Transactions without Cards

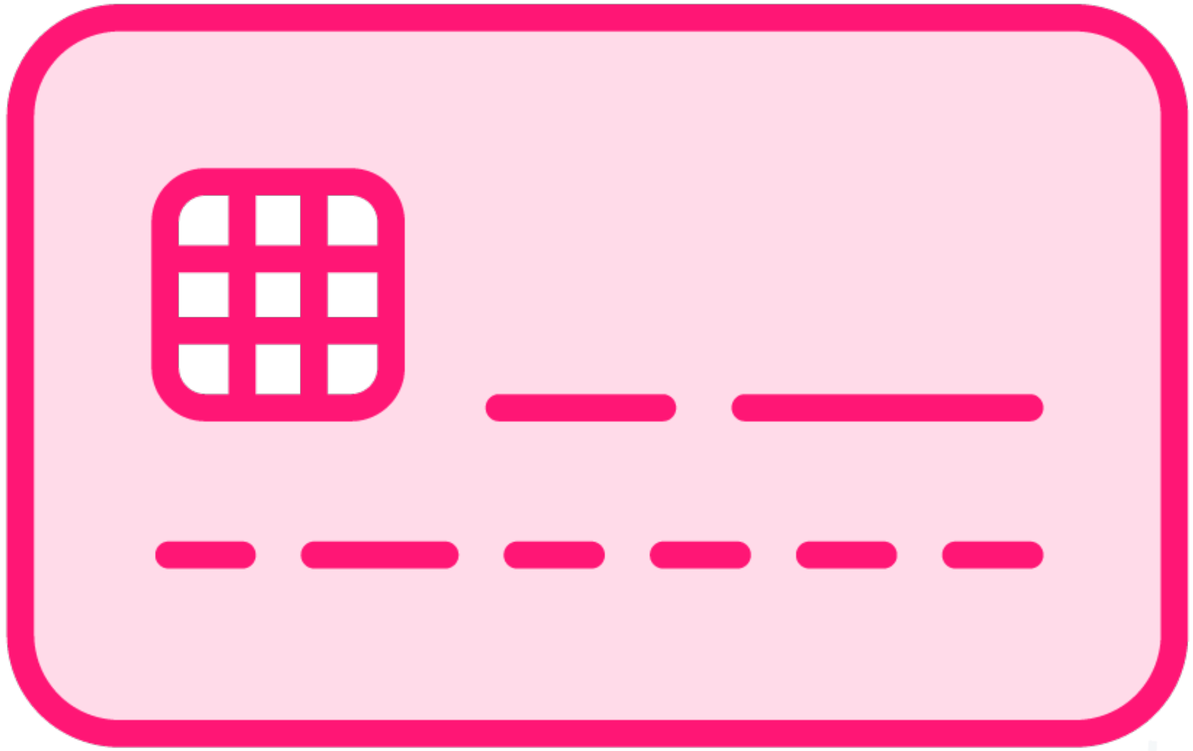


John Elliott

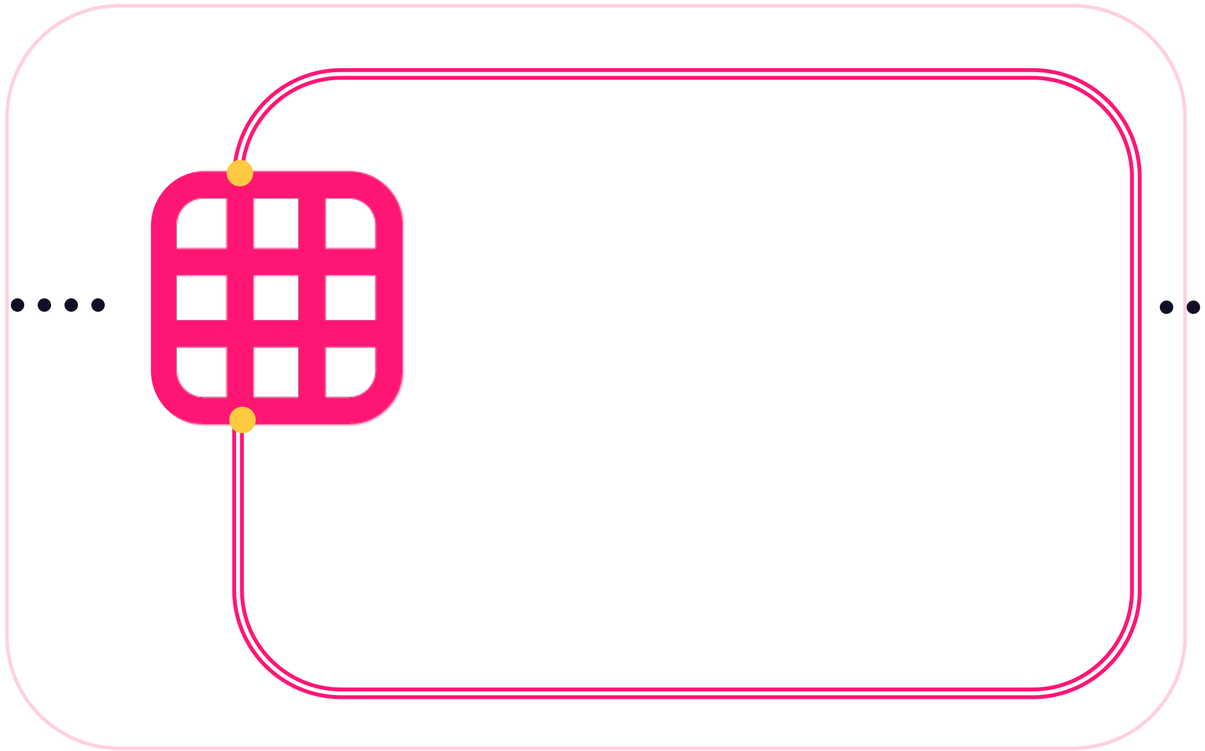
Payments, Security, Privacy, and Risk Specialist

@ withoutfire | pci.rocks

A Payment Card

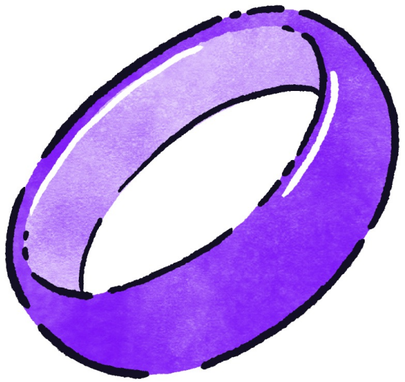


Inside a Payment Card



Dissolve credit card in acetone video

You Can Make a “Card Payment” With



Jewelry

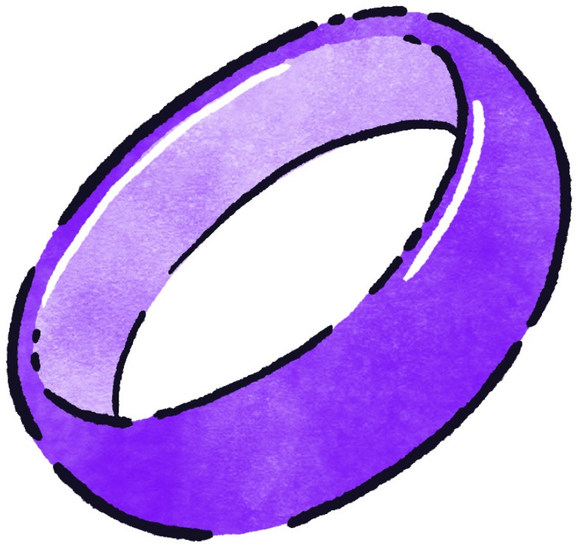


Smartphones



Smart devices

Jewelry



Contactless capability in the object

- Antenna
- Chip

Pre-programmed with a card number

- “Pre-paid PAN” or P-PAN

Either: works like a pre-paid card:

- Customer loads credit from other accounts

Or: works like a two-hop transaction

- Linked to second payment card

Credit Pre-payment Account



Cardholder



Merchant



Acquirer



Card brand



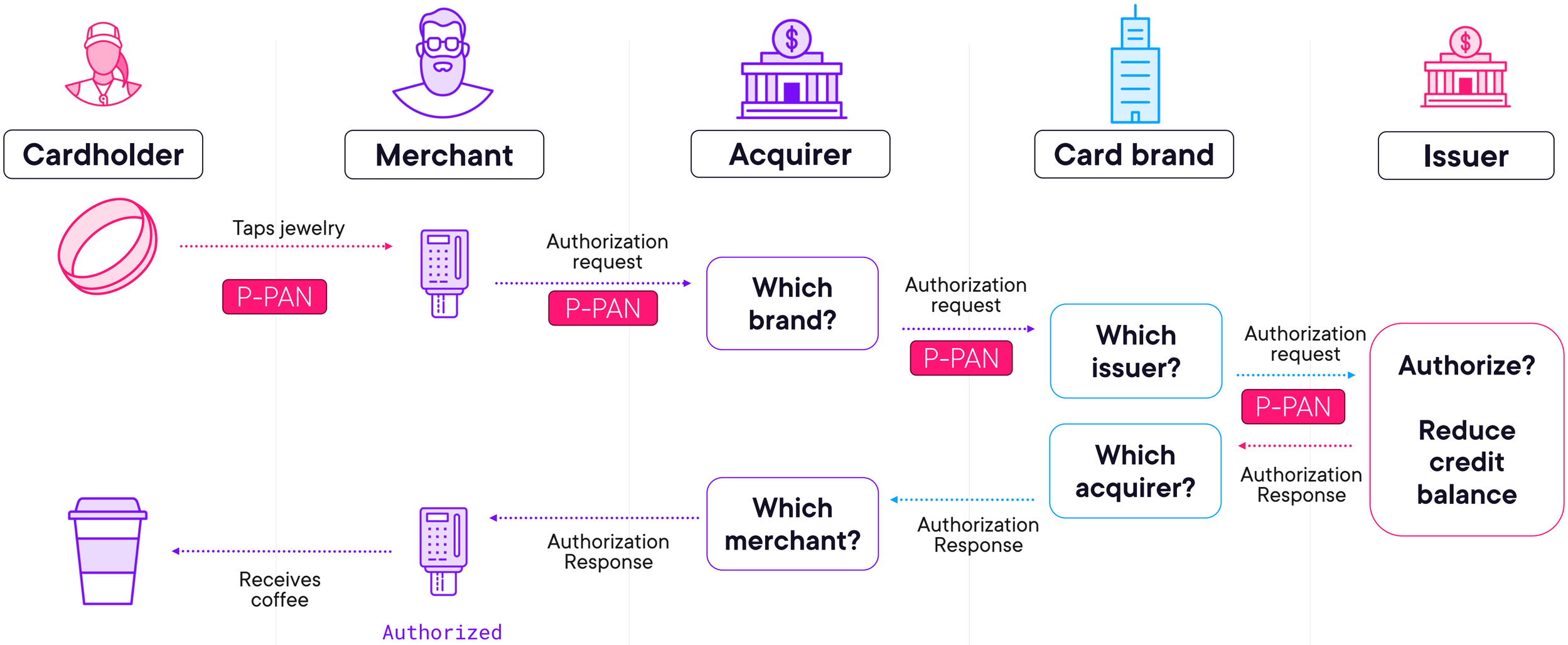
Issuer



Makes bank / wire / ACH transfer to deposit funds in pre-payment account

Increases credit balance with amount deposited

Message Flow: Pre-payment Authorization



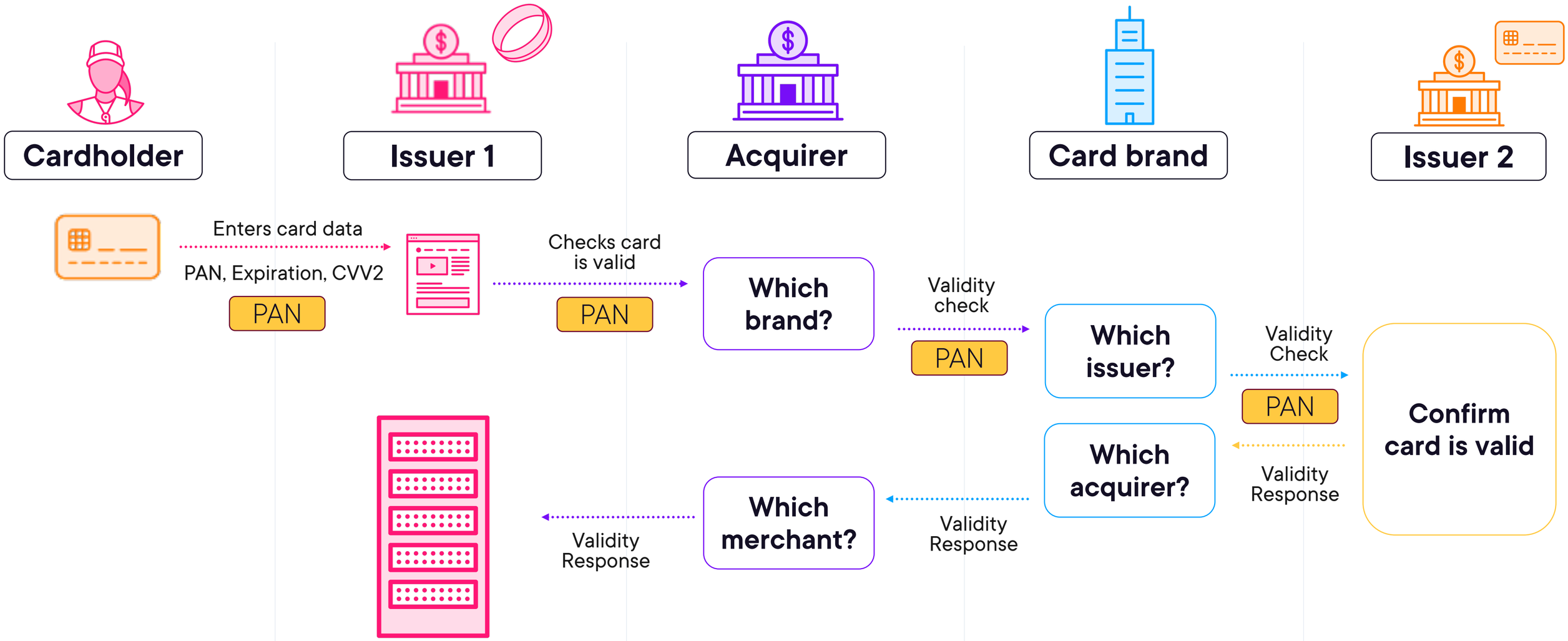
Jewelry Linked to Another Payment Card



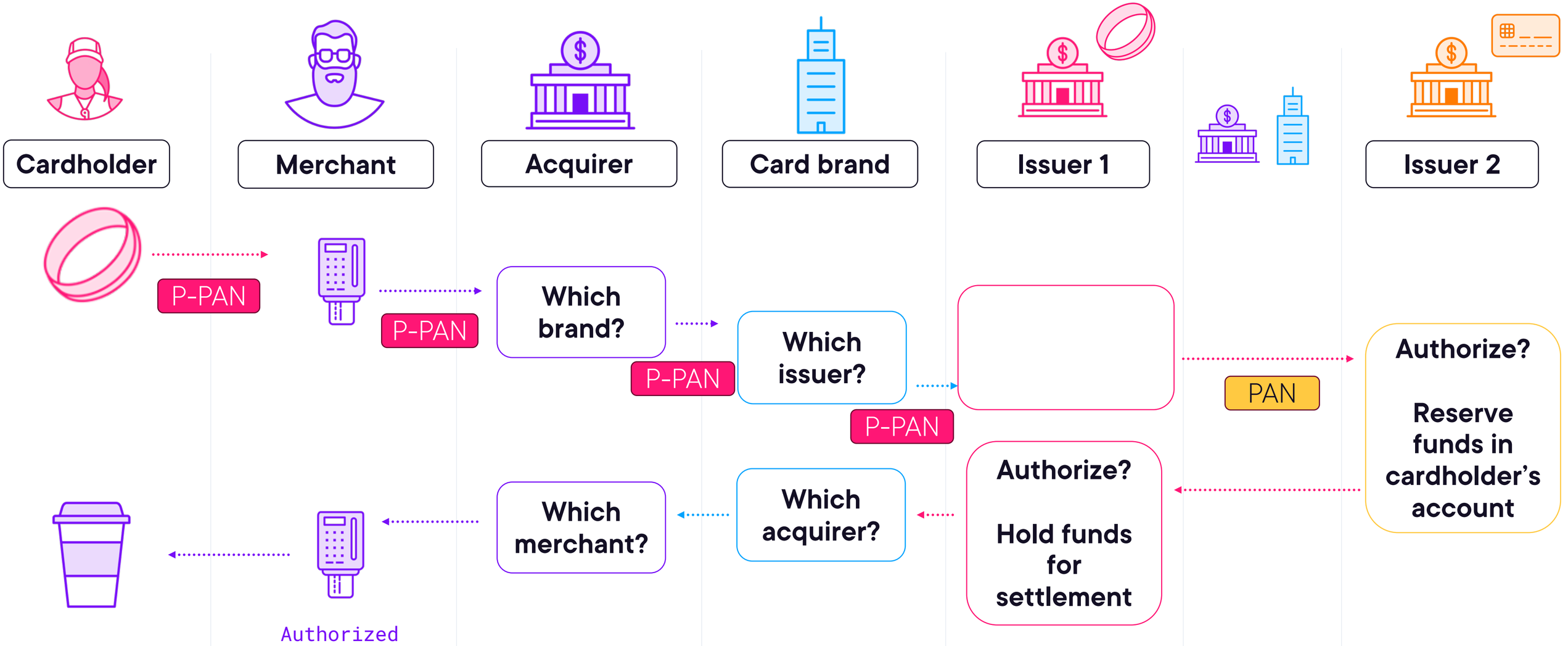
Uses this jewelry
to make the payment

Funds come from this
payment card account

Link Jewelry to Another Payment Card



Pay with Linked Jewelry



Pay with Linked Jewelry



Cardholder



Merchant

Acquirer

Card brand



Issuer 1





Issuer 2



P-PAN



P-PAN

Which brand?

P-PAN

Which issuer?

P-PAN

Initiate Authorization Request

PAN

Authorize?

Reserve funds in cardholder's account

In-person transaction

E-commerce transaction

Authorized

Which merchant?

Which acquirer?

Authorize?

Hold funds for settlement

Smartphones (and Watches)



Uses contactless capability in the phone

- EMV chip within secure element
- EMV chip emulation in software

Not pre-programmed with a card number

Enroll or load card onto the device

Enroll Card on Device: Cardholder Initiated



Cardholder



Merchant



Acquirer



Card brand



Issuer





Enters card data

PAN, Expiration, CVV2

Sends enrollment request to issuer PAN

Validates identity

Request token

Generates token

Sends token

Provisions token



Sends token to device DPAN

Enroll Card on Device: Issuer Initiated



Cardholder



Merchant



Acquirer



Card brand



Issuer

Prompts cardholder to enroll card via push notification

Installs issuer's app on the device



Agrees to enroll card

Validates identity

Request token

Generates token

Sends token

Provisions token



Sends token to device DPAN

Key Concepts



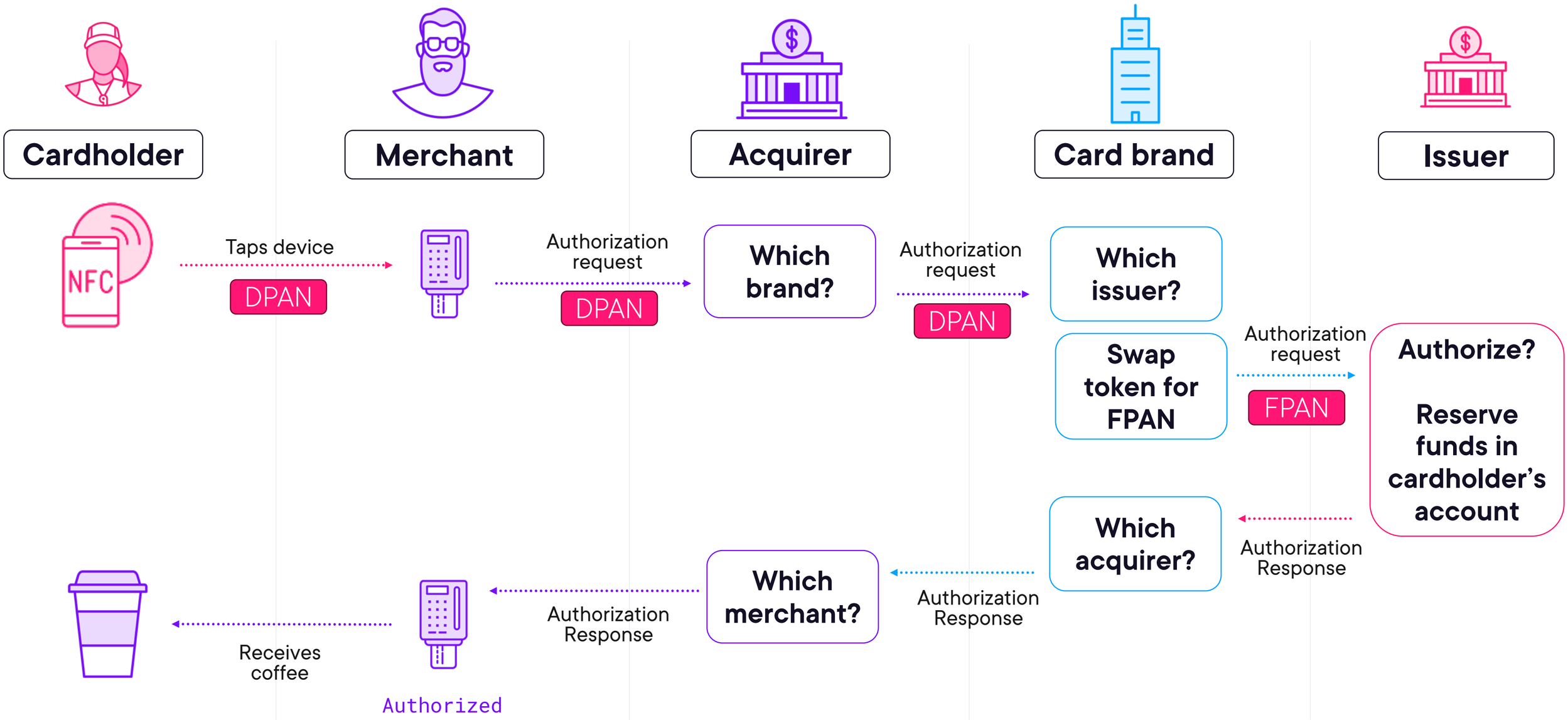
Token = Device PAN (DPAN)

- Looks like a normal 15/16 digit card number

Can only be used by that device

Mapped to a Funding PAN (FPAN)

Message Flow: Authorization



Remember the Issuer's Questions

1. Is it really the cardholder making that transaction?
2. Is it the real card?
3. Does the cardholder have enough money or credit?
4. Is it an allowed transaction?

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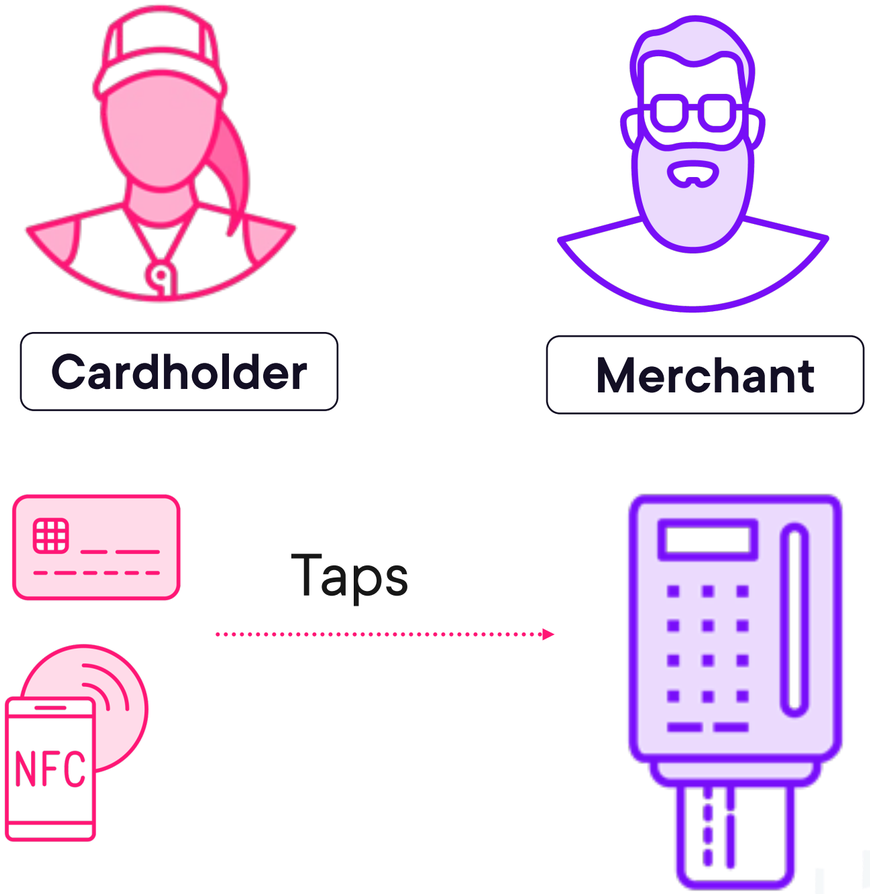
1. Is it really the cardholder making that transaction?

Yes: Device can verify it is the cardholder via biometric or unlock code

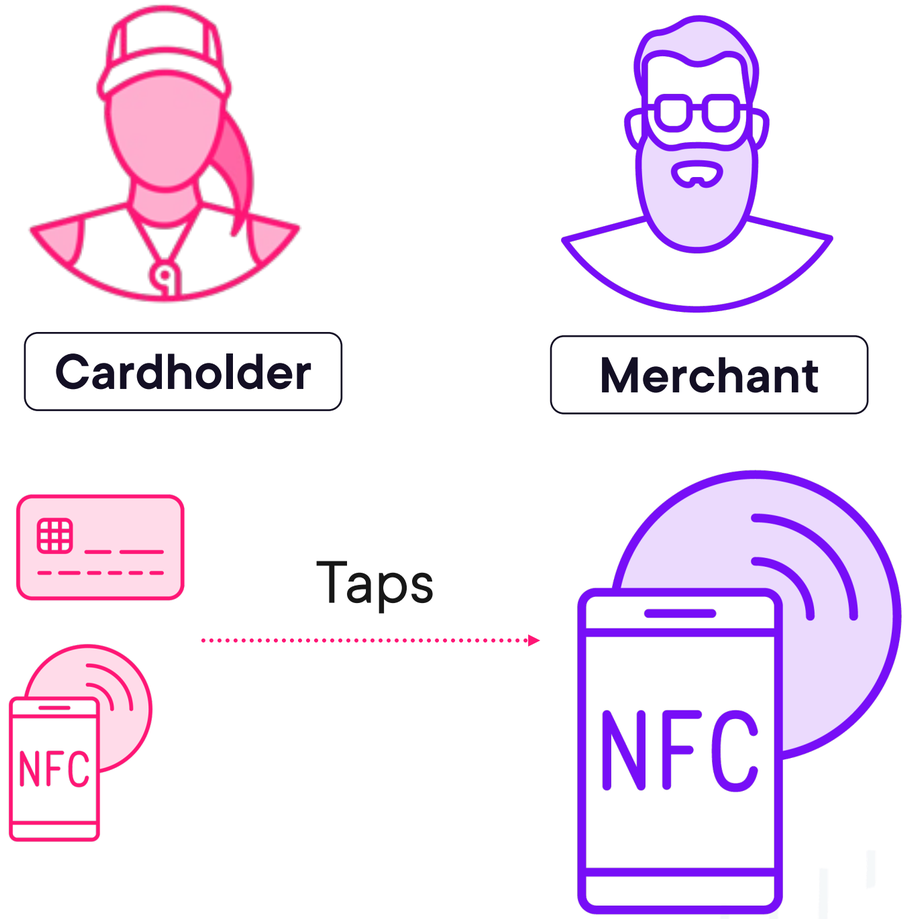
2. Is it the real card?

Yes: Only that device has access to that DPAN so only the cardholder's device can make the cryptogram

What’s Next



What’s Next

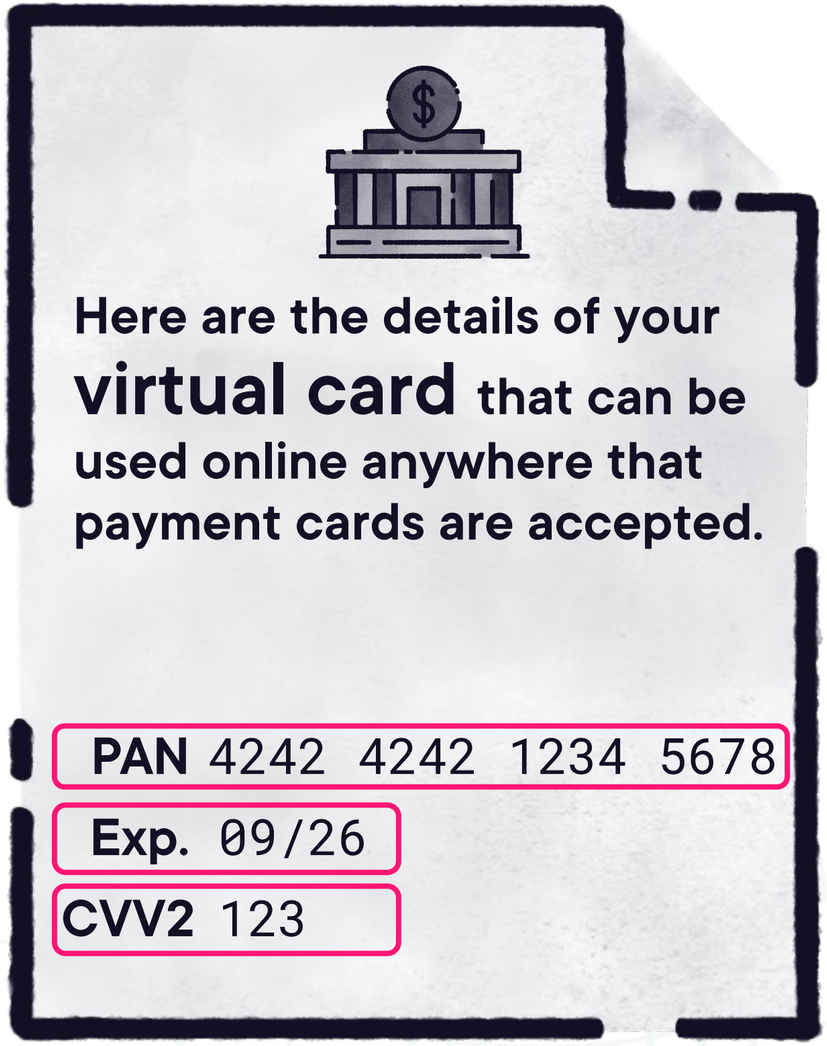


You Can Make an E-commerce Payment With





You Can Make an E-commerce Payment With





Issuer generates virtual card data

- Primary account number (VPAN)

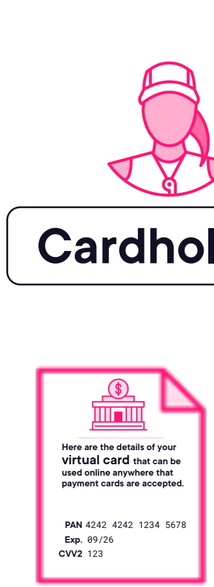
Linked to main account

Can be limited by

- Single use or multiple use
- Merchant type (often travel-related)
- Merchant (e.g airline X)
- Value (e.g. not over $350)
- Transaction (e.g. $1280 at airline X)

Processed as a normal e-commerce transaction

Message Flow: E-commerce Authorization with VPAN



Cardholder

Enters card data

VPAN, Expiration, CVV2

VPAN

Merchant

Authorization request

VPAN

Acquirer

Which brand?

Authorization request

VPAN

Card brand

Which issuer?

Authorization request

VPAN

Issuer

Authorize?

Reserve funds in cardholder's account

Can this virtual card be used for this transaction?

Authorization Response

Which acquirer?

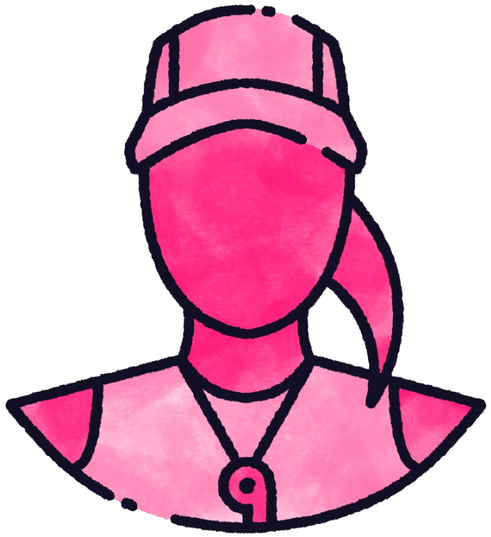
Authorization Response

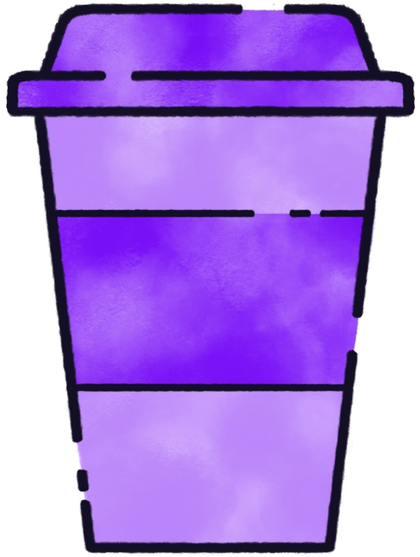
Which merchant?

Authorization Response

Authorized

Have You Ever Wondered?

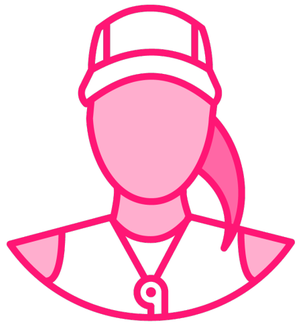




Card Statement
4687 38 **** 7980**

Pizza	$13.20
Rail fare	$56.87
Wired Brain Coffee	$ 5.10
Pluralsight	$29.99
Web hosting	$ 9.99
Total	$115.15

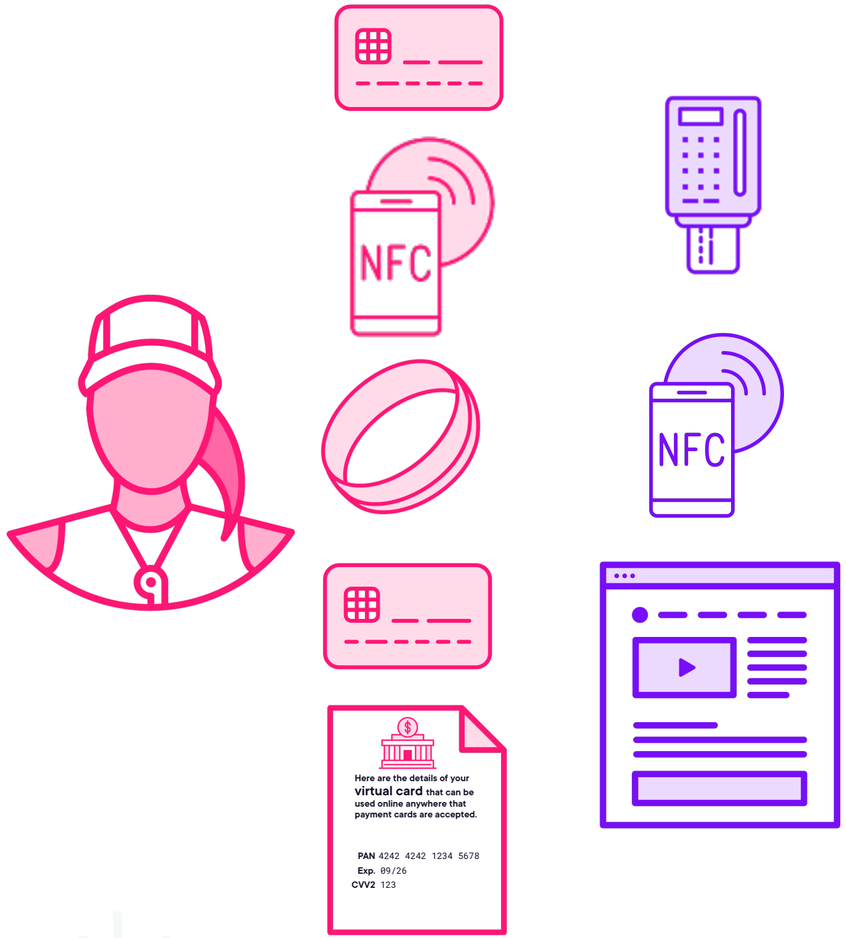
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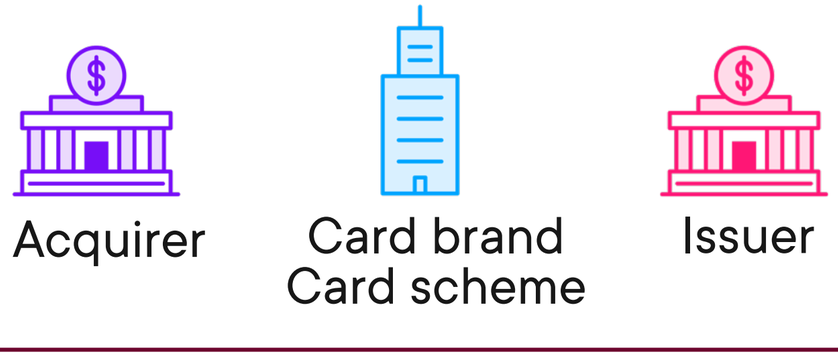


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Course Summary

The payment ecosystem

- Cardholders get cards from Issuers
- Merchants use acquirers to accept transactions
- Card brands / card schemes

There are four- and three-party models

Payments happen by sending messages in the ecosystem

- Authorization, clearing and settlement
- Refunds and chargebacks

But the world is big

- The ecosystem is evolving