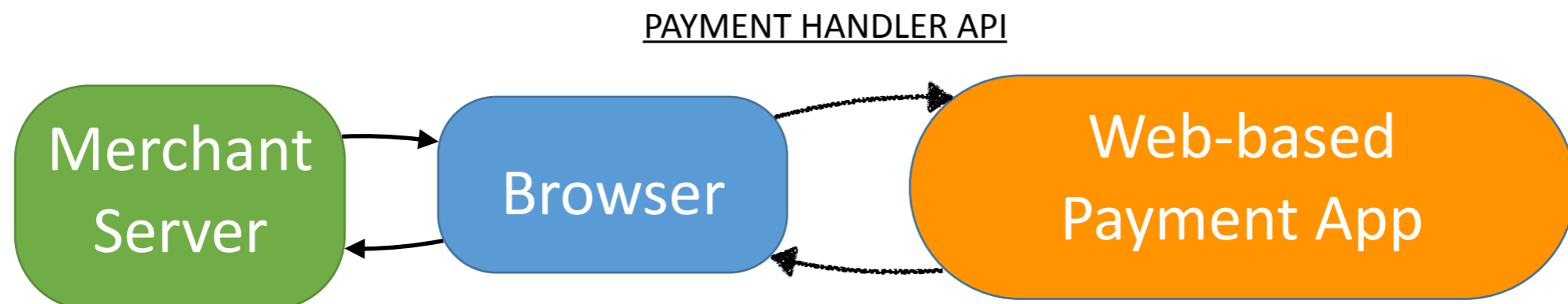


# 4. Payment App Innovation



# Web Payment Apps

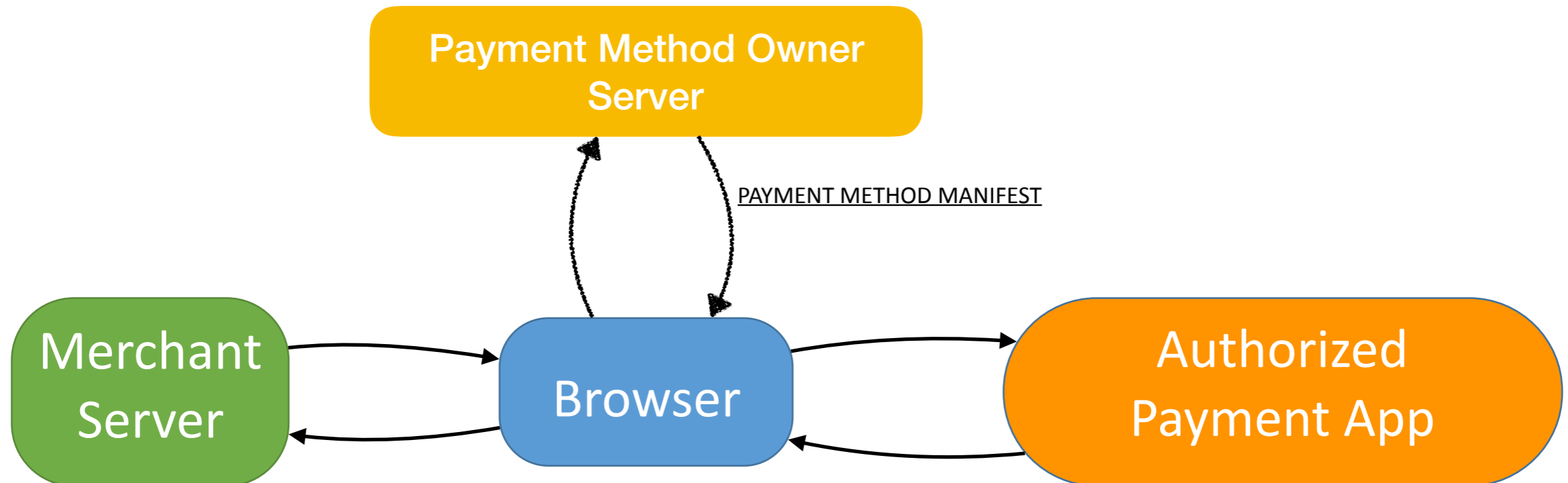
- Why Web apps? **Write once, run cross-platform.**
- Payment Handler API enables Web sites to appear in list of user payment apps.
- Once invoked, payment apps may use other Web standards (e.g., WebAuthn).
- Payment apps distinguish themselves through loyalty or other value propositions to users.





# Payment App Security

- Payment method owners want to ensure that only authorized parties serve authorized (digitally signed) payment apps.
- Browser consults Payment Method Manifests, displaying only authorized payment apps.
- In discussion: just-in-time app registration using manifest info.



# Review: Merchant Benefits

## **Increased conversions**

*reuse of stored info, reduced complexity, consistency, stay near merchant site*

## **Lower cost of front end development**

*standard API replaces web forms*

## **Reduced PCI DSS exposure**

*encryption, digital signatures, tokenization*

## **Strong consumer authentication**

*FIDO, 3DS 2.x*

## **Reduced fraud risk**

*all of the above + payment method manifest*

## **Payment innovation built on standards**

*standard APIs to facilitate more payment methods and apps on the Web, but without increased complexity in the UI due to “matchmaking” in Payment Request API*

# Implementation Status

- **All** major browsers are implementing Payment Request API.
  - *Card-in-browser supported by Chrome, Firefox, Edge, Samsung*
- Facebook, Shopify, Stripe, Braintree, WePay, BS Payone support Payment Request API.
- W3C encourages early, public implementation experience for quality assurance.
- Features are available **today** in some browsers, but may be “behind a flag” or in beta releases.
- Start planning to use the API **now**. Implementations will solidify over the next 9 months.
- Implementations of Payment Handler API and Payment Method Manifest are still experimental and we welcome early feedback!
  - *7 Feb 2018: Google announces intent to ship Payment Handler API.*
  - *Google also working with native mobile app providers on integration of Android Pay, Alipay, Samsung Pay, MasterPass, PayPal, Square, etc.*

# Standardization Timeline

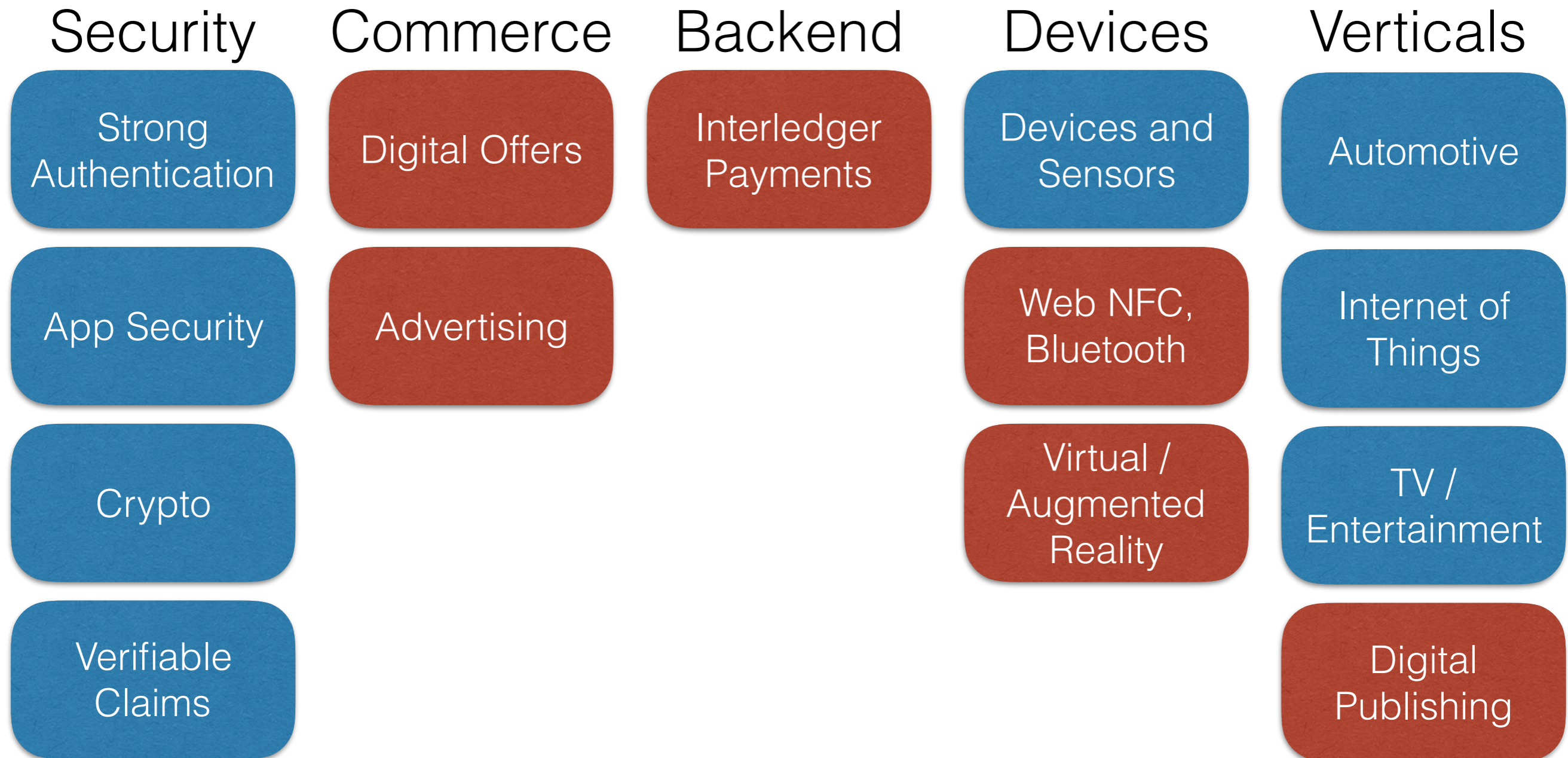
Working Draft

Candidate Recommendation

Recommendation

Oct 2015	Charter Web Payments WG
Feb 2016	Charter Web Authentication WG
Apr 2016	Initial Working Draft: Payment Request
May 2016	Initial Working Draft: Web Authentication, Payment Handler
Sep 2017	Candidate Recommendation: Payment Request
Dec 2017	Candidate Recommendation: Web Authentication + <b>Recharter Web Payments Working Group</b>
Q3 2018	Recommendation: Payment Request, Web Authentication
Q4 2018	Candidate Recommendation: Payment Handler

# More Activities to Enhance Commerce on the Web



**Key: standards track, incubation**

# Thanks!

- Want to get involved? Ian Jacobs <[ij@w3.org](mailto:ij@w3.org)>
- This presentation:  
[https://www.w3.org/2018/Talks/ij\\_payments\\_20180320/w3c.pdf](https://www.w3.org/2018/Talks/ij_payments_20180320/w3c.pdf)
- Web Payment Working Group specifications
- Demos, FAQ and Developer Portal
- PR API on Mozilla Developer Network and code samples
- More W3C Working Groups and Community Groups