EP28: The Payments Ecosystem. Also...

ALEX XU

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This week's system design refresher:

- The Payments Ecosystem
- Microservice architecture
- Web 3.0
- Flowchart of how slack decides to send a notification
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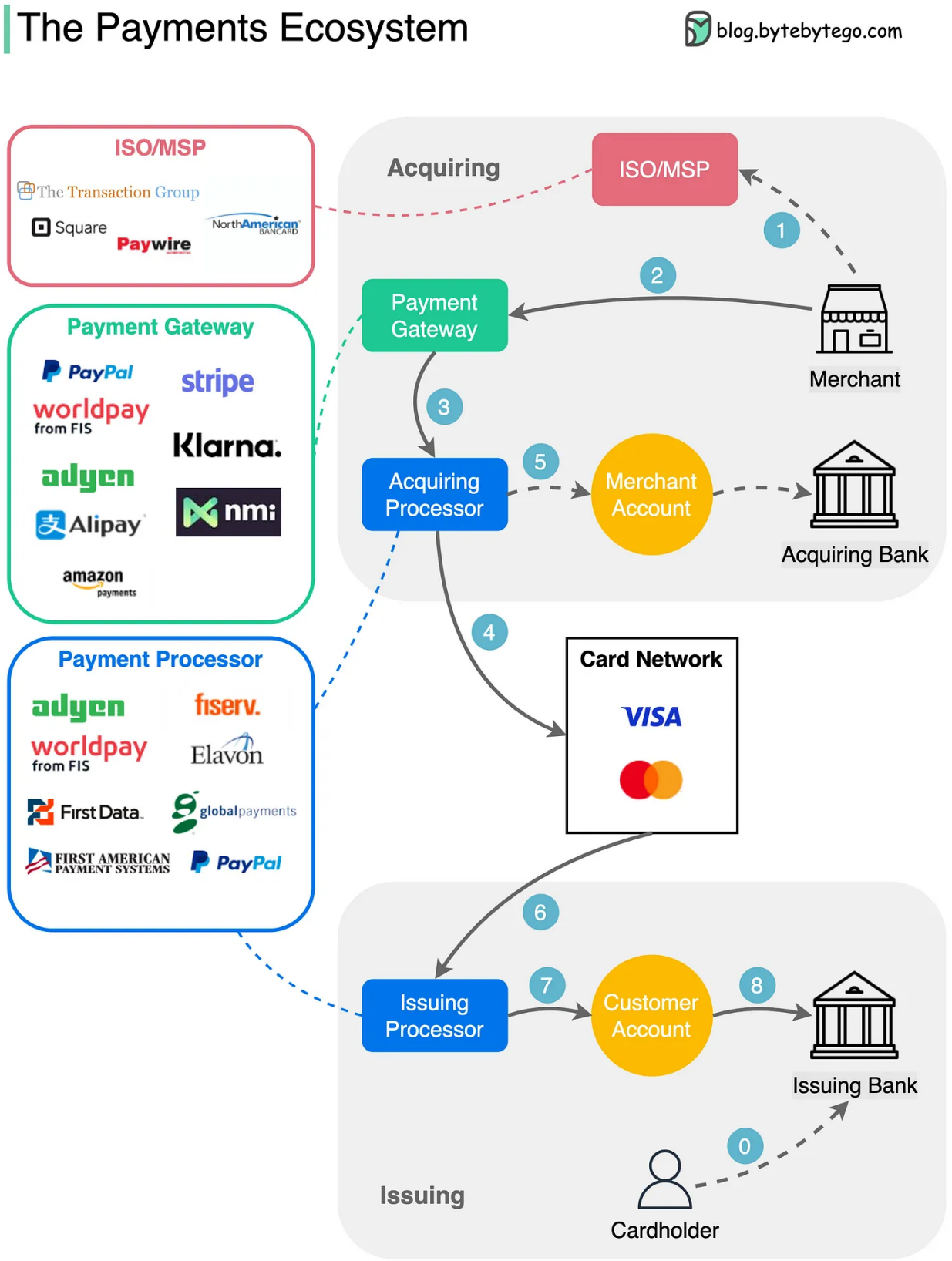
The Payments Ecosystem

How do fintech startups find new opportunities among so many payment companies? What do PayPal, Stripe, and Square do exactly?



Steps 0-1: The cardholder opens an account in the issuing bank and gets the debit/credit card. The merchant registers with ISO (Independent Sales Organization) or MSP (Member Service Provider) for in-store sales. ISO/MSP partners with payment processors to open merchant accounts.

Steps 2-5: The acquiring process.
The payment gateway accepts the purchase transaction and collects payment information. It is then sent to a payment processor, which uses customer information to collect payments. The acquiring processor sends the transaction to the card network. It also owns and operates the merchant's account during settlement, which doesn't happen in real-time.

Steps 6-8: The issuing process.
The issuing processor talks to the card network on the issuing bank's behalf. It validates and operates the customer's account.

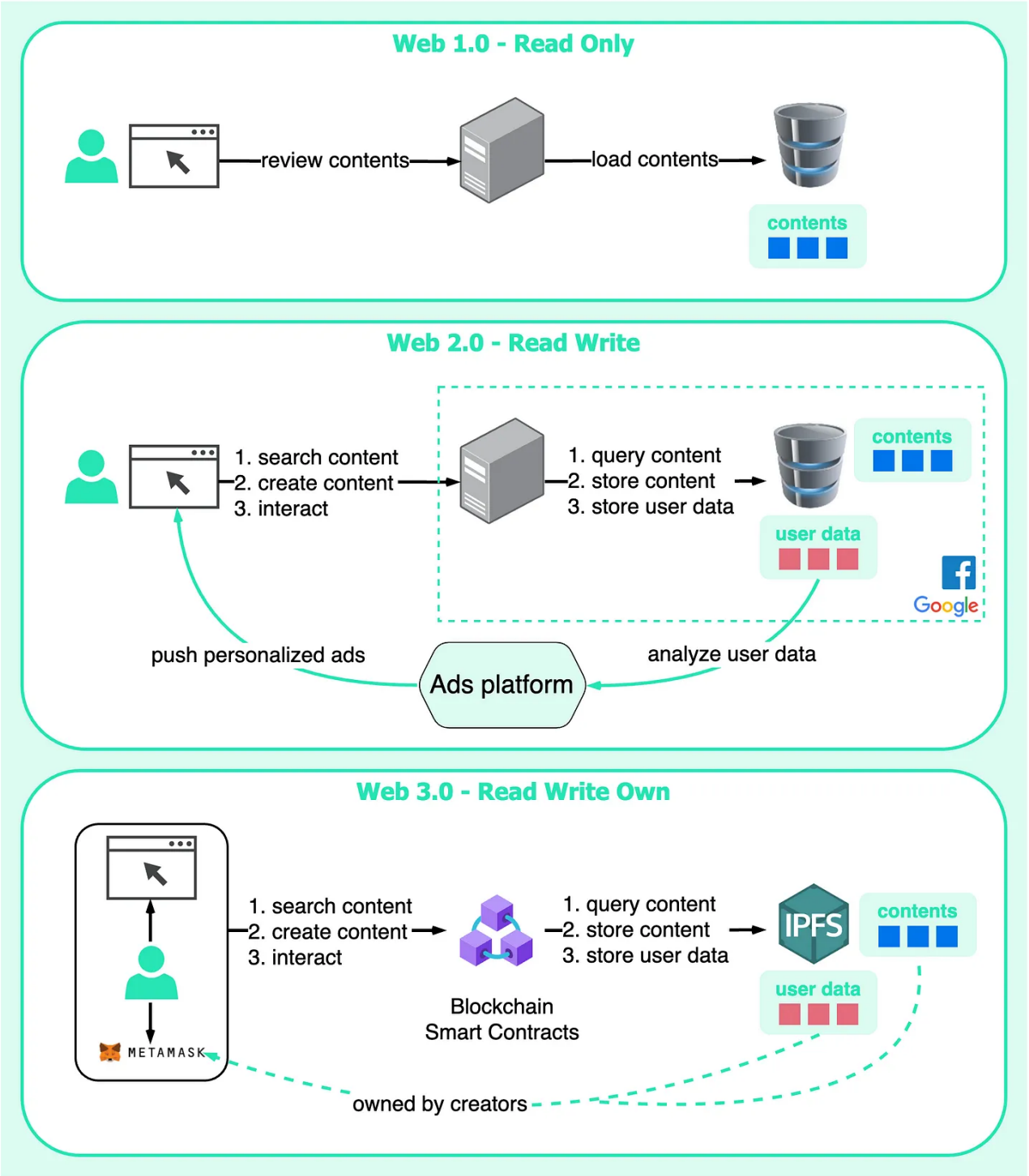
I've listed some companies in different verticals in the diagram. Notice payment companies usually start from one vertical, but later expand to multiple verticals.

Microservice Architecture

What does a typical microservices architecture look like? And when should we use it? Let's take a look.

What is Web 3.0?

The diagram below shows Web 1.0/Web 2.0/Web 3.0 from a bird's-eye view.



- Web 1.0 - Read Only

  Between 1991 and 2004, the internet is like a **catalog of static pages**. We can browse the content by jumping from one hyperlink to another. It doesn't provide any interactions with the content.

- Web 2.0 - Read Write

  From 2004 to now, the internet has evolved to have search engines, social media

apps, and recommendation algorithms backed apps.

Because the apps digitalize human behaviors and persist user data when users interact with these apps, big companies leverage user data for advertisements, which becomes **one of the main business models** in Web 2.0.

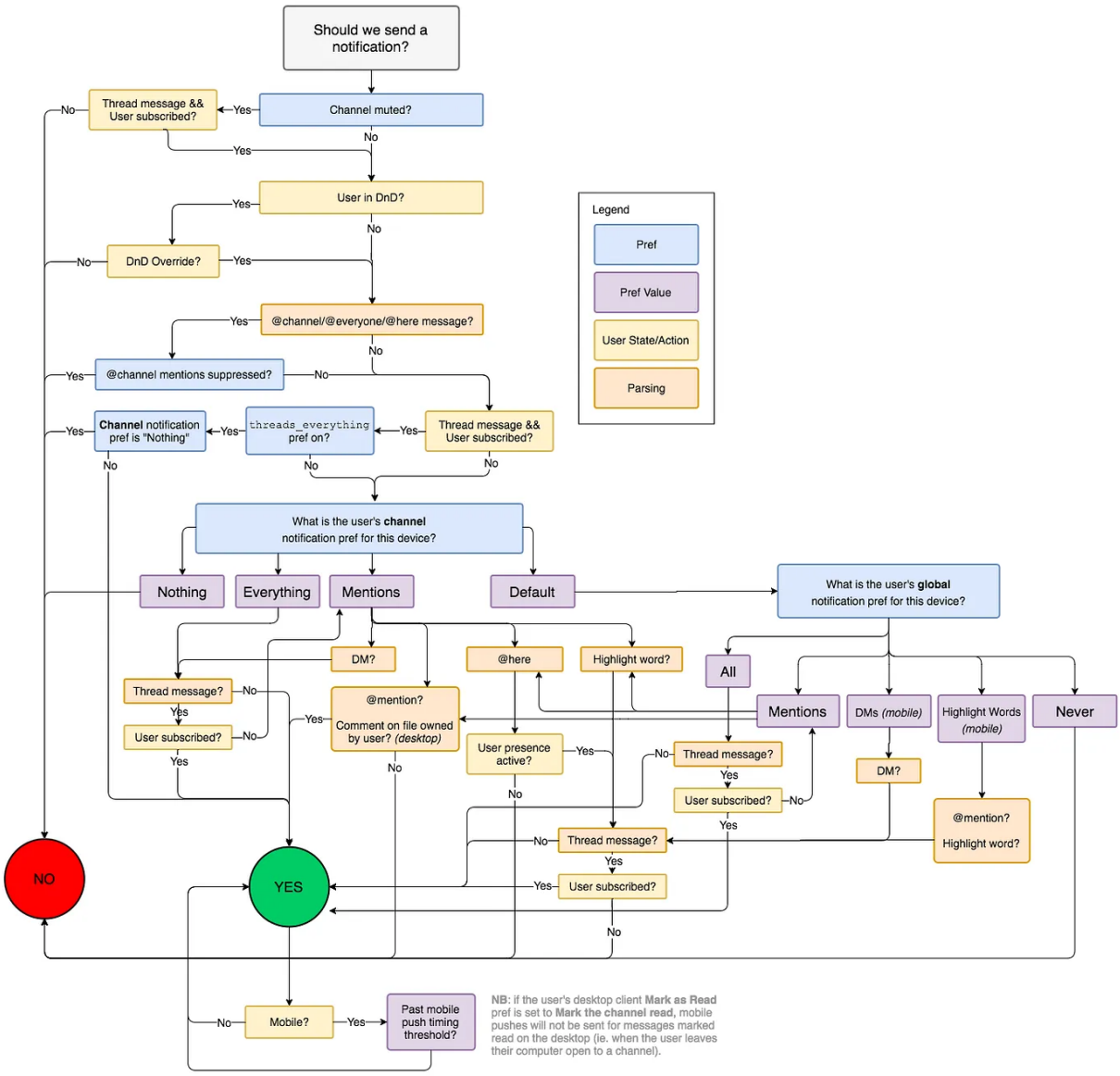
That's why people say the apps know you better than your friends, family, or even yourself.

- Web 3.0 - Read Write Own
  The idea has been discussed a lot recently due to the development of blockchain and decentralized apps. The creators' content is stored on IPFS (InterPlanetary File System) and **owned by the users**. If apps want to access the data, they need to get **authorization** from the users and **pay** for it.

In Web 3.0, the ownership change may lead to some major innovations.

Flowchart of how slack decides to send a notification

It is a great example of why a simple feature may take much longer to develop than many people think.



When we have a great design, users may not notice the complexity because it feels like the feature just working as intended.

Image source: slack eng blog

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2 Comments

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Dhruv Oct 6

Hi Alex - Thanks for this helpful diagram. I am unclear as to the relationship between ISO/MSPs and Payment Gateways? I.e. if I go to a cafe and put my card into a square terminal, I thought the square terminal was the gateway - if not, as per your diagram, what is the "payment gateway" square uses? Also, in the diagram, there is no indicated "line" relationship between ISO and gateway, whereas in the description below it suggests ISOs and processors work together to open merchant accounts. I would appreciate any clarification here if possible. Many thanks!

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Gabriel Dapiaggi Nov 25, 2022

In the payments ecosystem you have just put there couple of examples of acquirers and psps, right? otherwise I am missing worldline, for example....

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