



# The Future of E-Commerce is More Web-like

Ian Jacobs  
W3C



# I. What the Web Means for Commerce





# New Zealand E-Commerce



## ONLINE SHOPPING



**2 MILLION**

NEW ZEALANDERS  
SHOP ONLINE



**20.6 MILLION**

ITEMS PURCHASED  
LAST YEAR



**\$4.7 BILLION**

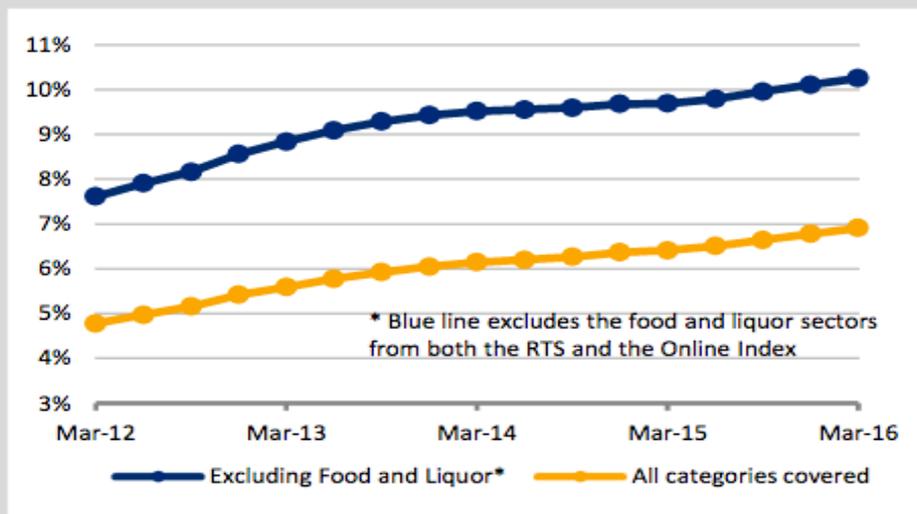
SPENT ON  
ONLINE SHOPPING



# E-Commerce Rising Proportion of Retail (NZ)

## Online retail spending as a % of reported retail sales\*

Online retail sales / Retail sales in Statistics NZ Retail Trade Survey (RTS)



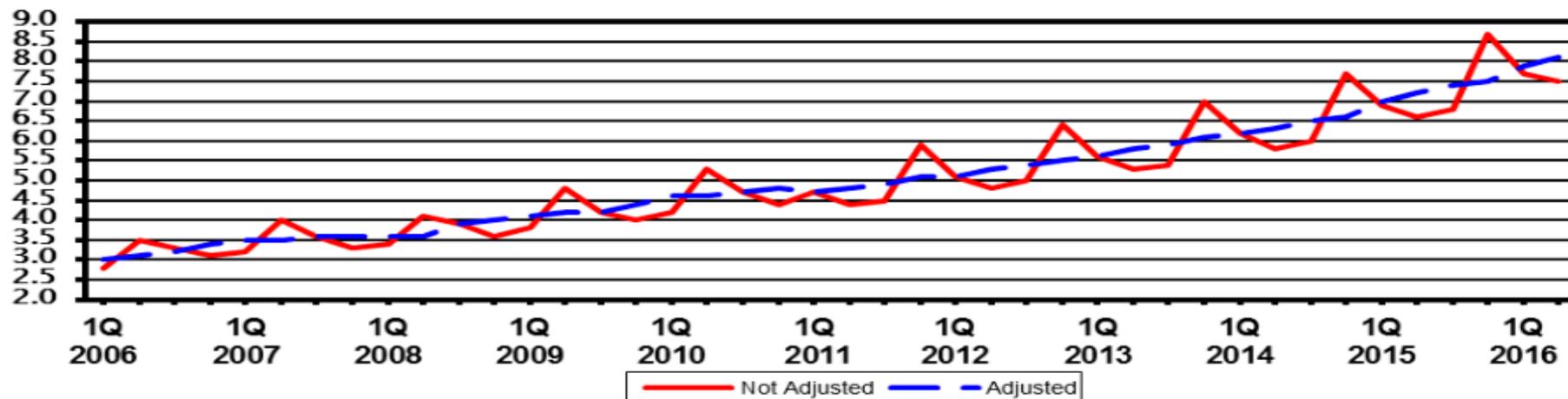
Official retail sales statistics are from Statistics New Zealand's Retail Trade Survey (RTS)\*  
Online data is from BNZ/Marketview. The footnote on page 1 lists categories included in the analysis.



# Similar Trend in the US

**Estimated Quarterly U.S. Retail E-commerce Sales as a Percent of Total Quarterly Retail Sales:  
1<sup>st</sup> Quarter 2006 – 2<sup>nd</sup> Quarter 2016**

Percent of Total



The Quarterly Retail E-Commerce sales estimate for the third quarter of 2016 is scheduled for release on November 17, 2016 at 10:00 A.M. EST.



# E-Commerce Used to Be More Linear

Research



Shop



Purchase



Loyalty





# Now Customers Expect a Web Experience

Fast,  
Effortless  
Discoverable

Online  
Security and  
Privacy

Payment  
choice,  
Fast clearing

Cross-device,  
Ubiquitous,  
Integrated

Digital loyalty,  
Customization,  
Social



# Mobile a Key Enabler (US)

“Where have you used your smartphone to perform the following shopping-related activities in the past month?”

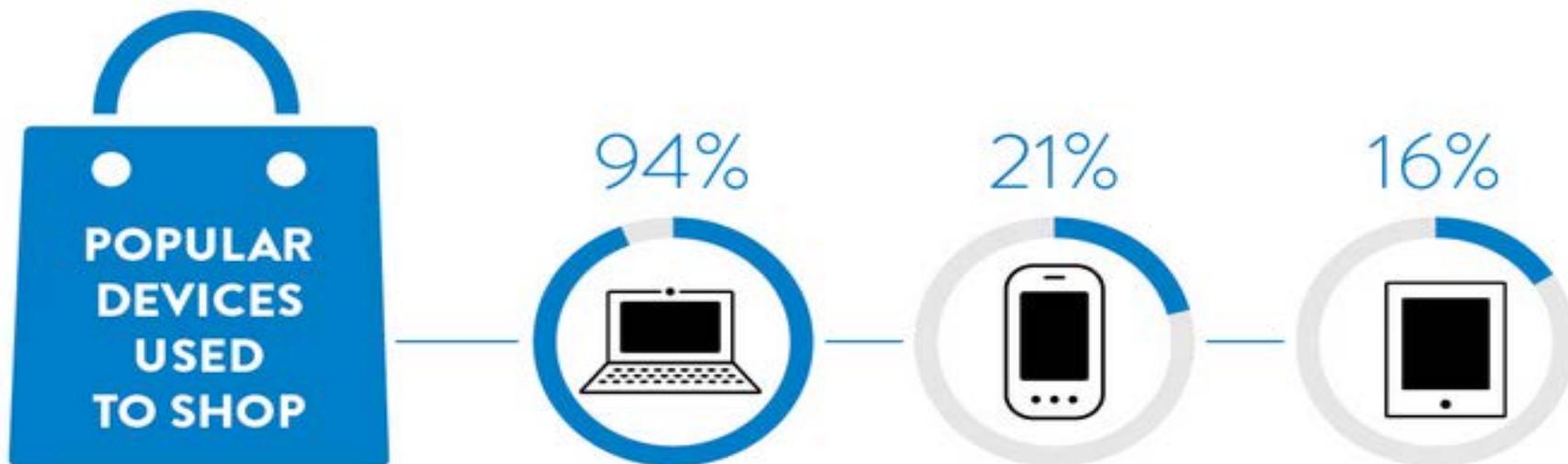


Base: 511 consumers who have used their mobile phone in the past three months to perform a retail-related activity

Source: A commissioned study conducted by Forrester Consulting on behalf of RetailMeNot, July 2015



# Mobile is Lagging in NZ?





## What Can Retailers Do?

*For retailers to attract consumers today, they need to put themselves in their shoppers' shoes. **Fast tracking the consumers' experiences on their mobiles and allaying delivery concerns means online retailers could enjoy **double digit growth** over the year ahead.***

-- [Nielsen New Zealand E-Commerce Report 2016](#)



# Poor Experience Leads to Abandonment

- Usability challenges on mobile
  - Small screens, keyboards
- Mobile wallet fragmentation
- Complex check-out
- User payment preference not offered
- Different experiences on all sites
- Different experiences in-app, proximity, Web





# Poor Security Leads to Lost Loyalty...

- Passwords are inadequate
  - Multi-factor authentication not well-integrated
- User interface complexity creates attack opportunities (e.g., phishing)
- Distributed applications create attack opportunities (e.g., cross-site scripting)
- Standard crypto primitives not available to Web applications

*"After a security breach, 12% of loyal shoppers stop shopping at that retailer, and 35% shop at the retailer less frequently."*

- [Forrester Research](#)



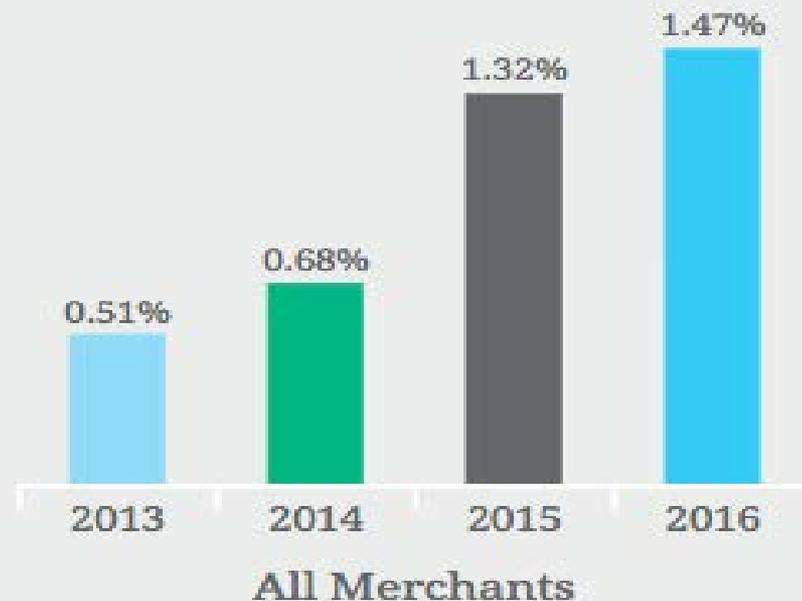
# ...and Increased Costs

## Cost of Fraud as a % of Revenues Keeps Going Up

Weighted merchant data

Q: What is the approximate dollar value of your company's total fraud losses over the past 12 months? Fraud losses as a percent of total annual revenue.

Fraud Costs as a Percentage of Annual Revenues





# Merchants (and Web) Need to Adapt

- Web intended to enable humanity to connect and communicate
  - Powerful enough for [1.5 trillion USD](#) of E-Commerce annually
- But the Web was not designed as an E-Commerce platform
- Evolving expectations driving new requirements



# Web Scale Improvements Call For Standards

- Many standards bodies exist
  - ISO, EMV, PCI, X9, IEEE, NIST, ...
- Interfaces between Web stack, applications, underlying payment systems not generally standardized
- Inadequate integration. Specifically, no standard APIs for wallet access, raising implementation costs for payment services providers; tokenization not part of the Web, biometrics not yet part of the Web



## II. Who is W3C?



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



# Key Facts

- [Founded in 1994](#) by Web inventor Tim Berners-Lee
- [~425 Members](#); full-time staff ~80
- Community of thousands
- [Liaisons](#) to drive interoperability
  - ISO TC 68, ISO 20022, IETF, ...
- [Hundreds of specifications](#) ([royalty-free](#))





# W3C is Building an Open Web Platform

- The Open Web Platform is a full-fledged programming environment for rich, interactive, cross-platform applications
- HTML5 is the cornerstone
- Most interoperable platform in history
- A billion Web sites
- Millions of developers

**HTML**





# Including Built-In Payments Capabilities

*“We are long overdue for a payments user interface for the web.”*

*-- Tim Berners-Lee*

[What if ‘One Click’ Buying Were Internetwide?](#)

New York Times, 25 September 2016



## III. The Road to More Web-Like E-Commerce

Streamlined  
Checkout

Enhanced  
Security

Payment  
method  
innovation

Browser as  
ubiquitous  
platform

Loyalty and  
Marketing



# Streamlined Checkout





# Demo

Payment Requested from github.adrianba.net

## Pay with



## Ship To

6825 Amber Moor  
Illinoistown, WA 98940  
(253) 099-9684

## Shipping Option

Ground 5-7 day shipping

## Summary

Sub-total	55.00
Sales Tax	5.00
Express (2 day)	8.00
<b>Total due</b>	<b>68.00</b>

Cancel

Authorise

- [Demo](#) by Adrian Bateman (Microsoft)



# Chrome/Android Beta Available

Worldwide multi-option shipping ✕  
rsolomakhin.github.io

**Order summary**  
Donation USD **\$55.00** ∨

**Shipping address**  
Google, 340 Main St, Los Angeles, CA 90291,  
555-555-5555, United States ∨  
Jane Doe

**Shipping option**

Standard shipping  
\$0.00

Express shipping  
\$12.00

**Payment**  
Visa ...1112 ∨  
Jane Doe

- [“Payment Request API Guide”](#) (Google)



# Key Ideas for “Payment Request API”

- Replace forms with native browser UI for payment info (card, address, etc.)
  - Browser chrome is fast
  - Improves security -- harder to spoof than Web page
- Simplify user experience (UX), especially on mobile
  - User reuses data without re-typing
  - Browser only shows matching payment methods, so less noise
  - User can find preferred payment method without scanning page
  - Browsers distinguish themselves through optimized UX (e.g., 1-click)



# Please Note

- Neither Payment Request API nor browser submits payment for processing
  - Data returned by API depends on payment method (e.g., PAN, EMV token)
- Goal of API is to facilitate information collection and return to merchant
  - Merchant (or gateway) still needs to handle data they receive
- Authentication is handled by another W3C group
  - [Web Authentication Working Group](#)



# Open Ecosystem of 3<sup>rd</sup> Party Payment Apps

- Payment Request API only supports browser-stored card credentials
- A complementary API will enable third party payment apps
  - User registers payment apps from many sources: banks, merchants, mobile operators, etc.
  - Merchant may recommend payment apps during checkout
    - *Note this is a new way for users to learn about and register (payment) apps*
  - Payment apps support different payment methods (e.g., cards, credit transfers, proprietary methods, distributed ledgers, etc.)
- Payment apps will distinguish themselves through services
  - Usability, strong authentication, tokenization, location services, loyalty programs, etc.



# Merchant Perspective

- Consistent, simpler UX should increase conversions
- Enables a branded, harmonized experience across channels through (retailer) payment apps
- Merchant payment apps can integrate loyalty and points
- Facilitates adoption of payment method improvements (e.g., to improve security)
- Increased support for user preferred payment methods

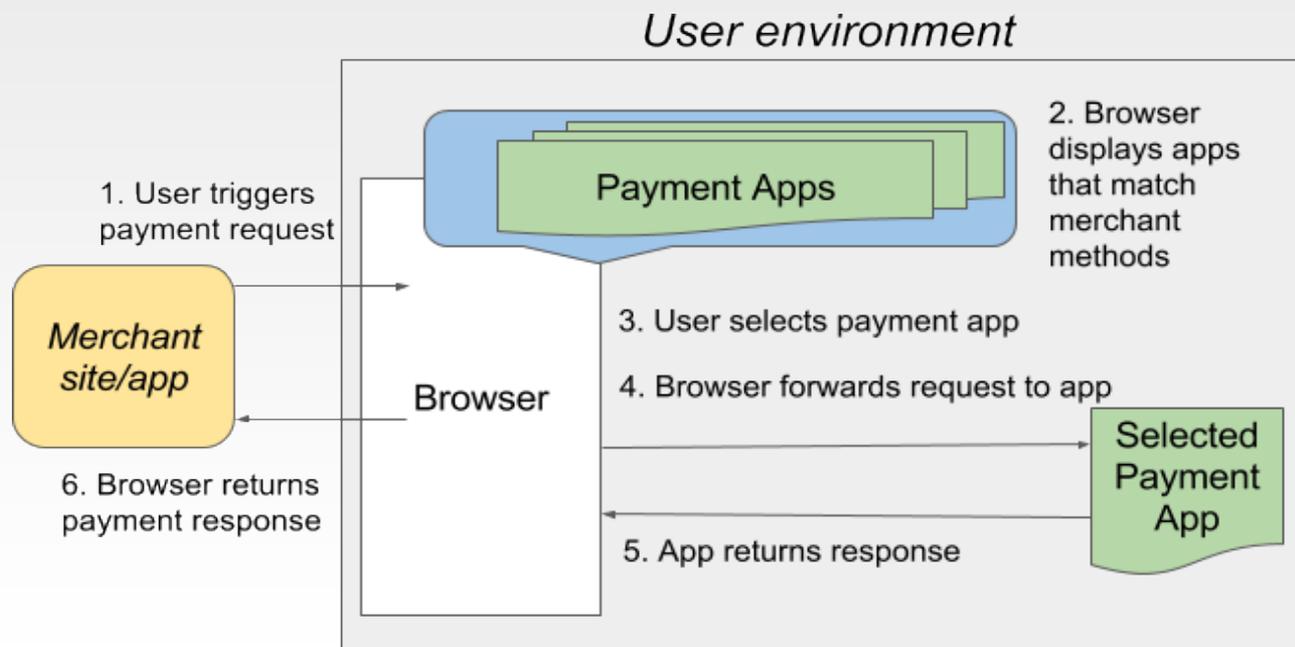


# Payment Gateway Perspective

- Cross-device interoperability at lower cost (benefit of using the Web)
- Lower cost to build checkout
- Can support more payment methods without more complex UX
  - Thanks for browser “match making”

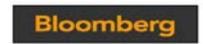


# Flow





# Who's Involved





# Status

- Microsoft, Google have announced publicly their goal that the API be available for holiday season 2016
  - Implementations underway
  - See Google's evolving [Payment Request API Integration Guide](#)
- Apple announced "Apple Pay on the Web" and [stated](#) goal within Web Payments Working Group of convergence to a "solid, cross-browser framework for payments."
- Mozilla, Opera have begun work
- Gathering feedback from experiments with merchants, E-Commerce providers, proprietary payment app providers



# Enhanced Security





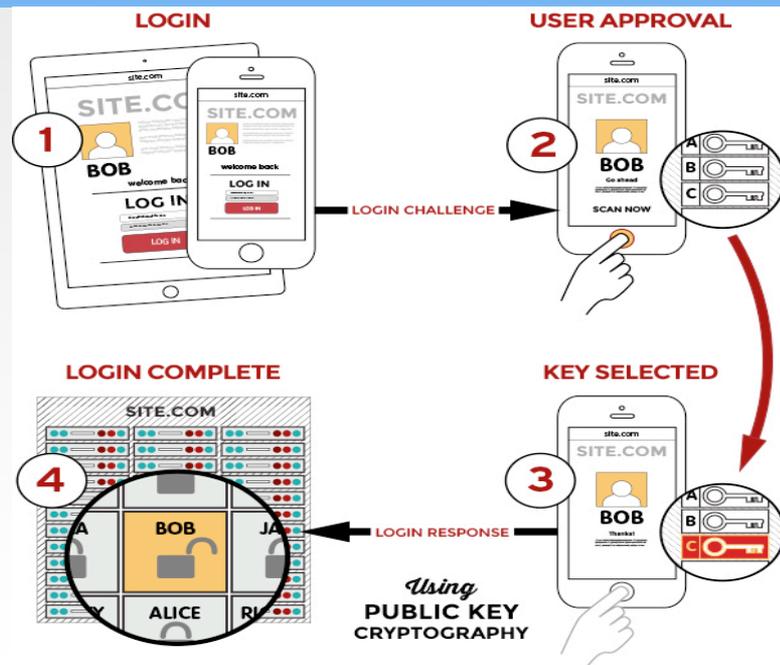
# Data Protection

- Crypto primitives for Web apps:
  - Hashing, signature generation and verification, and encryption and decryption, key management.
  - [Widely supported in browsers](#); gaining broad interoperability.
- For:
  - Secure messaging
  - Multi-factor authentication
  - Protected document exchange
  - Cloud storage
  - Document signing
  - Data integrity



# Strong Authentication

- Passwords weak
  - Phishing, data loss, liability
- Replace them with logins via USB key or smartphone.
- Collaboration with FIDO Alliance, who brought 2.0 specs to W3C
- [Launched 17 Feb 2016](#)
- [First Working Draft published in May](#)





# Application and Communication

- Protect apps against injection of unwanted or malicious code
- Assure the integrity, authenticity, and confidentiality of Web interactions
- Includes:
  - Secure communication channels
  - Apps delivered without spoofing, injection, eavesdropping
- [Numerous specifications at different maturity levels](#), such as
  - Cross-Origin Resource Sharing, Content Security Policy, Subresource Integrity, Credential Management, ...



# Hardware Security

- Access to secure element and other hardware from Web apps
  - More general than Strong Authentication work
- Identity use cases (e.g., government issued identifiers) raise interesting privacy issues.
- [Hardware Based Secure Services Community Group](#) now:
  - Clarifying use cases
  - Documenting technical requirements
  - Planning to write draft API
  - Then will propose clearer charter

Incubation  
Phase





# Verifiable Claims

- Problem statement from Credentials Community Group:

*“There is currently no widely used self-sovereign and privacy-enhancing standard for expressing and transacting verifiable claims (aka: credentials, attestations) via the Web.”*

- CG wrote [use cases](#) for several industries. Includes for financial services:
  - Lowering KYC costs
  - Money transfer
  - Setting up bank account from home
- Next steps: W3C Management to review [draft charter for a Verifiable Claims WG](#) and decide whether to propose to W3C Membership



# Payment Method Innovation





Incubation  
Phase

# Interledger Payments (ILP)

- Ripple brought to W3C (see [white paper](#))
- Moving money between payment systems is costly and cumbersome
  - Users want payments to be simple, whatever the underlying systems
- Interledger bridges payment systems
  - Very Web-like vision
  - Anyone with accounts on two ledgers can connect them (and charge a fee)
  - Protocol ensures everyone paid, or no one
- [ILP Community Group](#) developing plan for specifications
  - Some specs likely to advance to a W3C Working Group



# Loyalty and Marketing





# Digital Offers

Incubation  
Phase

- Merchants interested in:
  - Coupons, loyalty, discounts, multi-tender
  - Harmonized experiences in-store and online
  - Omni-channel customer relations
- Coupons natural extension to Web payments API
  - Improve the Web for digital offers, including loyalty, coupons, rewards, points, and vouchers.
- [Digital Offers Community Group](#)
  - Launched **10 October** to develop gap analysis, use cases, incubate

*“65% of customers use their smartphones to find coupons online...Retailers that can create experiences that serve consumers in context will drive both customer loyalty and business results.”*

- [Forrester Research](#)



# Browser as Ubiquitous Platform





# Broad Set of Activities to Enhance Browser

- [Geolocation Working Group](#)
  - Geolocation and geofencing
- [Web Applications Working Group](#)  
~~[Web Real-Time Communications Working Group](#)~~
  - Real-time video/audio in the browser for remote enrollment?
- [Paid Content CG](#)
  - Discovery, pricing, transactions, storage and access control.
- Push notifications
- [Web Bluetooth CG](#) and [Web NFC CG](#)
  - Web app support for proximity payments?
- [Blockchain CG](#)



# Help W3C Build the Web

Tim Berners-Lee featured at London Olympics 2012





# Resources

- These slides:  
[https://www.w3.org/2016/Talks/ij\\_paymentsnz\\_2016/w3c.pptx](https://www.w3.org/2016/Talks/ij_paymentsnz_2016/w3c.pptx)
- Contact:  
Ian Jacobs <[ij@w3.org](mailto:ij@w3.org)>
- More about W3C Payments  
<https://www.w3.org/Payments/>