Web Payments Architecture

Next steps for the Web Payments WG

Disclaimer

This does not represent consensus of the WG

What follows is a conceptual architecture for the payment APIs based on feedback, discussion and experience of the WG

Goals

- **Lower Friction**

  fewer clicks, swipes, taps, no typing

- **High Security**

  cryptographic certainty, risk-based policies, two-factor authN

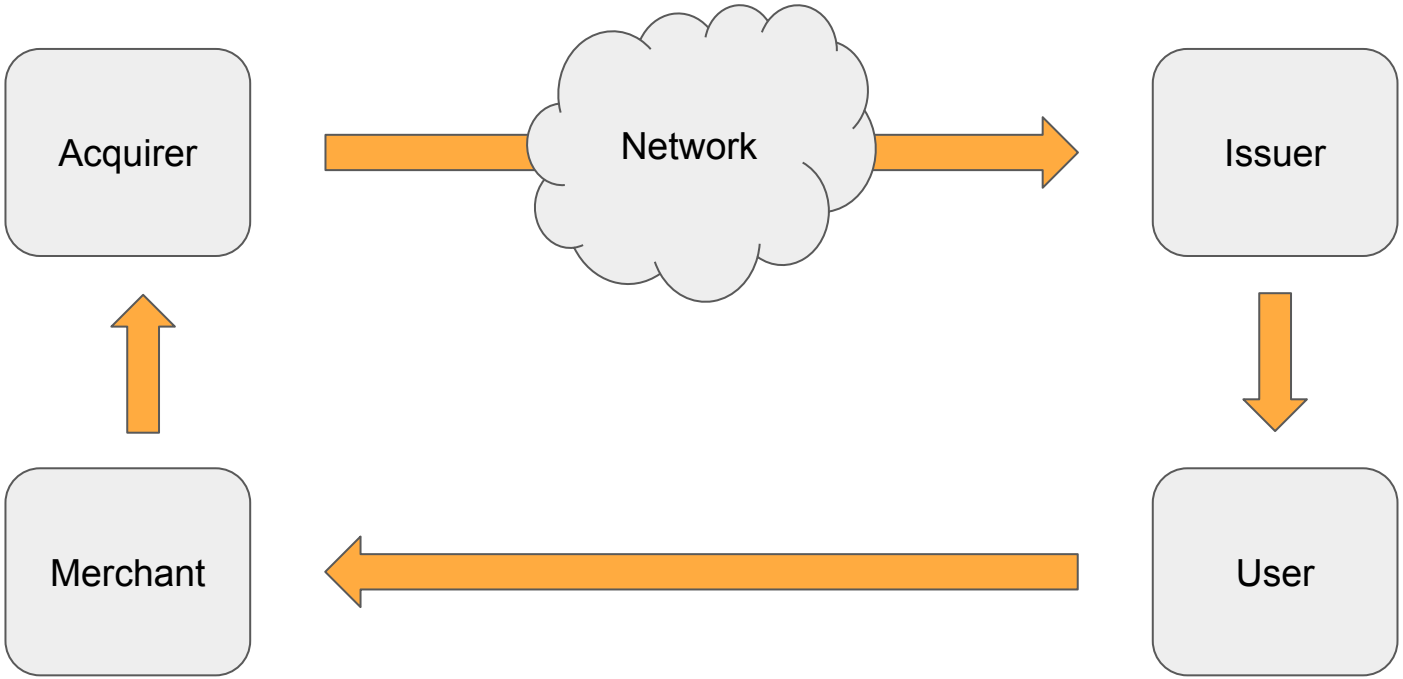
- **Protect Privacy**

  only share data as required, always with consent

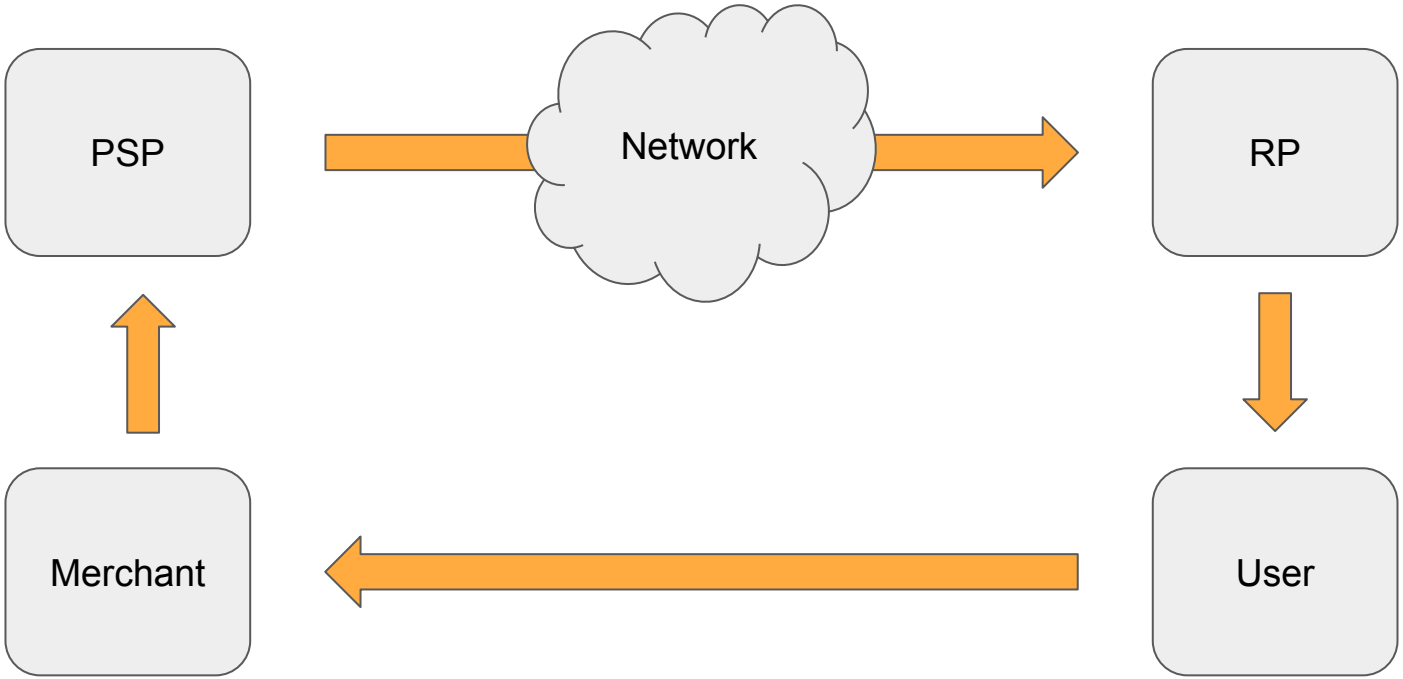
Immovables

- Origin Security Policy
- Risk is evaluated based on data
- Data collection is bad for privacy
- Payment initiation often done by 3rd-party from 3rd-party context (iframe)
- Browsers limiting 3rd-party access to data/cookies to prevent tracking

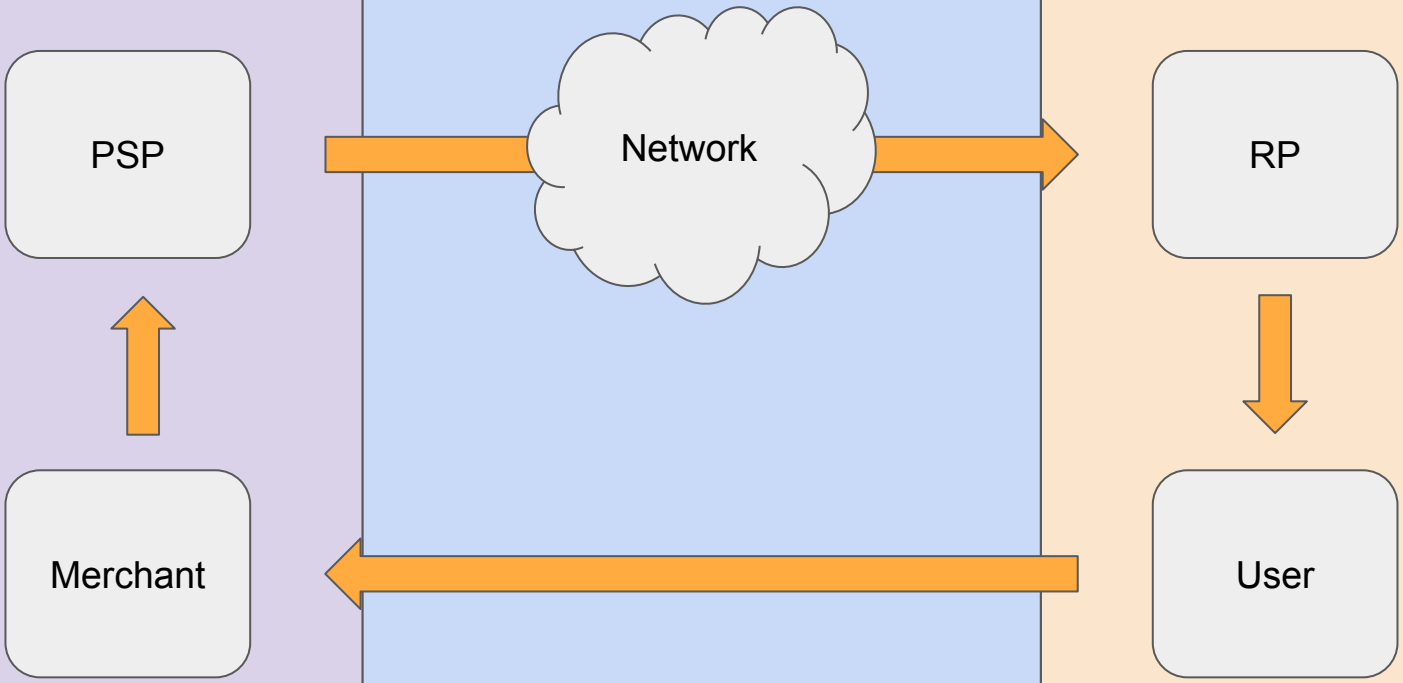
4 party model



4 party model (generic)



3 domains



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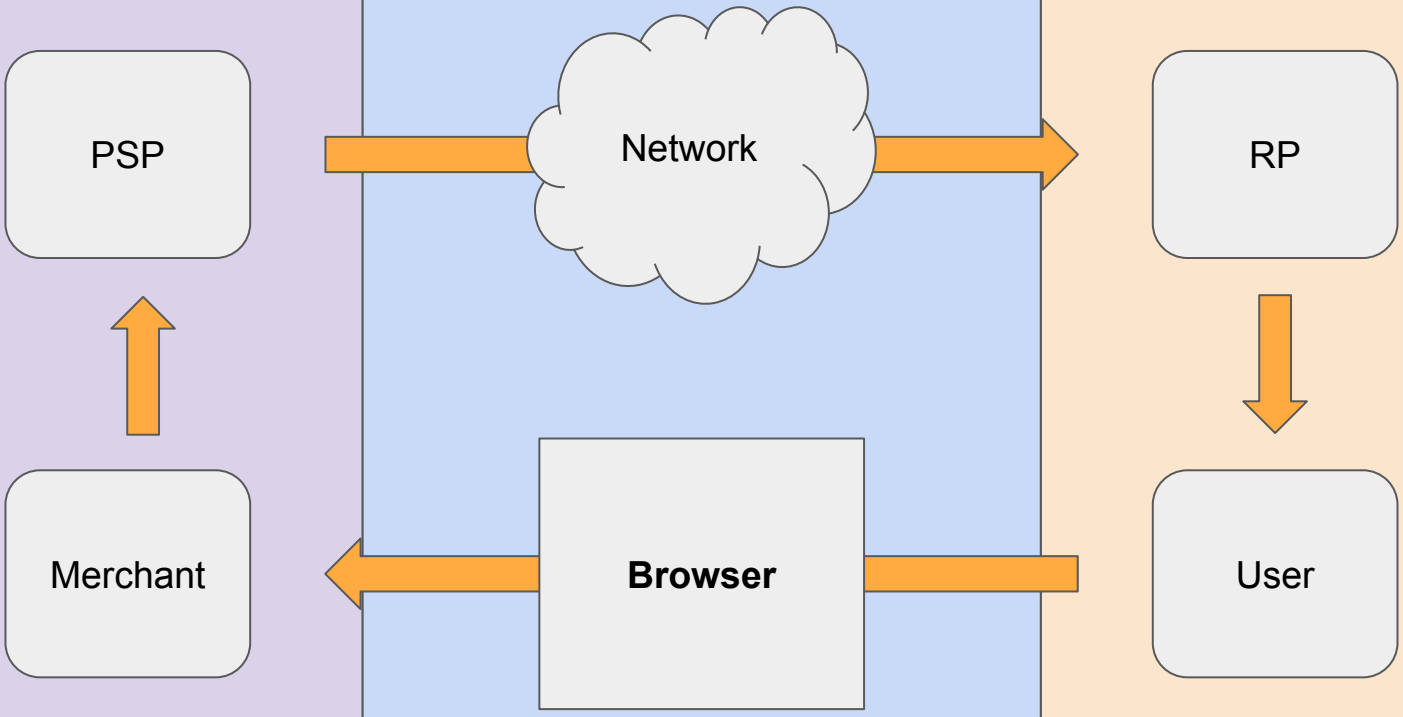
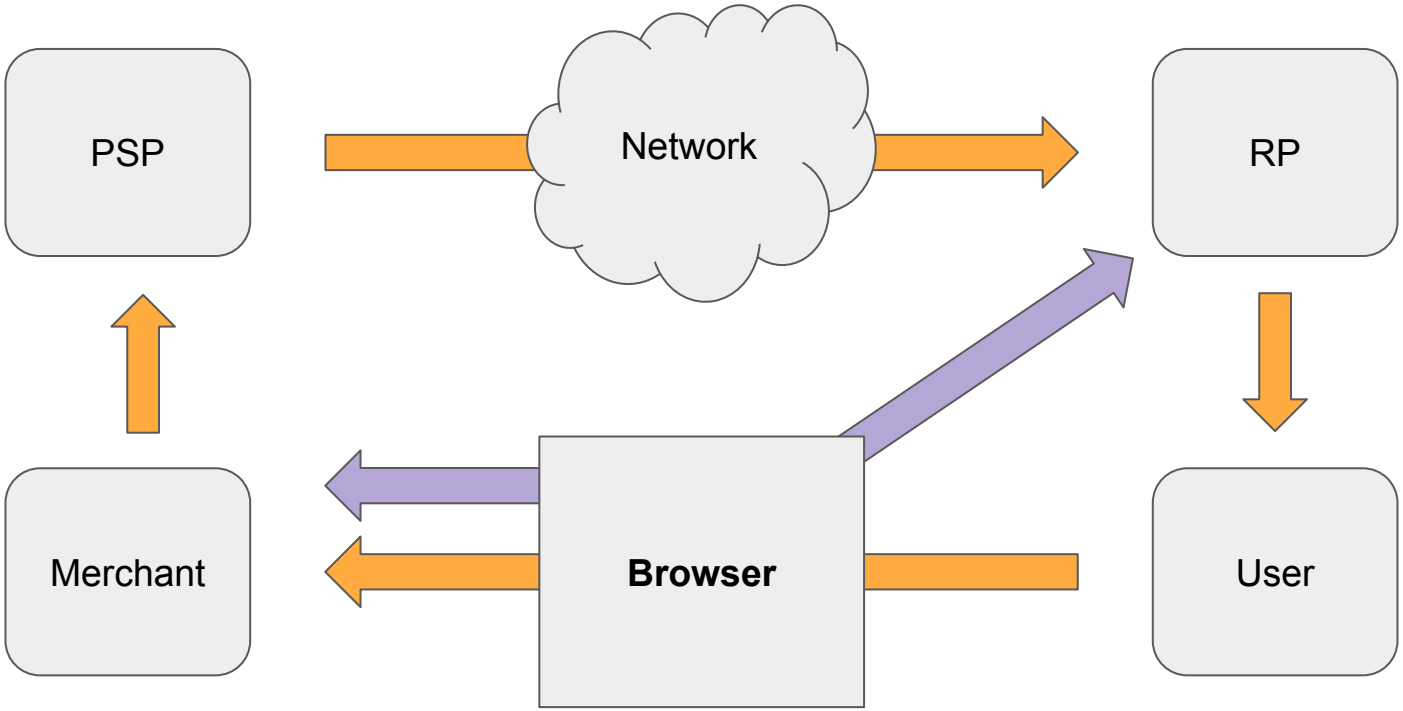


Old Thesis - Interoperability



New Thesis

Provide More Options

Break a payment into stand-alone functions

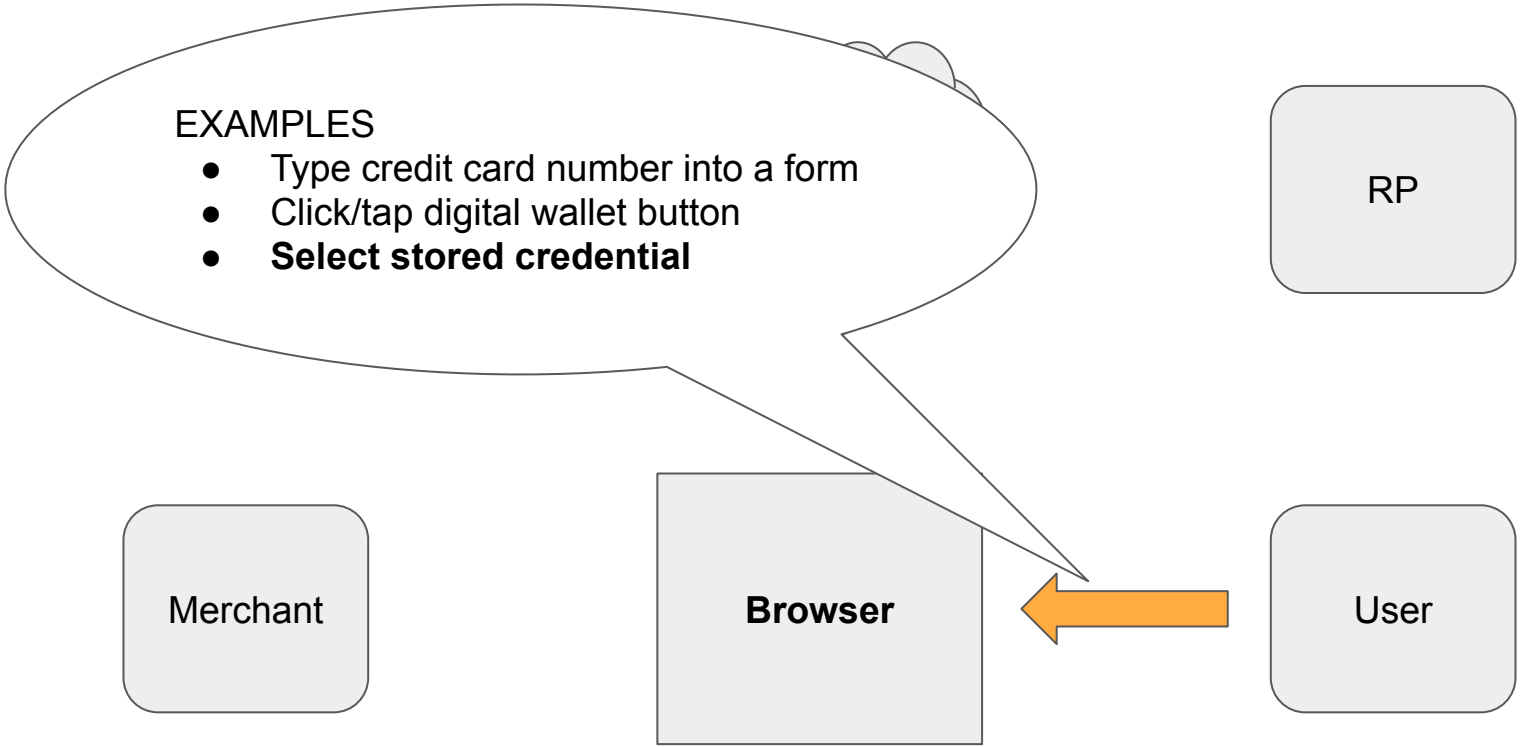
Provide primitives to cater for each function:

1. Instrument/Payment Method Selection
2. Authentication of User and Payment Details
3. Authorization of Payment

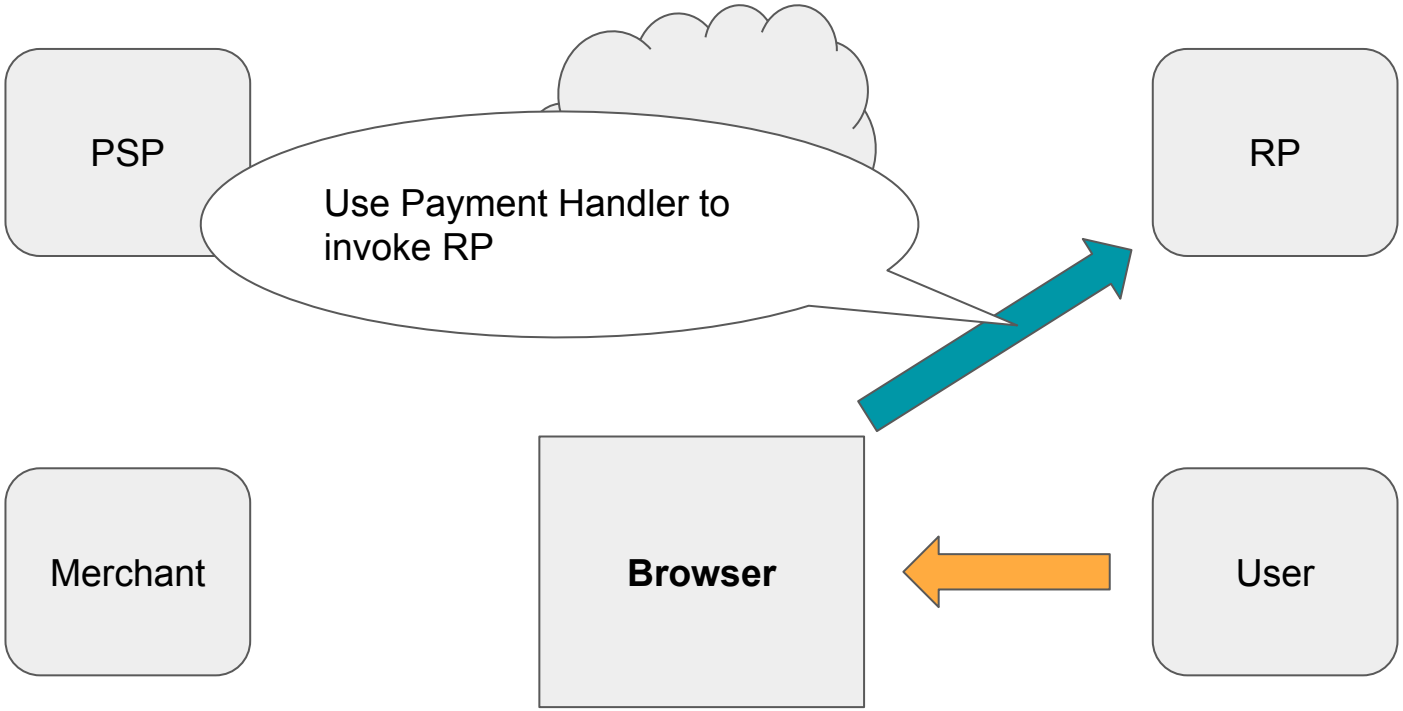
Instrument/Payment Method Selection

1. User decides how to pay
2. RP is selected implicitly
3. RP is invoked

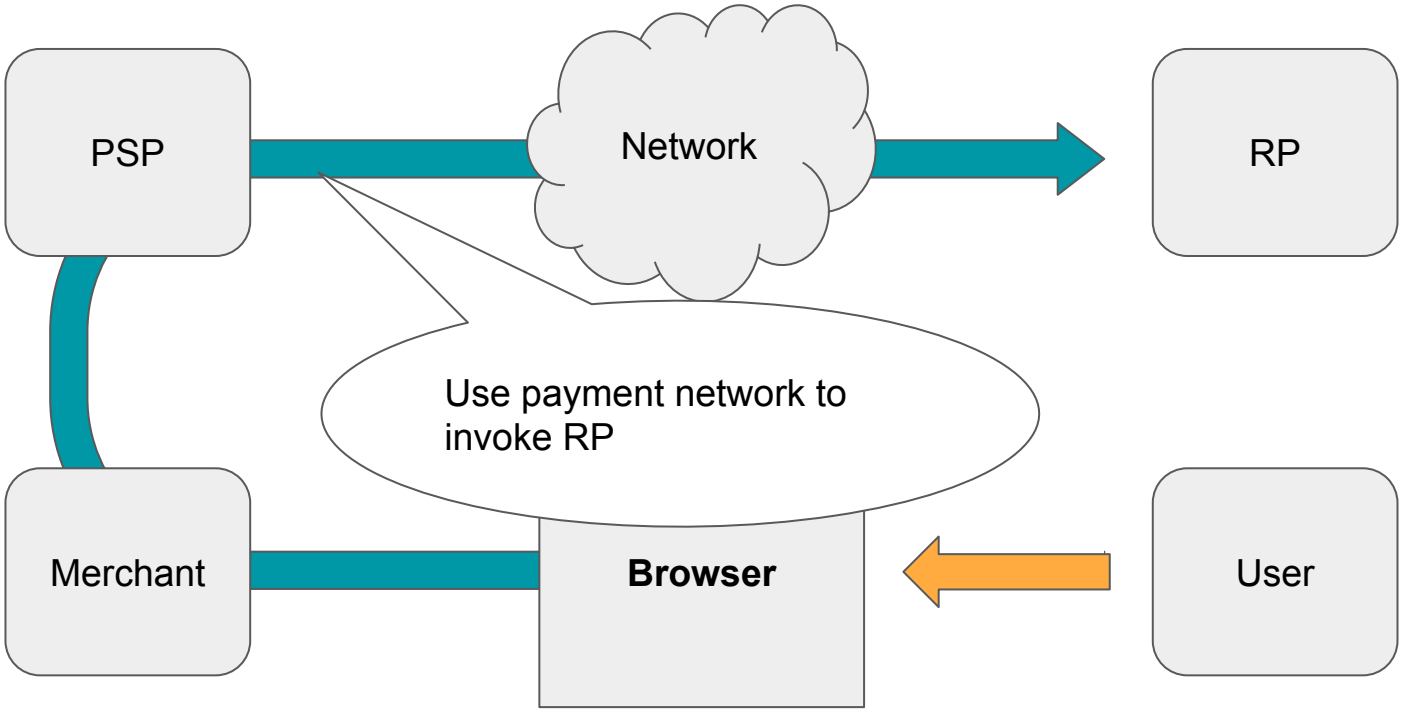
Instrument/Payment Method Selection



Instrument/Payment Method Selection via PH



Instrument/Payment Method Selection via Merchant

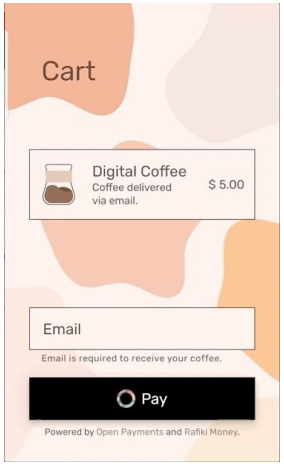


Discussion

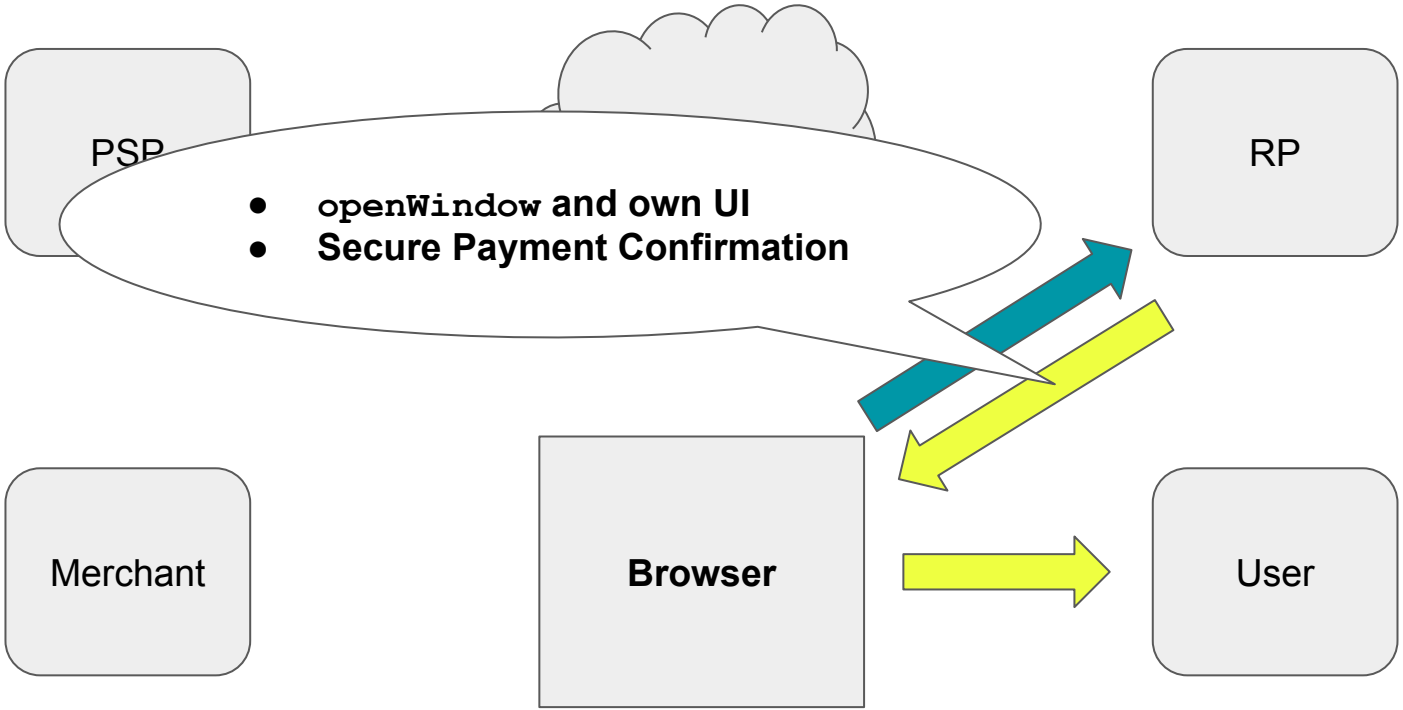
- Could we add an event to the Payment Request to reveal selection to **merchant** if no Payment Handler associated?

- What is the best UI: Payment sheet, minimal UI, other?

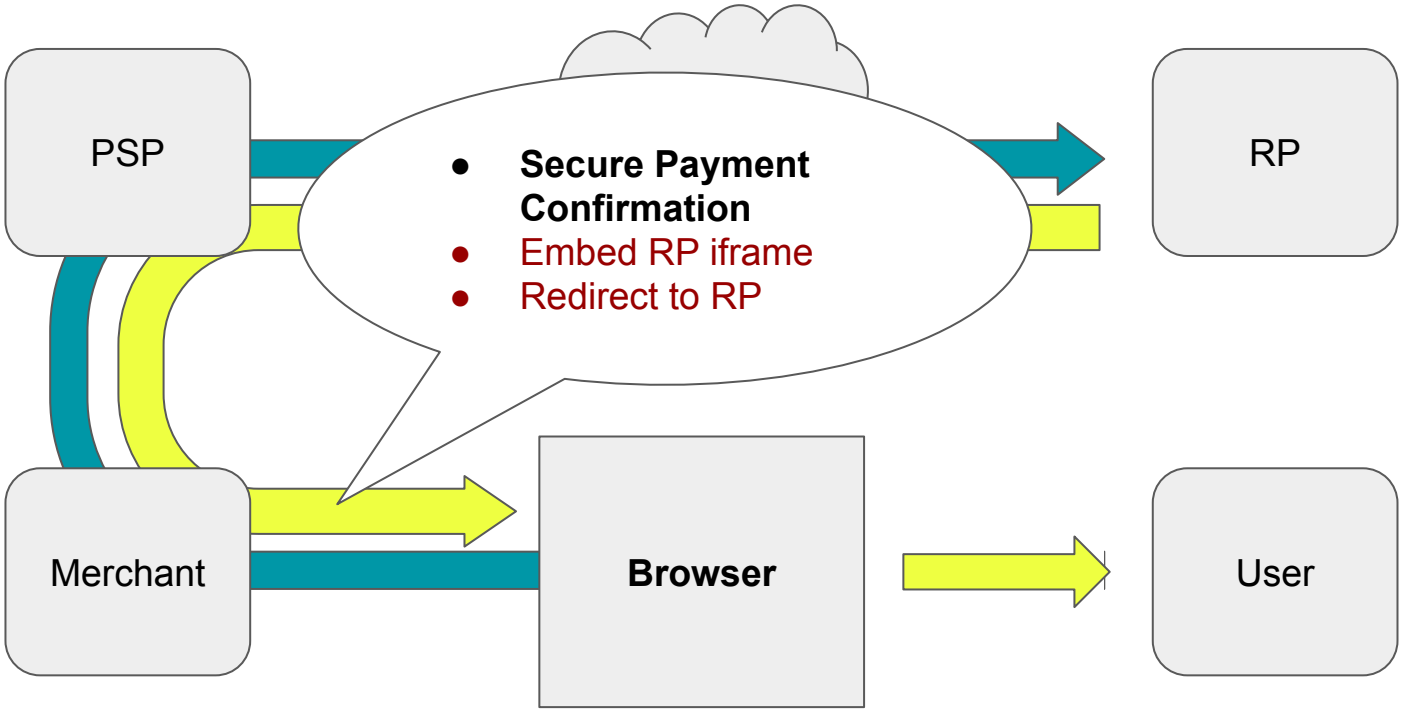
- Select what?
  - Payment Method
  - Payment Handler
  - Payment Instrument
  - Payment Credential



Authenticate via Payment Handler



Authenticate via Merchant & Network



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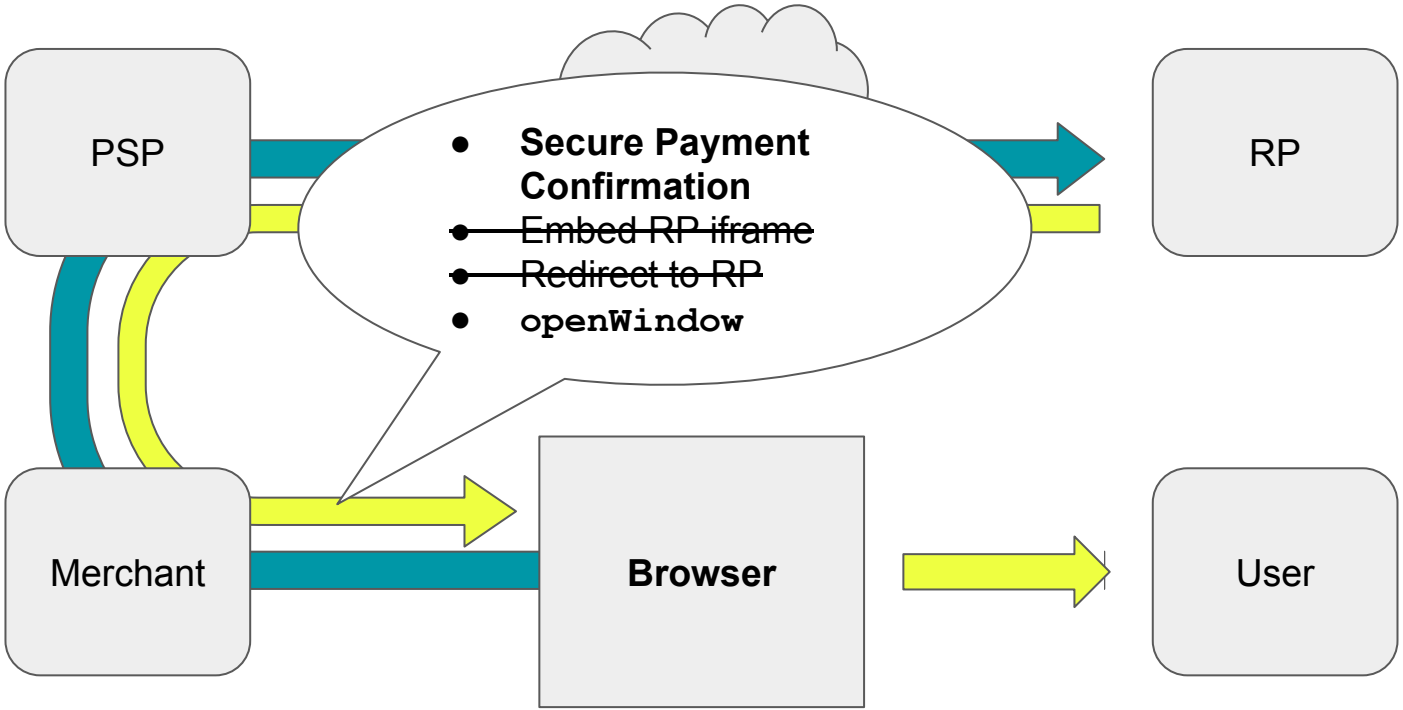
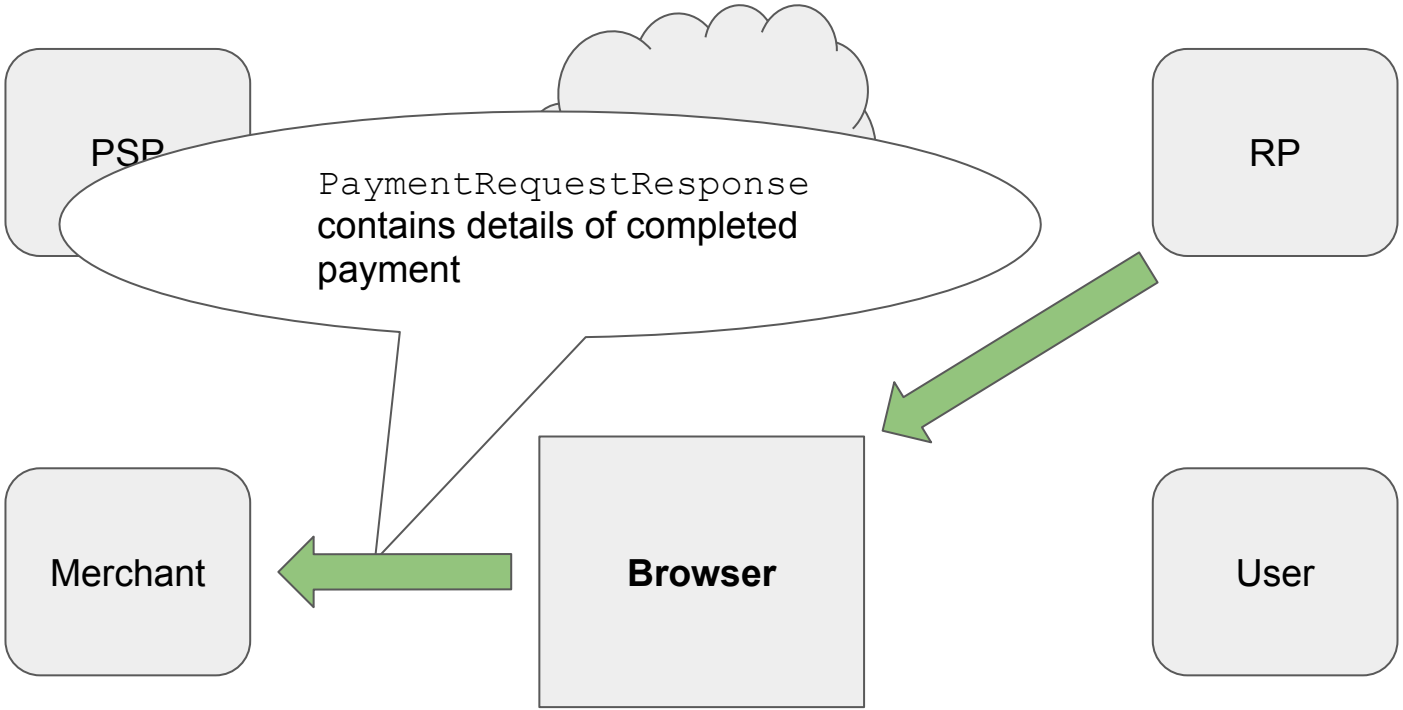


Discussion

- Is it safe to allow the merchant to call `openWindow` on the Payment Request AFTER the user has selected an instrument/method?

- What if we limit the origin of the modal window to be “same origin” as the selected

Authorize via Payment Handler



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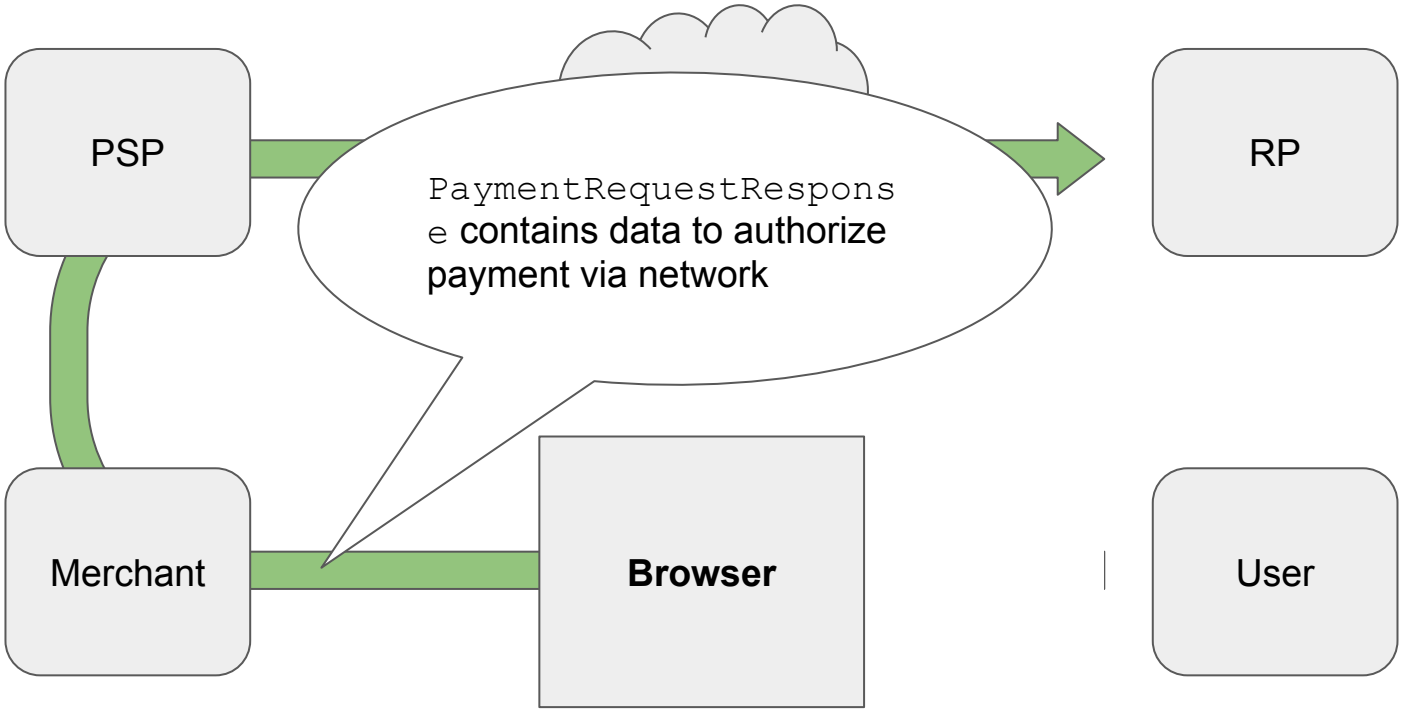


Some Concepts

Payment Context

1. Merchant has called Payment Request API
2. User has been shown browser rendered payment UI

Browser can expose powerful features and reveal select user data within this context (even to the merchant origin):

- Enable Modal Window
- Secure Payment Confirmation allows non-RP WebAuthn invocation
- Selected payment instrument/method revealed to merchant

Only inside Payment Handler event OR Payment Request event

Browser Primitives exposed in Payment Context

- Modal Window:

  In-context display of cross-origin UI

- Secure Payment Confirmation:

  Streamlined secure authentication using WebAuthn + PaymentRequest data

- Payment Instrument/Method Selection:

  Stored identifiers/logos/labels from RP for re-use and low friction

Modal Window

Display UI from the RP or PSP origin **in context** (no redirects or pop-ups)

Superior mobile experience

Renders **top-level** context (access to cookies and storage)

Privacy concerns mitigated if UI makes it clear that the window is a new context and new origin (UA must show origin and context - “Paying $5 to abc.com”)

Secure Payment Confirmation

Invoke WebAuthn from payment context

Display payment details (amount, payee) in authenticator prompt

Include payment details in signed client data

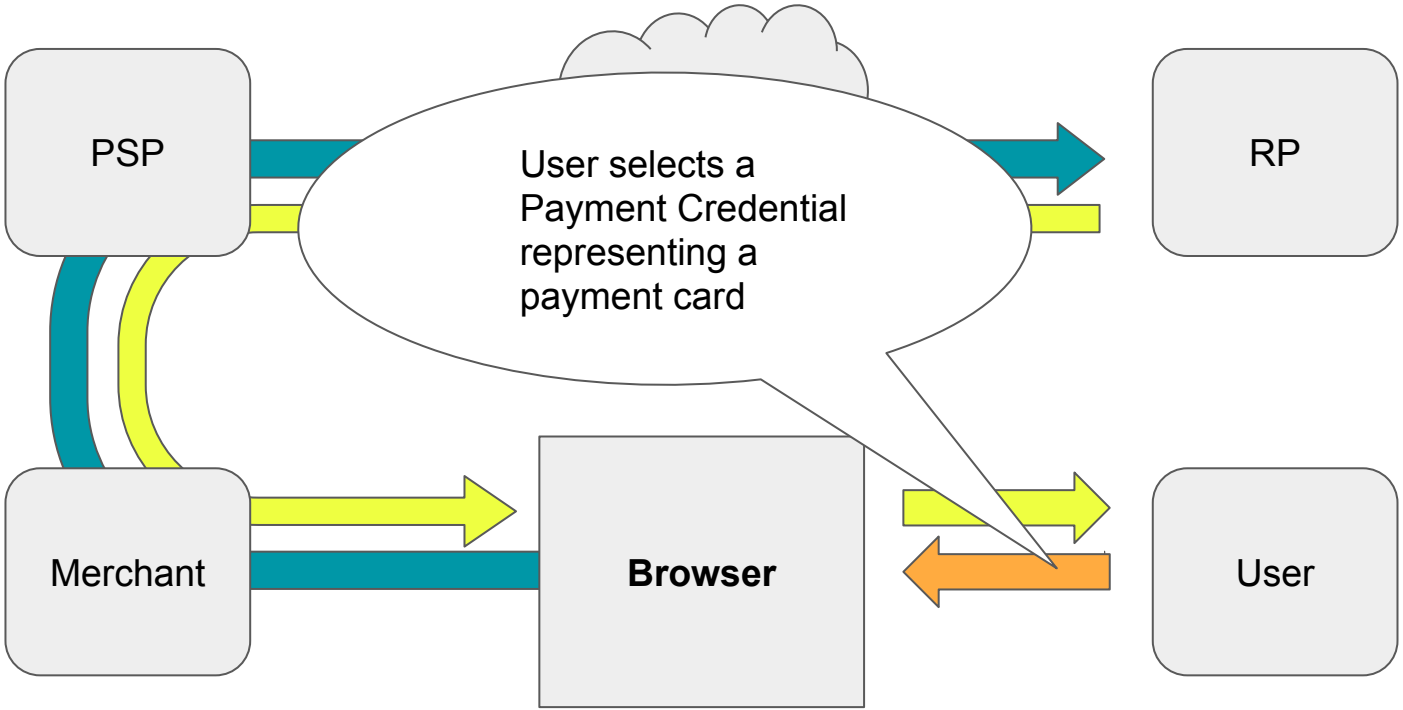
Allow non-RP origin to invoke and get attestation from inside payment context

RP not required to ship UI for authN

Stored Credential

- *A “Payment Cookie”* or *“Payment Credential”*
  - **icon** and **label** for display in selection lists
  - associated with one or more **payment methods**
  - has a unique non-sensitive **identifier** (URL?) that is shared with merchants and/or Payment Handlers after selection by user
  - can be associated with a **Payment Handler** (or be a Payment Handler)?
- Controlling origin (relying-party) can enumerate, delete and add and link to `PublicKeyCredential` or Payment Handler from top level context
- Managed independently of cookies and storage in browser settings

Example 1: Selection + 3DS + SPC (with fallback)



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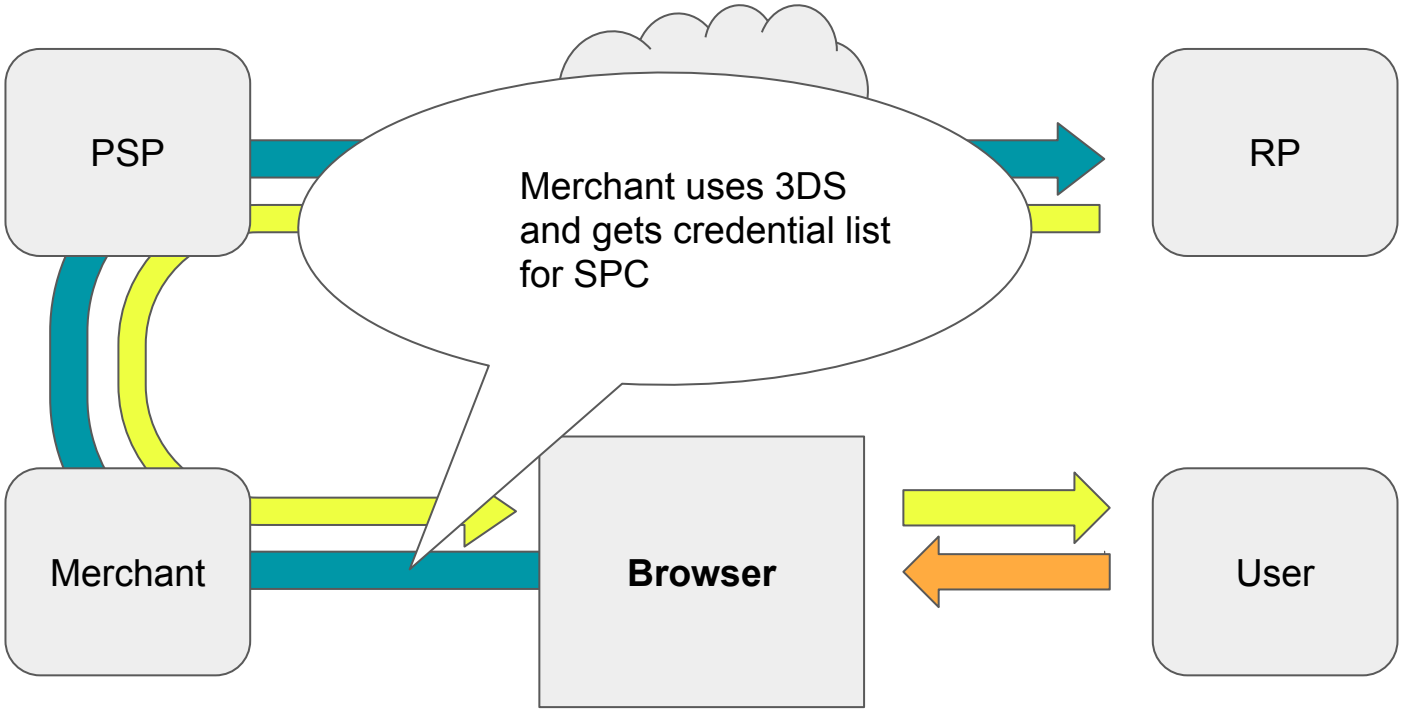

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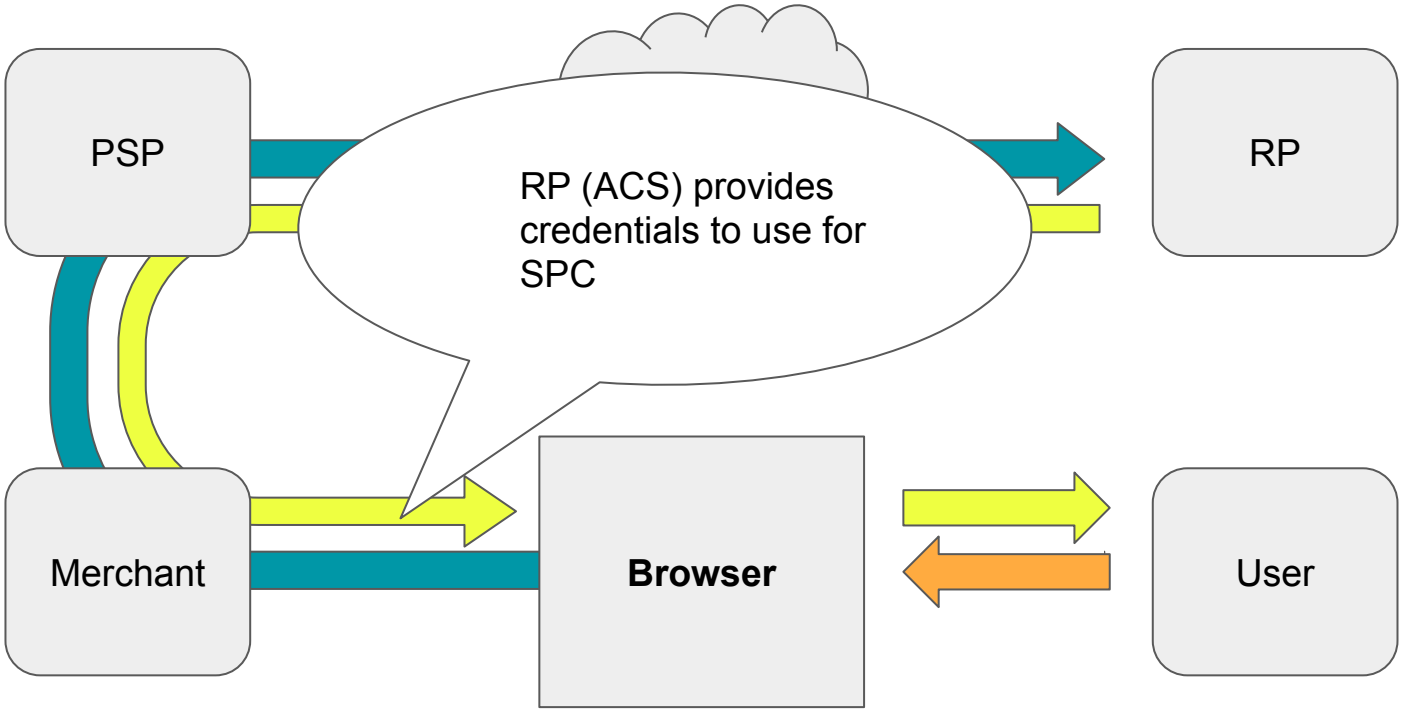

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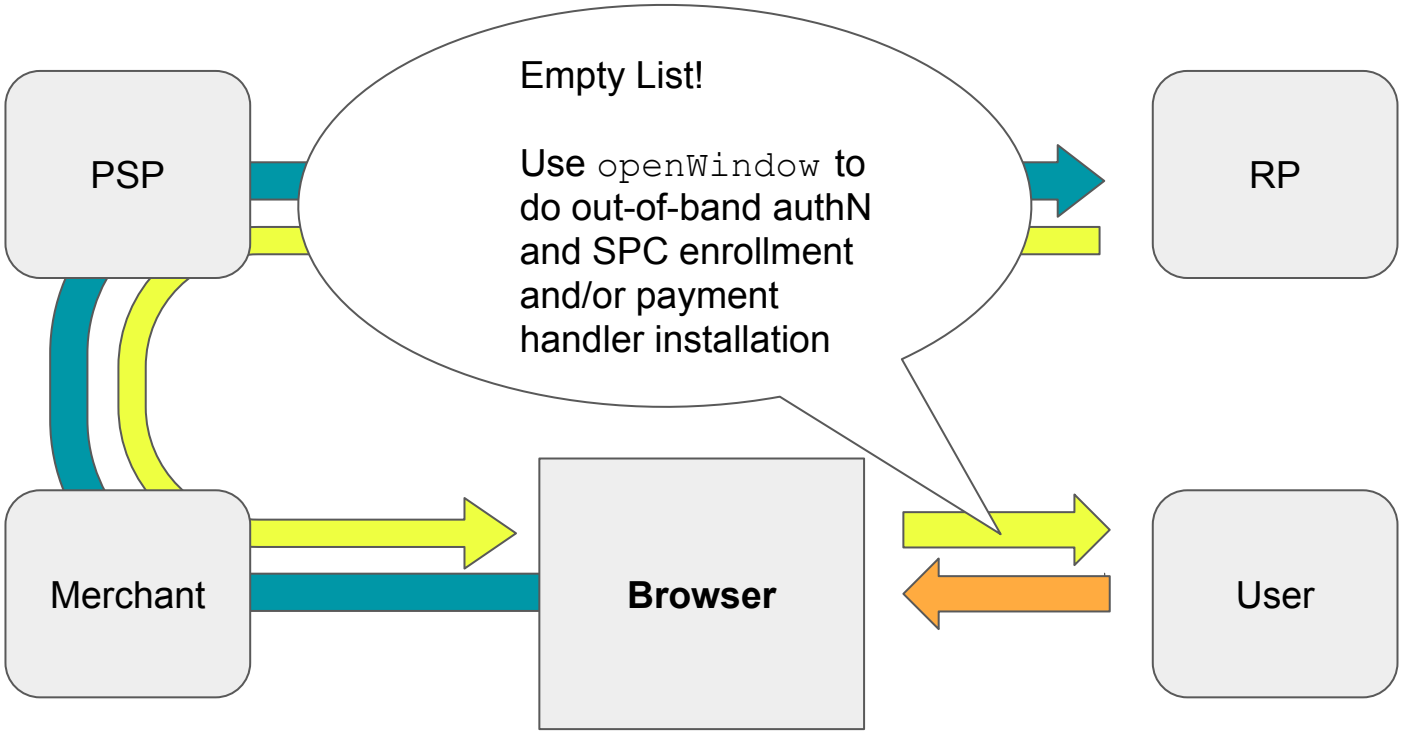
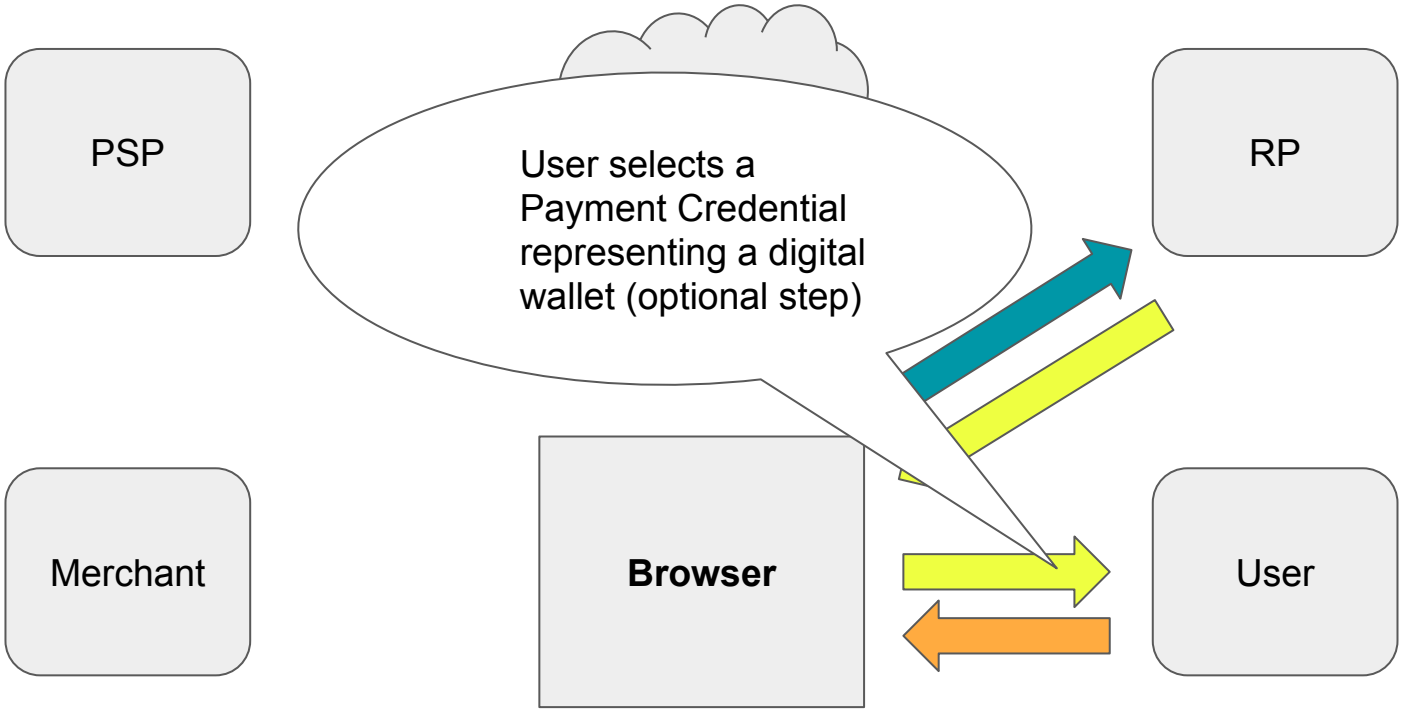


Example 2: Digital Wallet via Payment Handler



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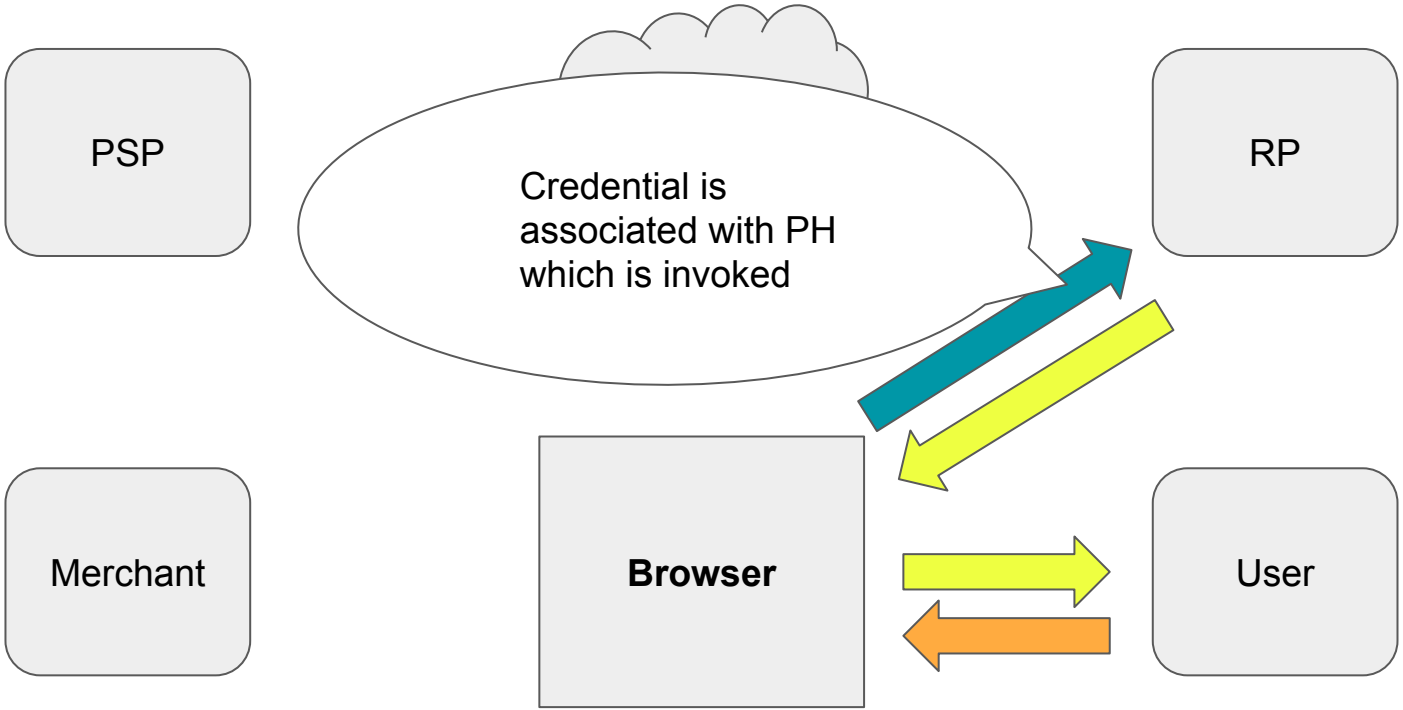

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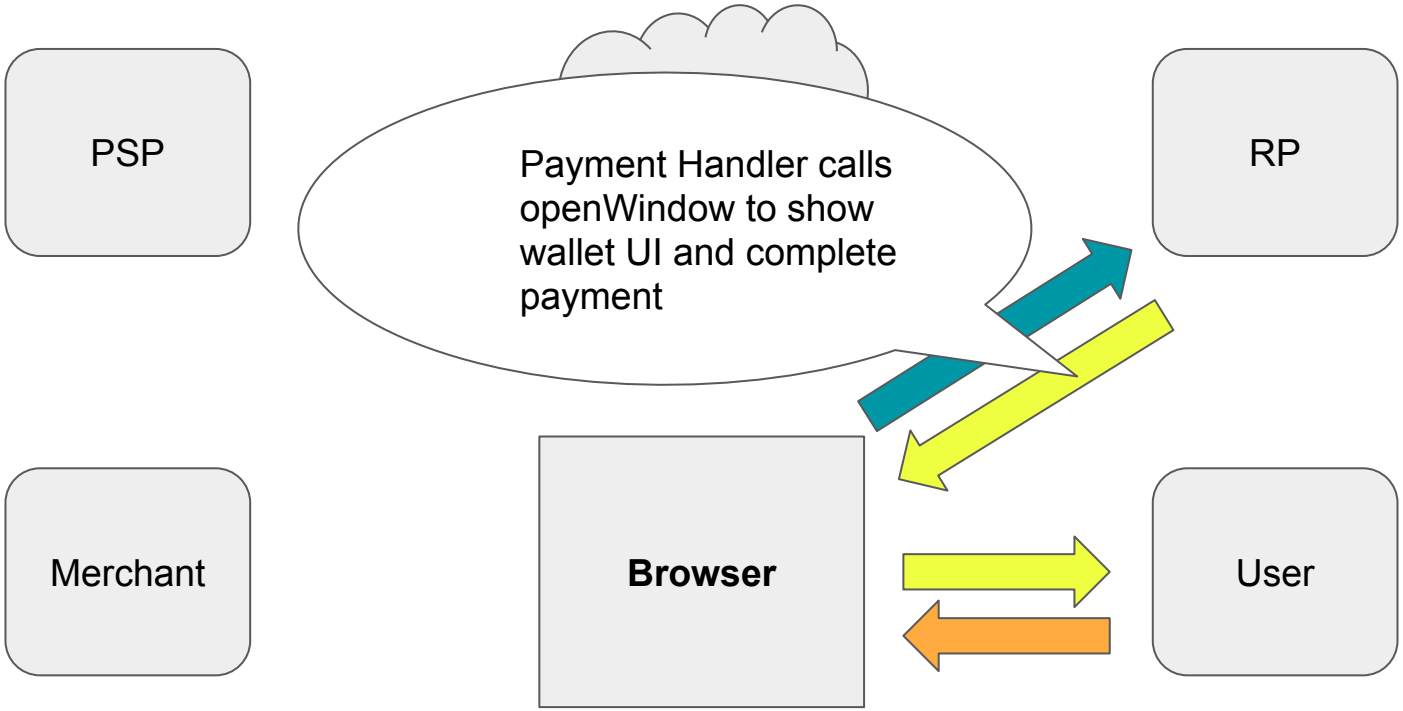
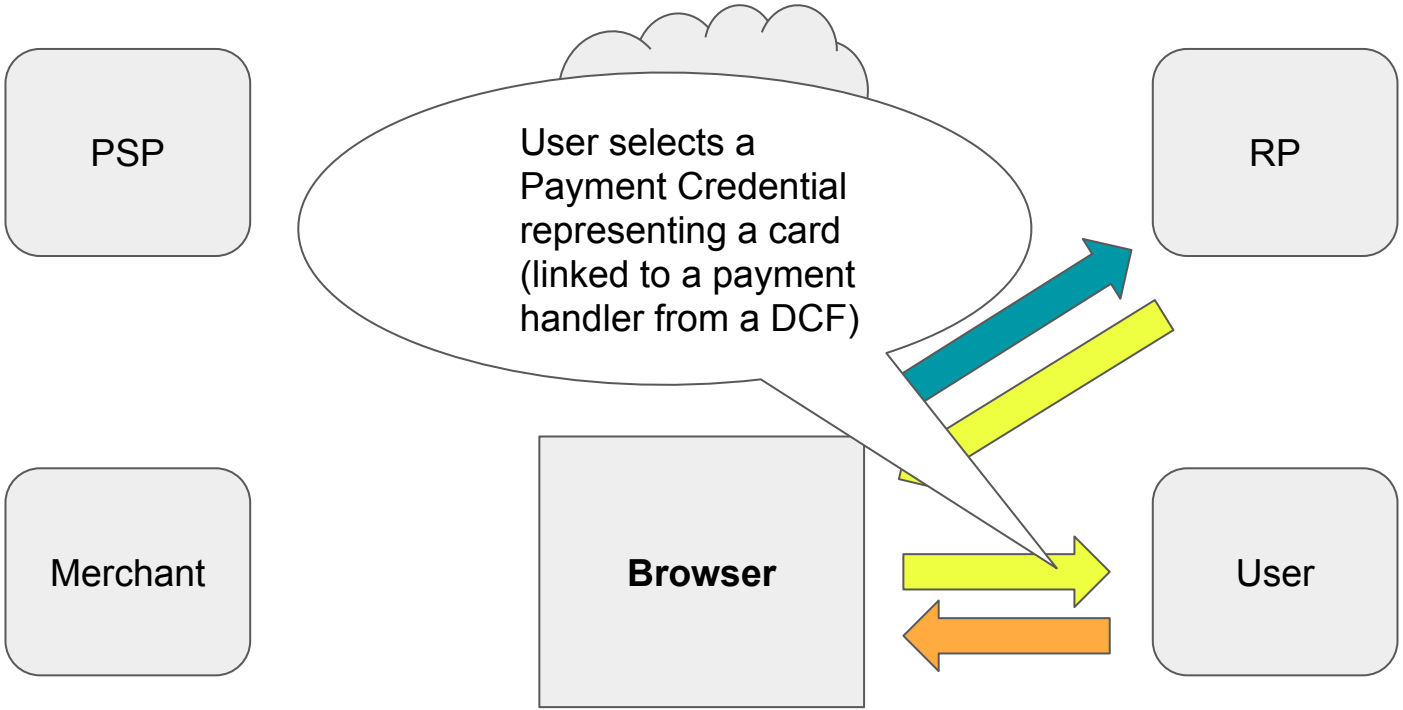


Example 3: SRC via Payment Handler + SPC



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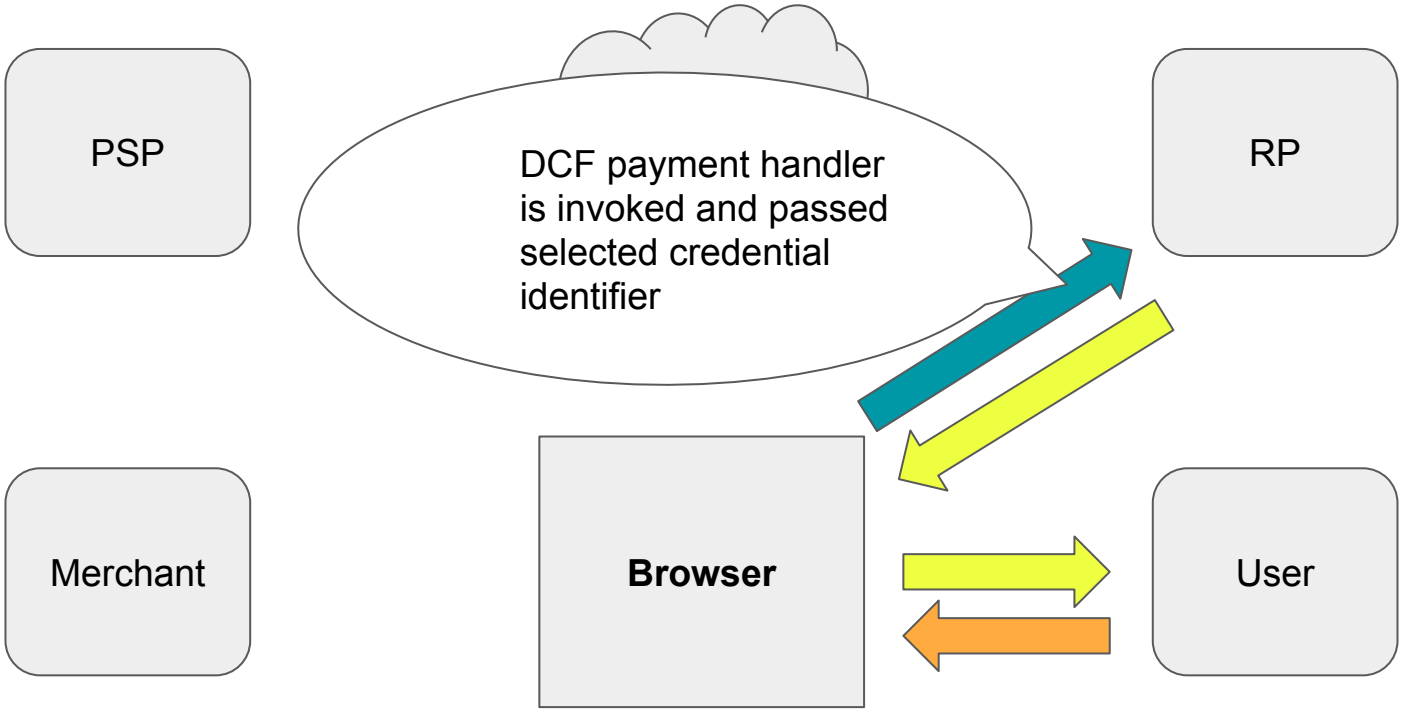

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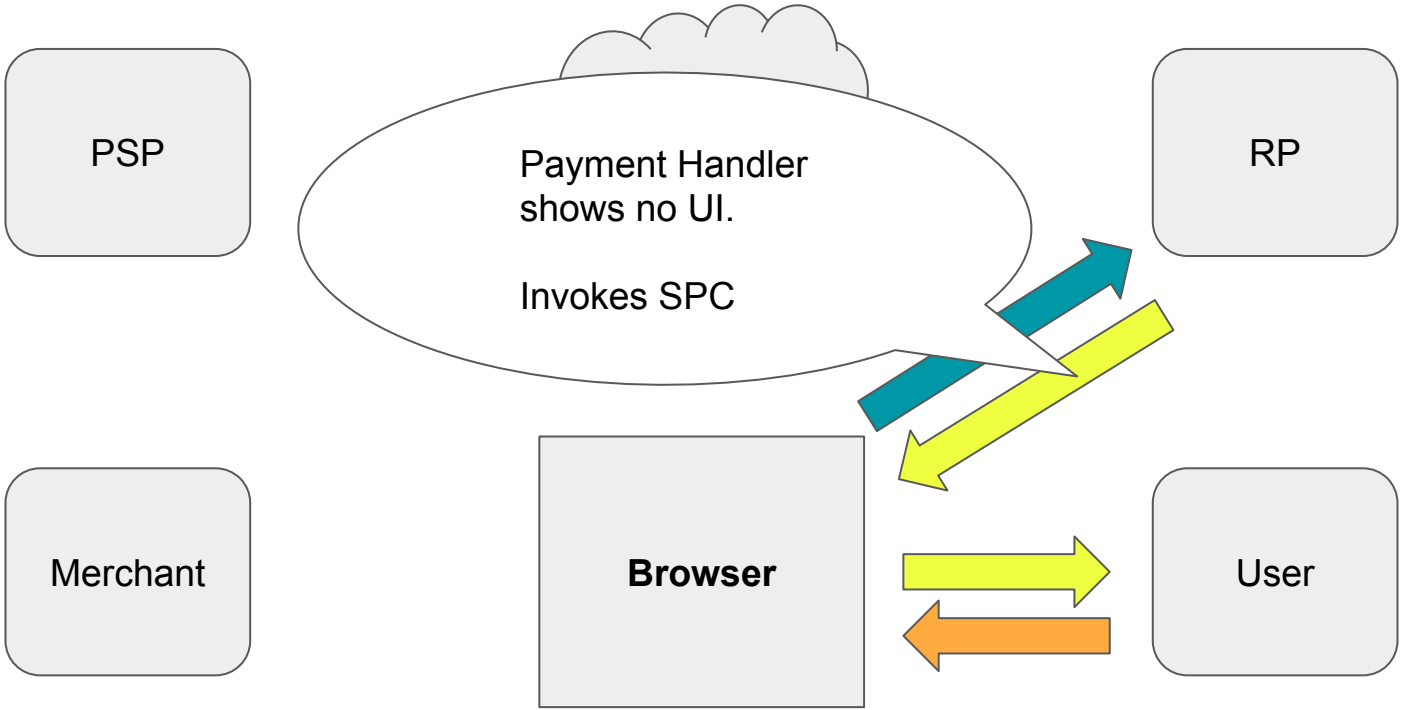

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- What is the best UI: Payment sheet, minimal UI, other?
- Is it safe to allow the merchant to call `openWindow` on the Payment Request AFTER the user has selected an instrument/method?
- What if we limit the origin of the modal window to be “same origin” as the selected credential?
- What about `hasEnrolledInstrument` and skip-the-sheet?