eBay Developers Conference

2008

Inside the Black Box—PayPal's® Deployment Architecture

eBay Developers Conference 2008

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eBay PayPal™ ProStores an eBay company Shopping.com skype™

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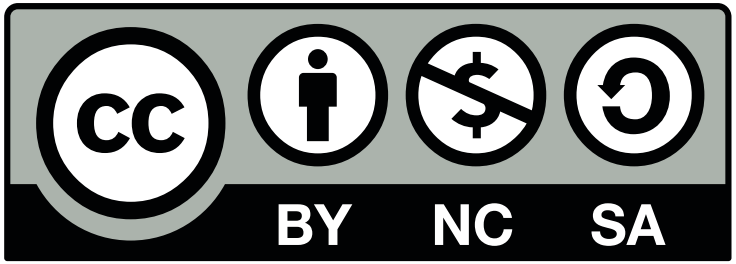

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Inside the Black Box

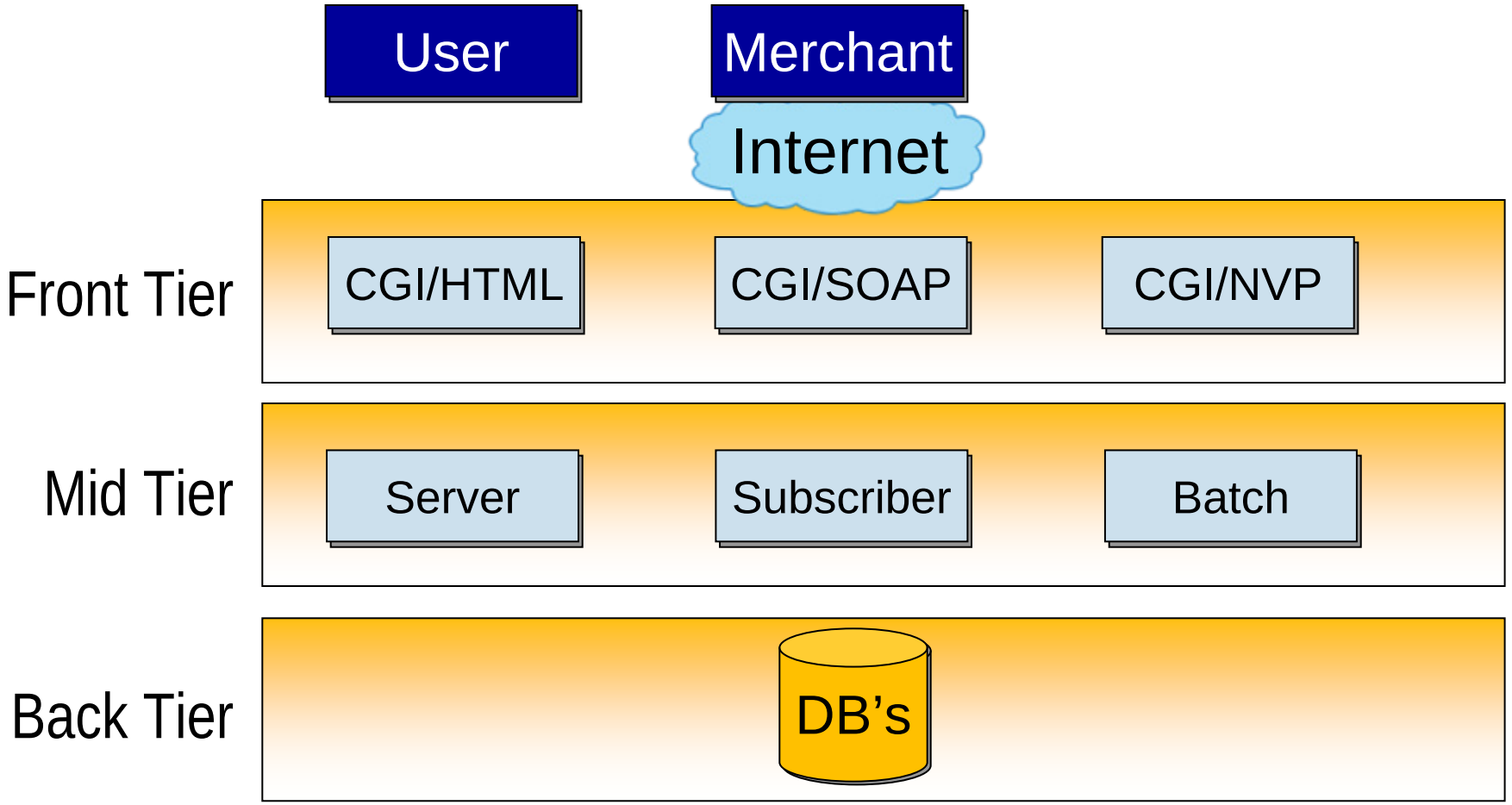
- Traditionally developers are presented with a model which views PayPal as a simple black box. That model is sufficient from a development perspective, but developers are curious
- In this talk we'll get to see behind that simple model and follow messages as they travel through the PayPal system

Things You'll Learn

- How does PayPal's Tiered Network Architecture improve security?
- How do stateless service pools address scalability and availability?
- What are the process interactions in PayPal's data center for some common actions?

Tiering and Pooling

Tiered Architecture



Tiered Architecture Benefits

- A firewall sits in front of each tier for increased security
- We run two data centers with similar layouts for disaster recovery
- The PayPal system is distributed across 1000+ systems for scalability and availability
- We have dozens of High Availability DB's to scale our transactions

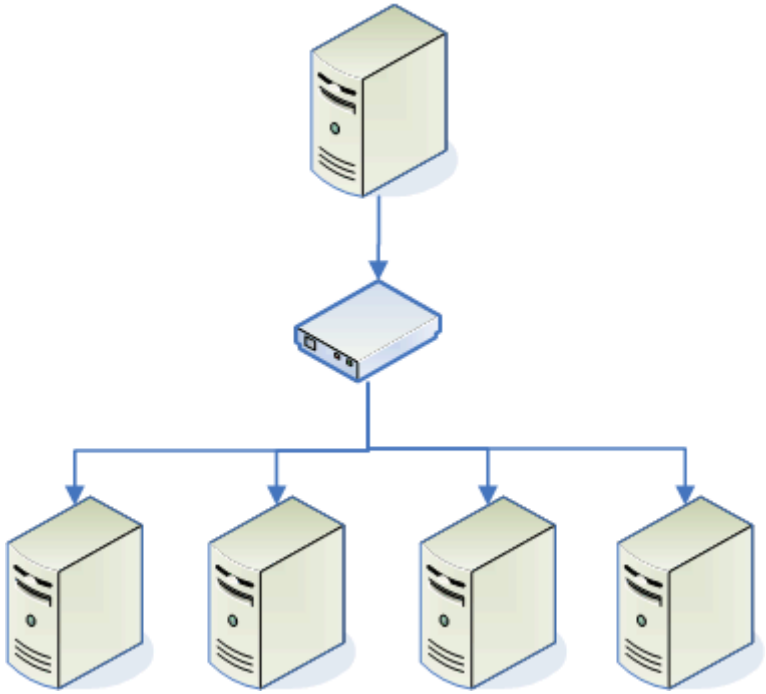
Load Balanced Pools of Servers

The key to scaling and availability is load balanced stateless services…

Client

Load Balancer

Pooled Servers



Issues request to a Virtual IP (VIP) and port—e.g., 10.193.48.16:12346

Transparently manages mapping between VIP and configured set of hosts

Receives inbound Request. Unaware of other pool servers. May in turn be client of other VIPs.

Common System Model

- Linux-based hosts
- C++ is dominant development language
- Front end applications run under Apache CGI
- The “webscr” application does most browser based interaction
- Front end SOAP and Name Value Pair (NVP) also under Apache
- Stateless request handling reduces impact of single system failure and scales
- SSL-based communication throughout

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Website Standard Payments

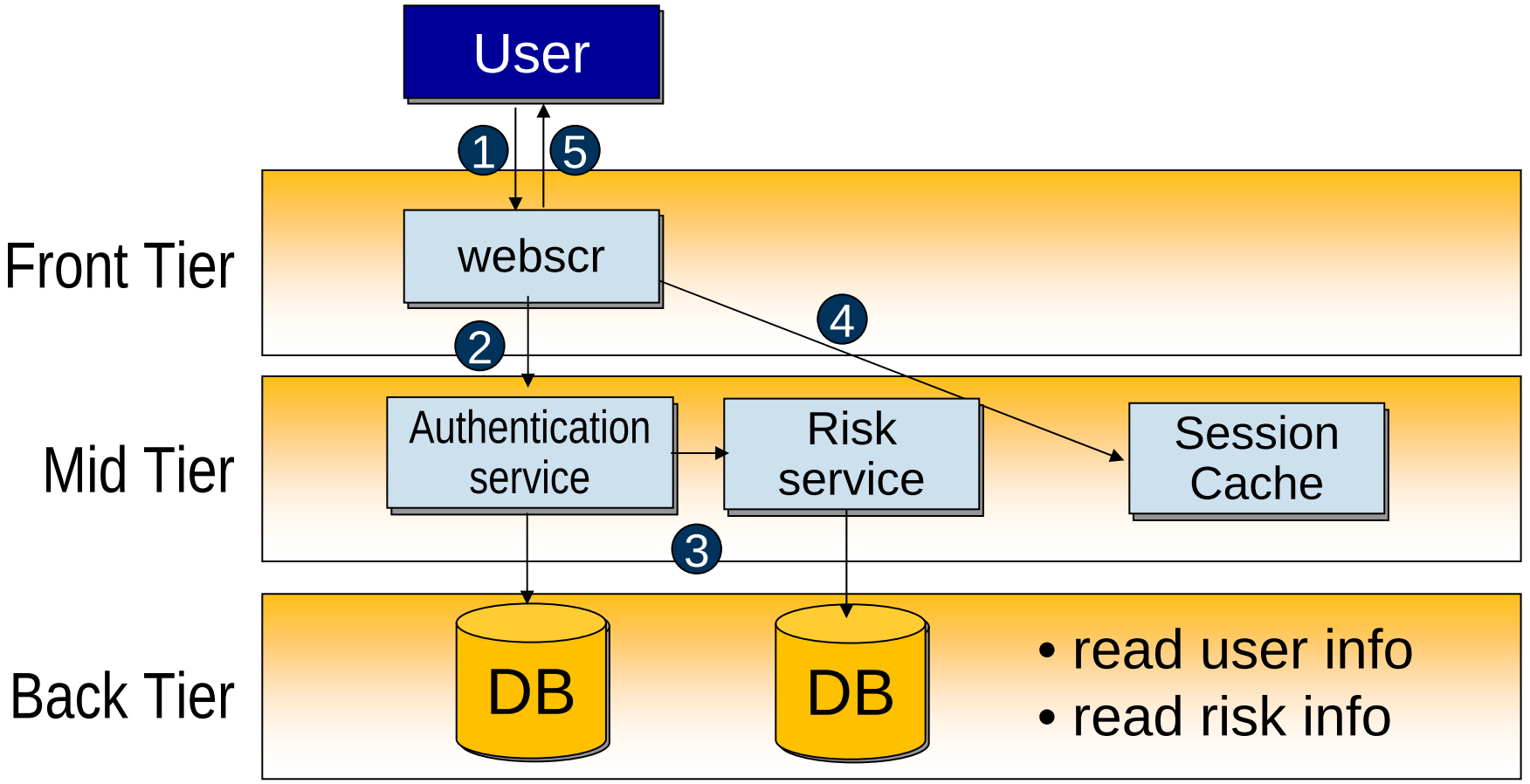
Website Payments Standard

Customers shop on your site and click the payment button.

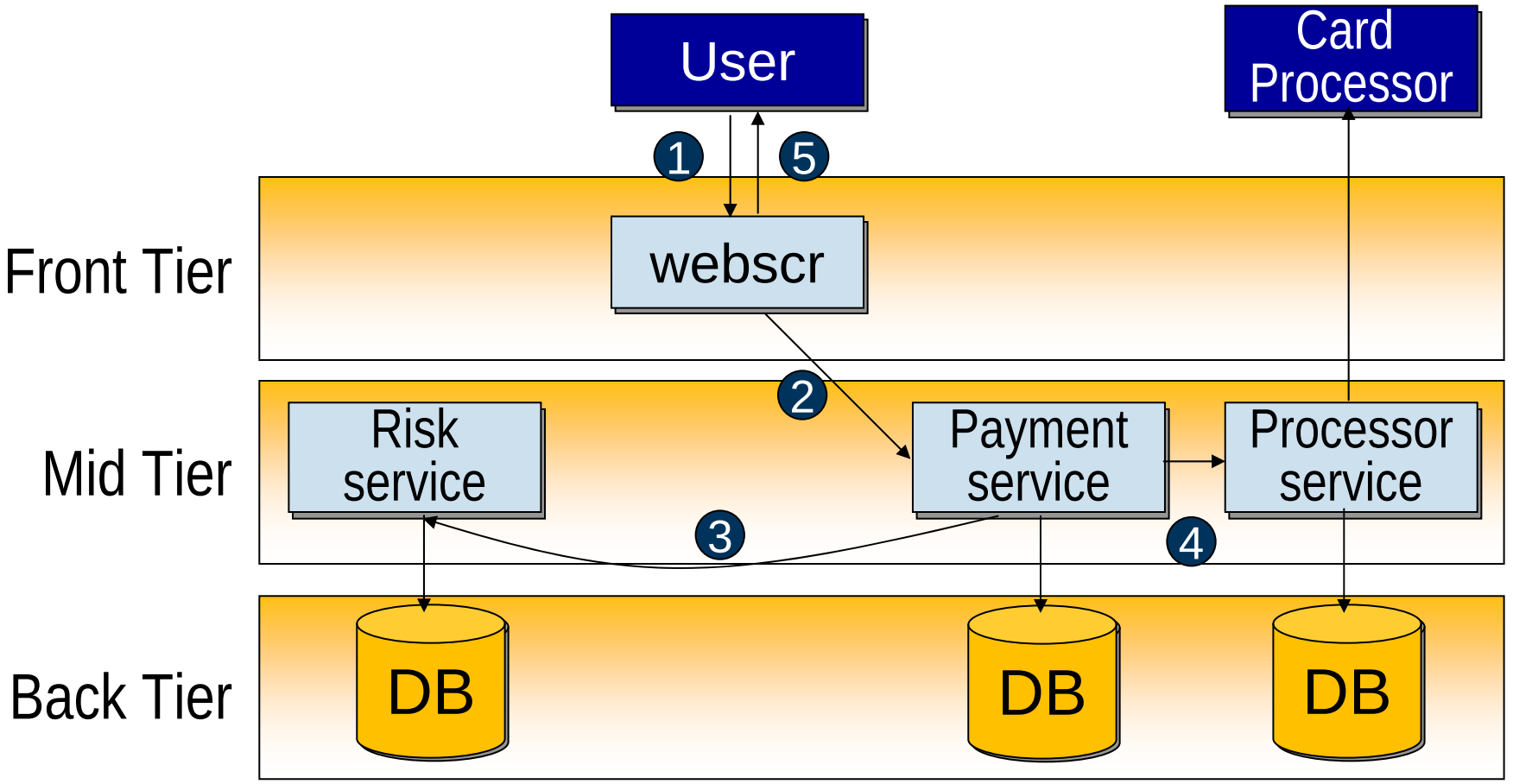
They pay on secure PayPal pages.

And return to your site after payment.

User Logs in to PayPal



User Confirms Payment



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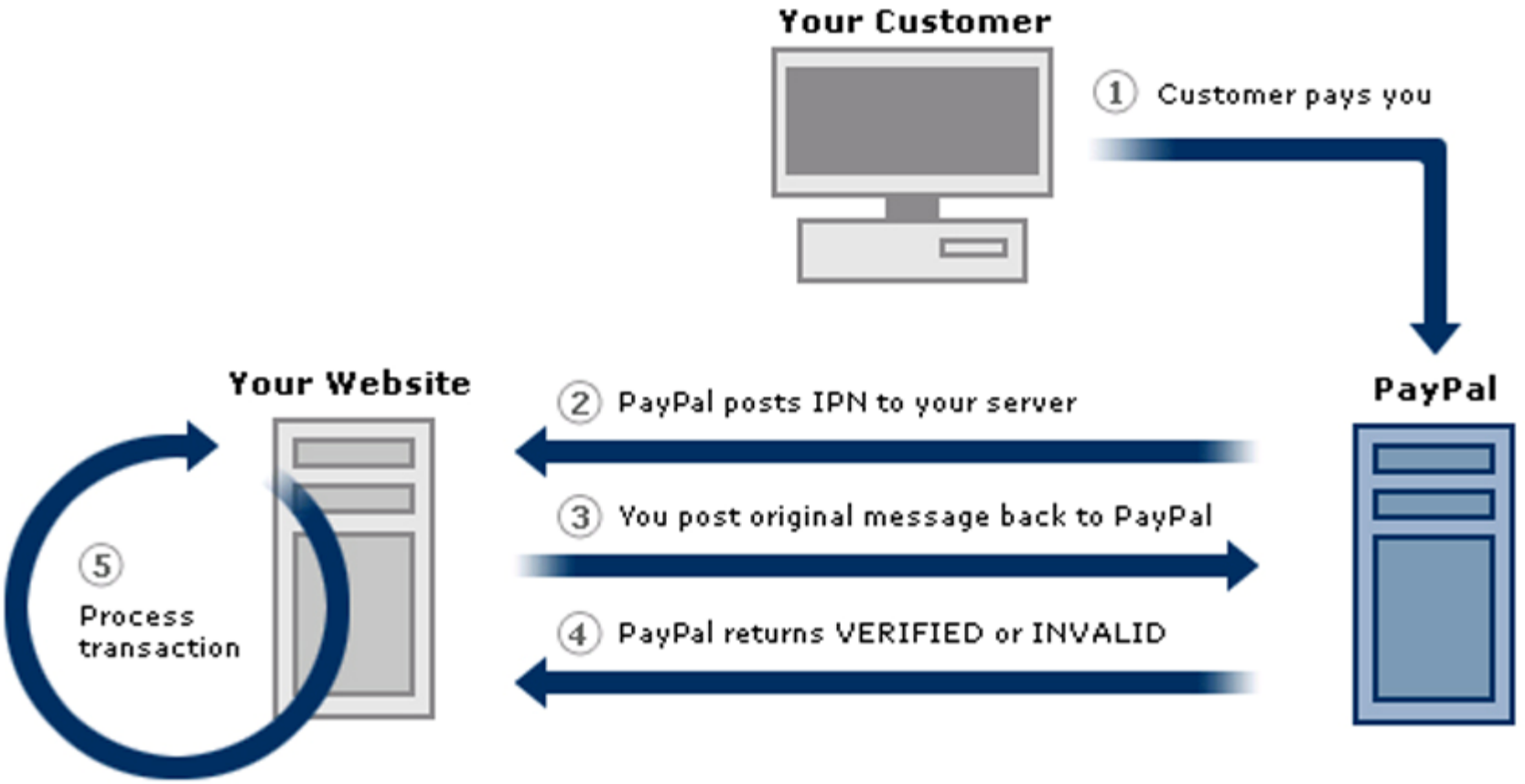
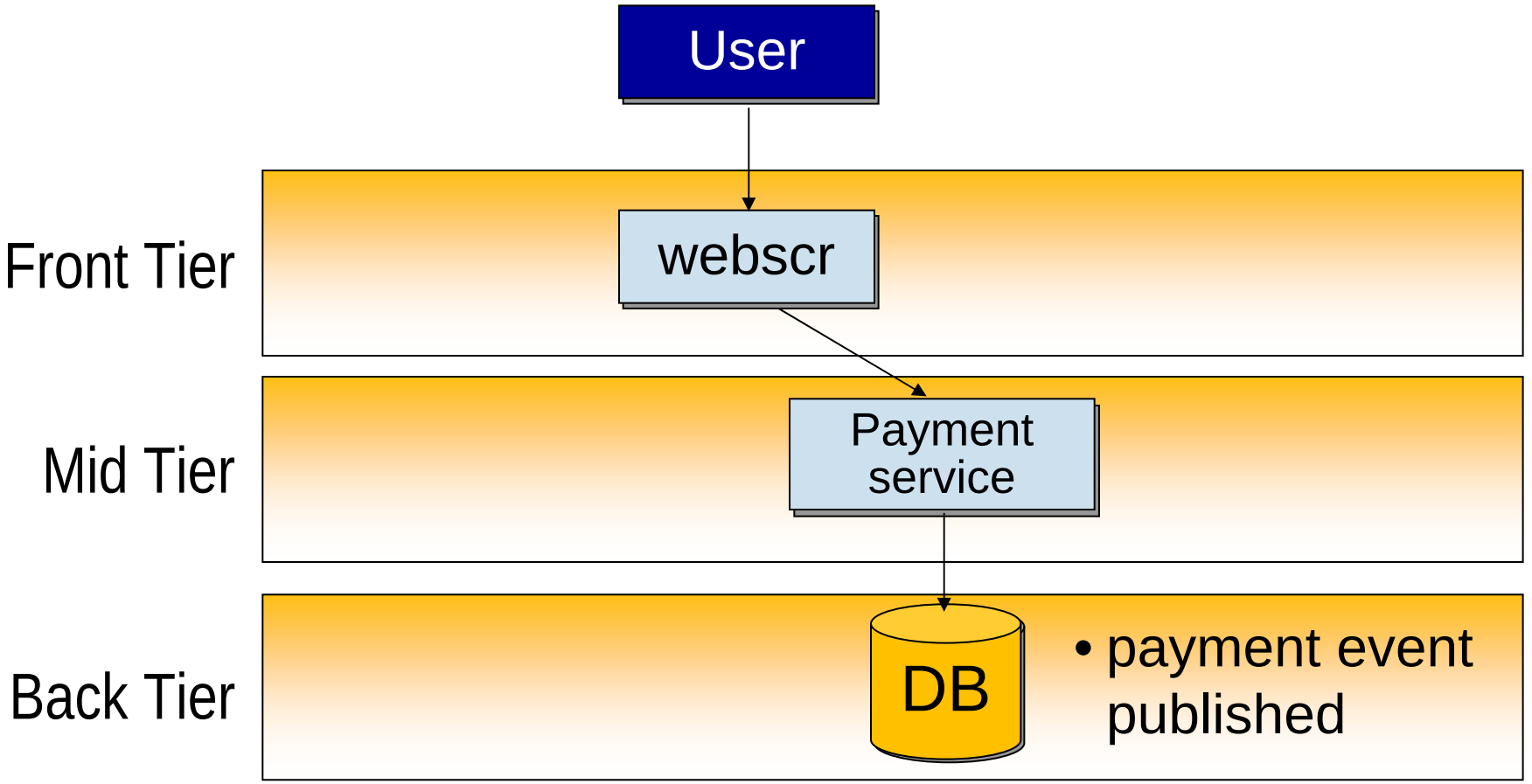
Instant Payment Notification

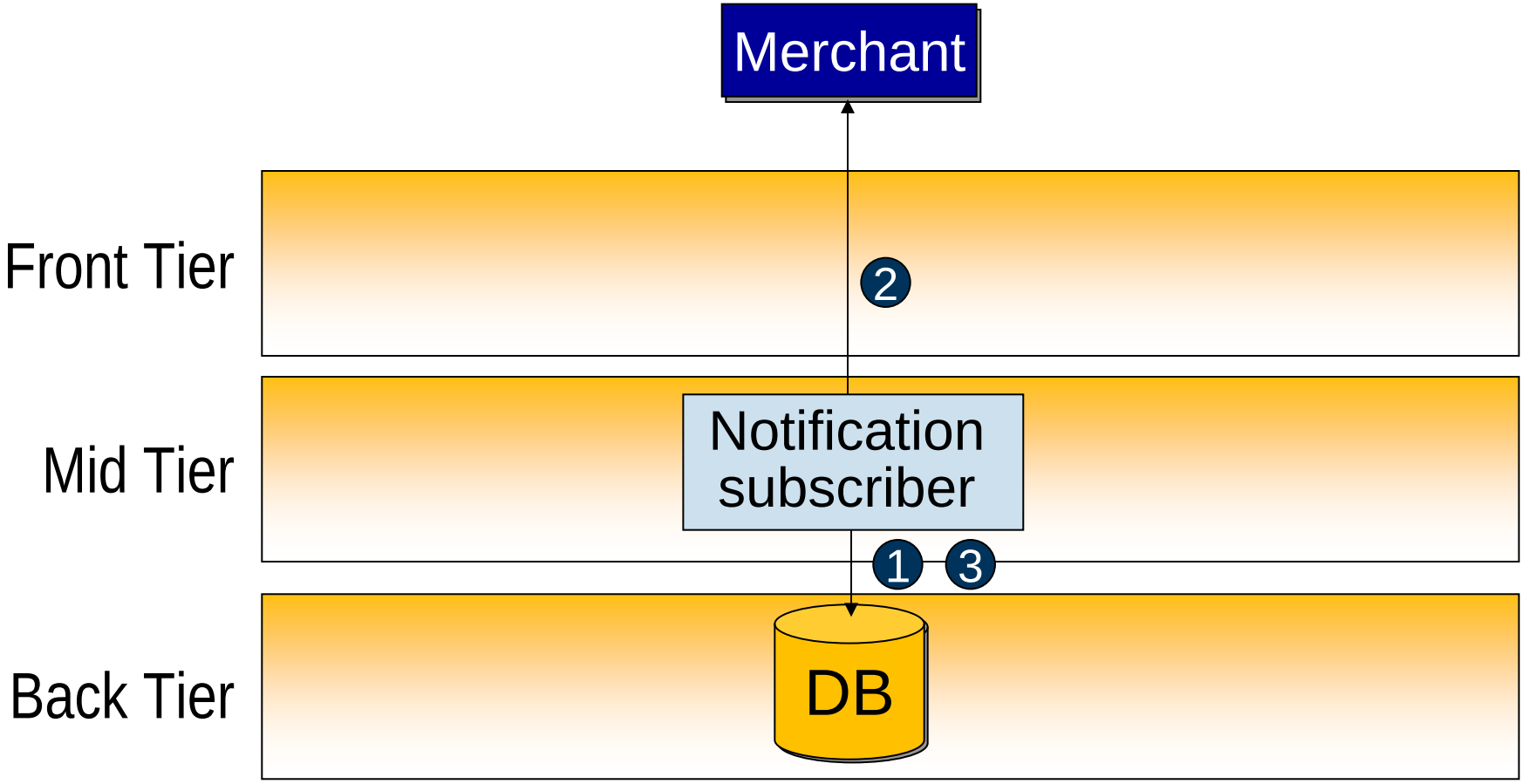
Instant Payment Notification



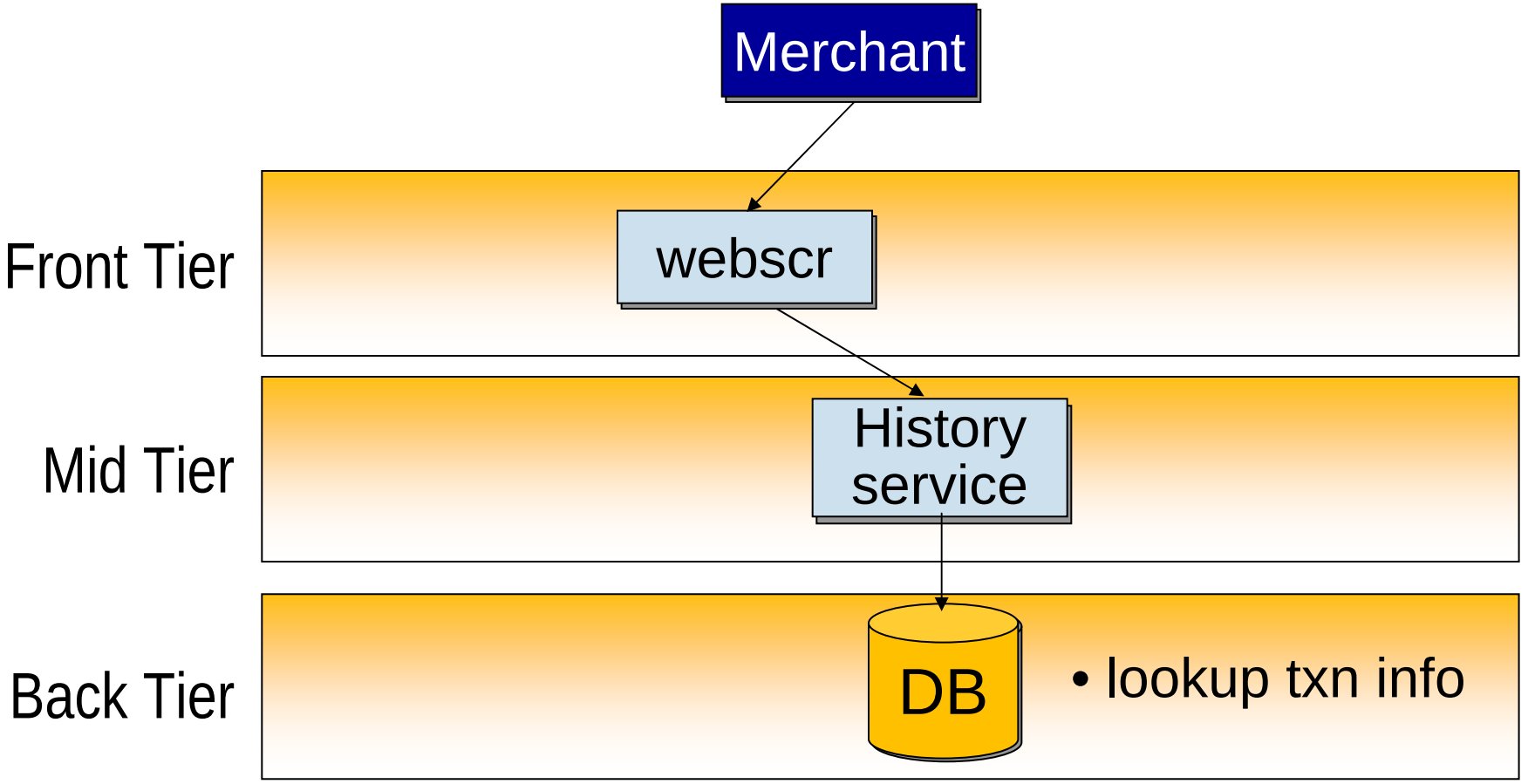
User Confirms Payment & Event Is Published…



Payment Event Turned into Notification by Subscriber



Merchant Sends Info to PayPal to Verify



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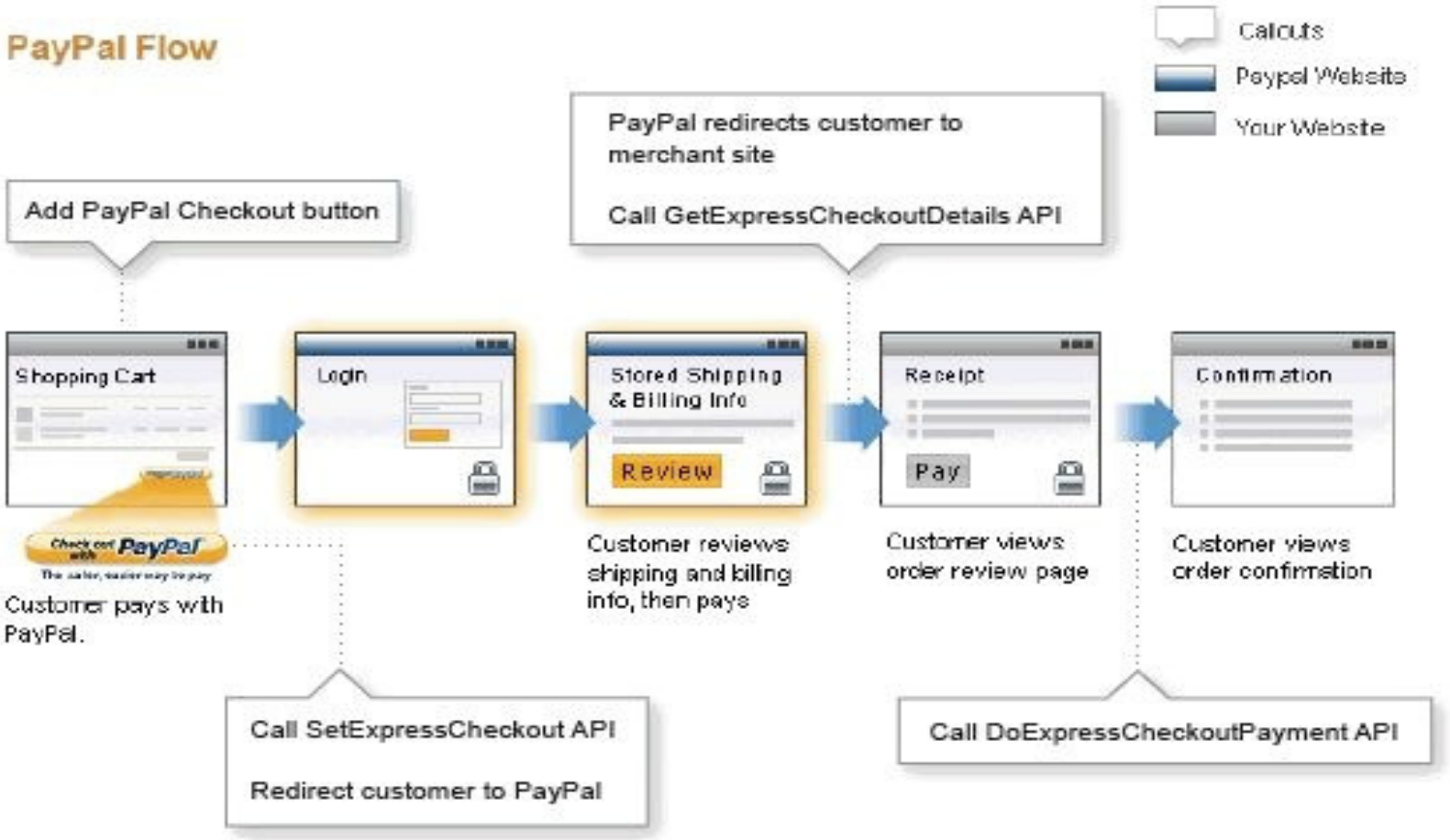
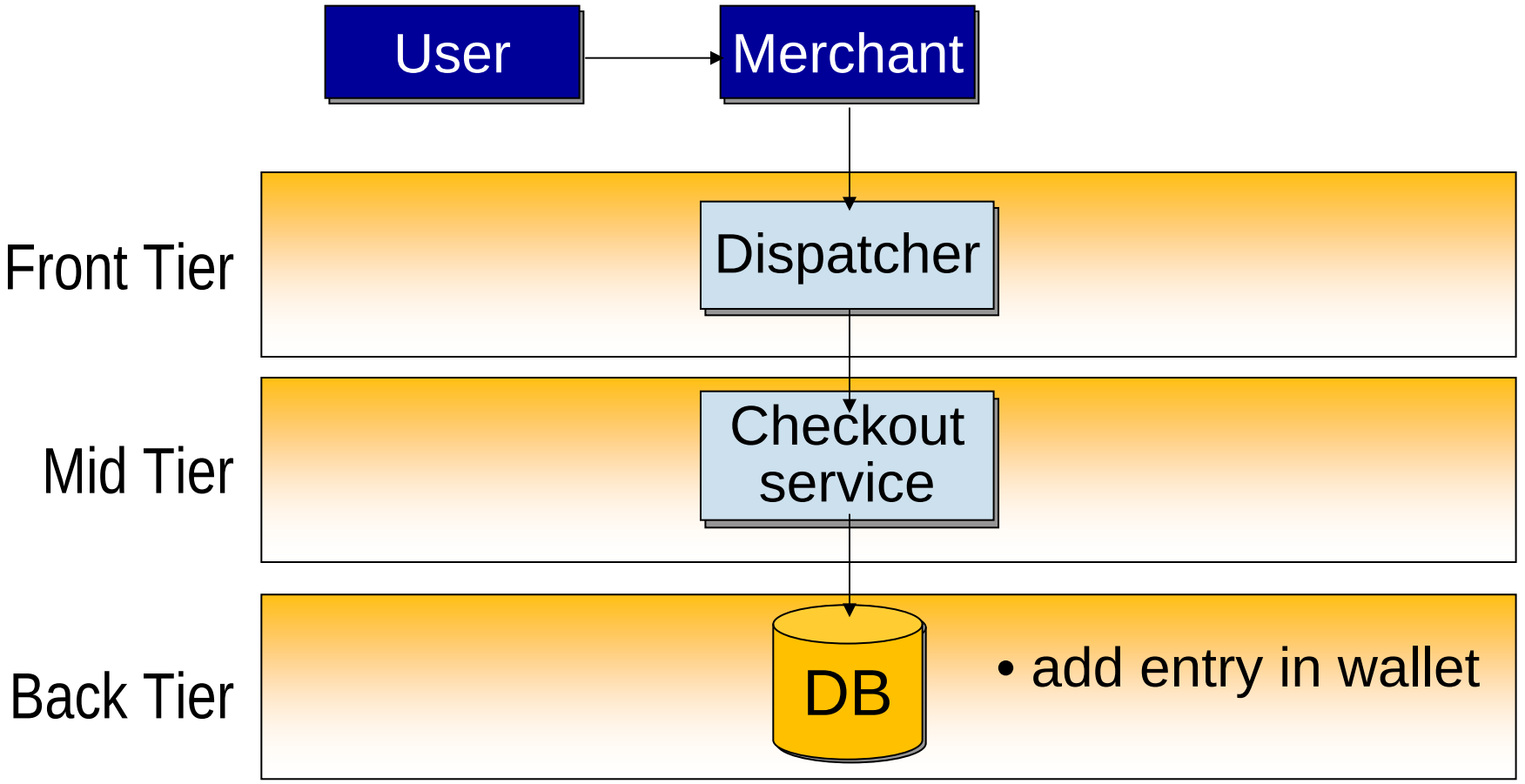
Express Checkout

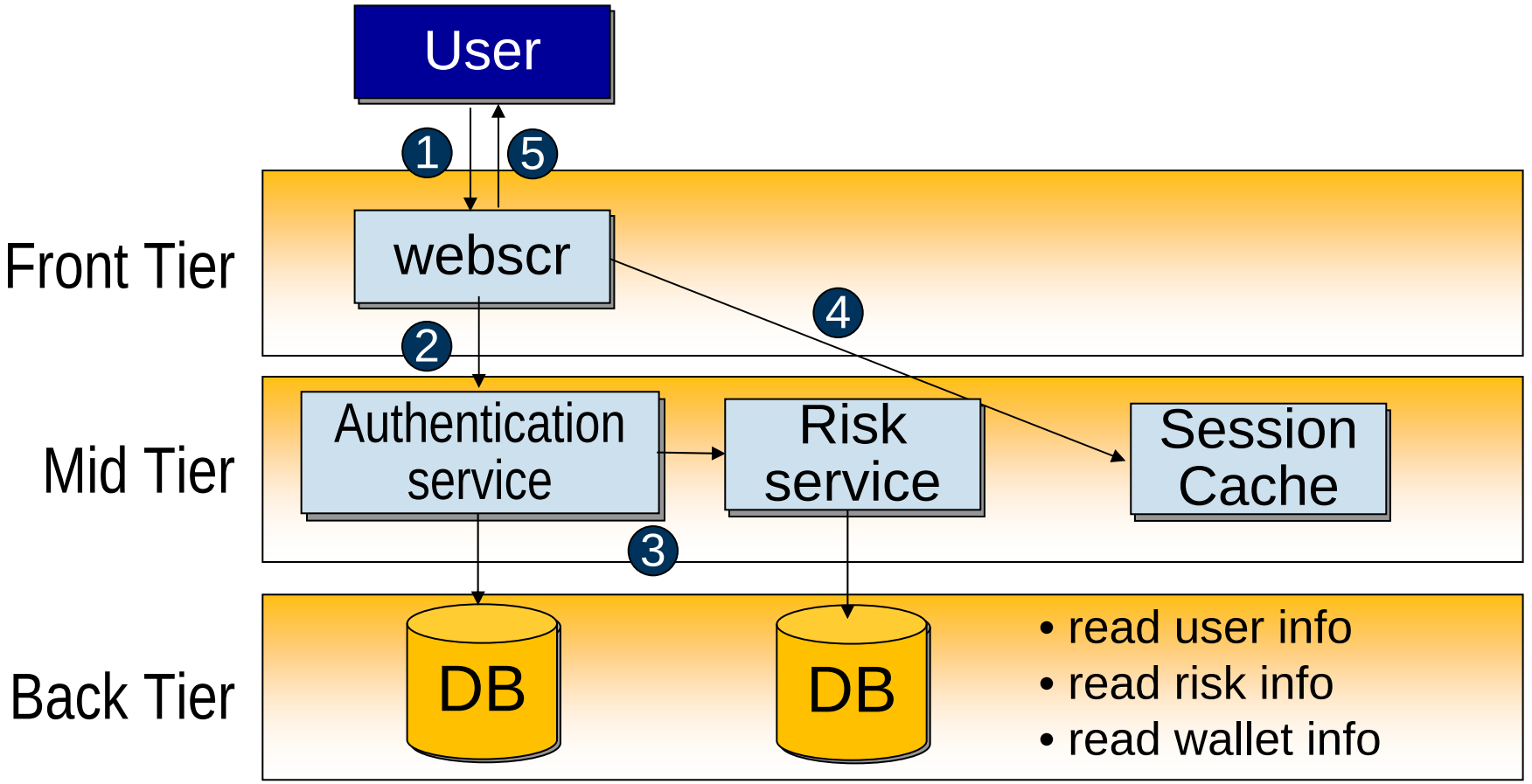
Express Checkout–Use Case



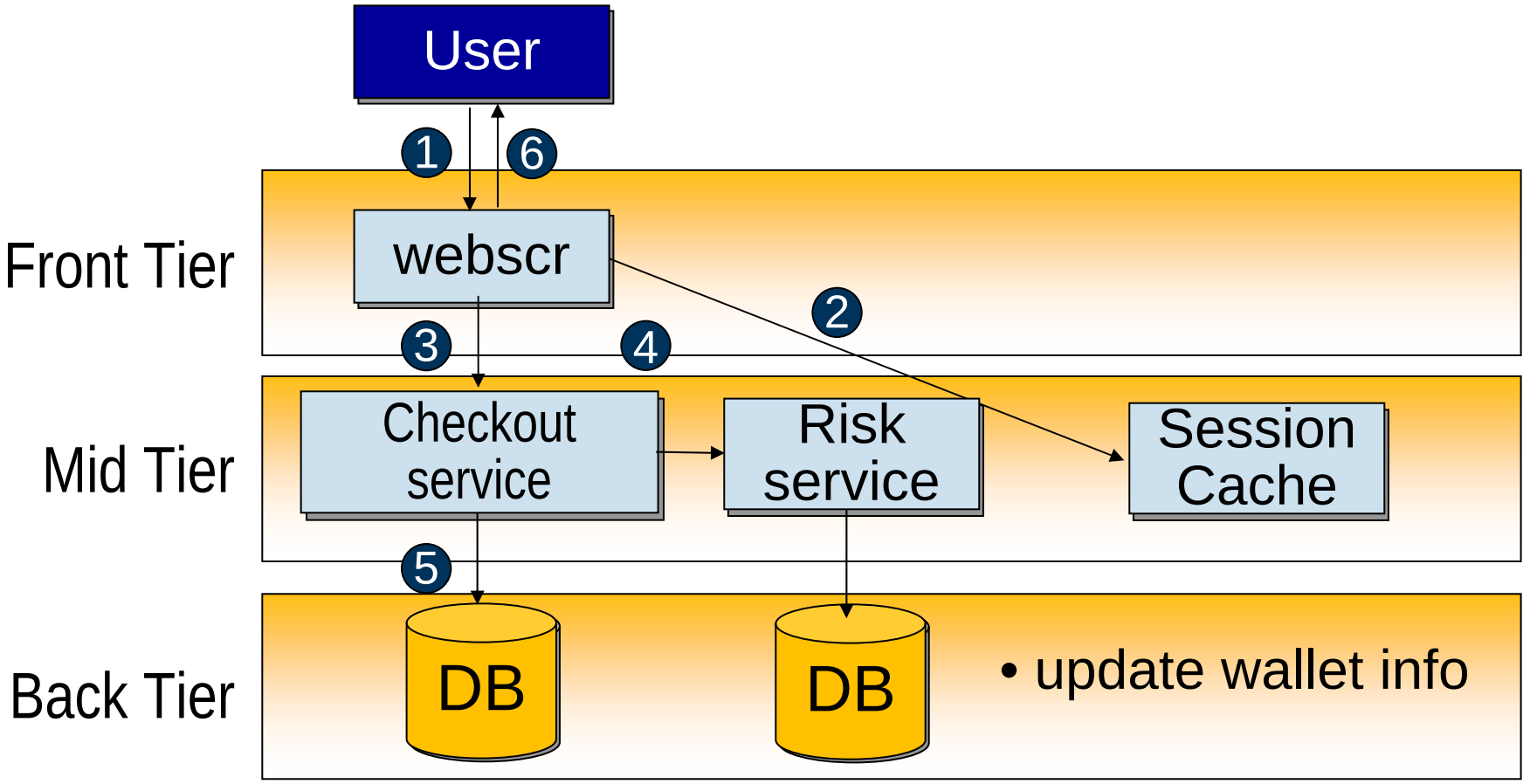
SetCheckout API Call



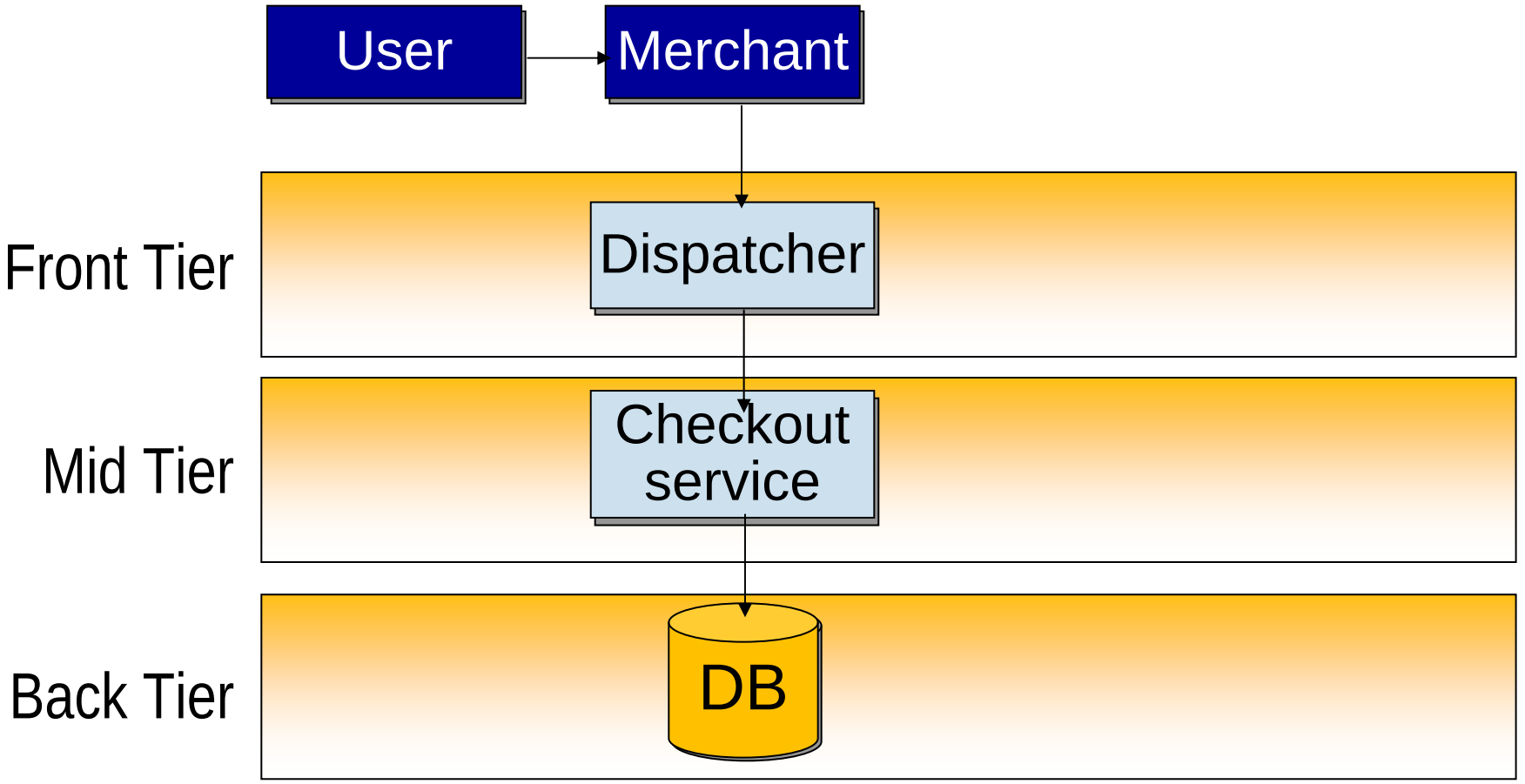
User Logs in to PayPal



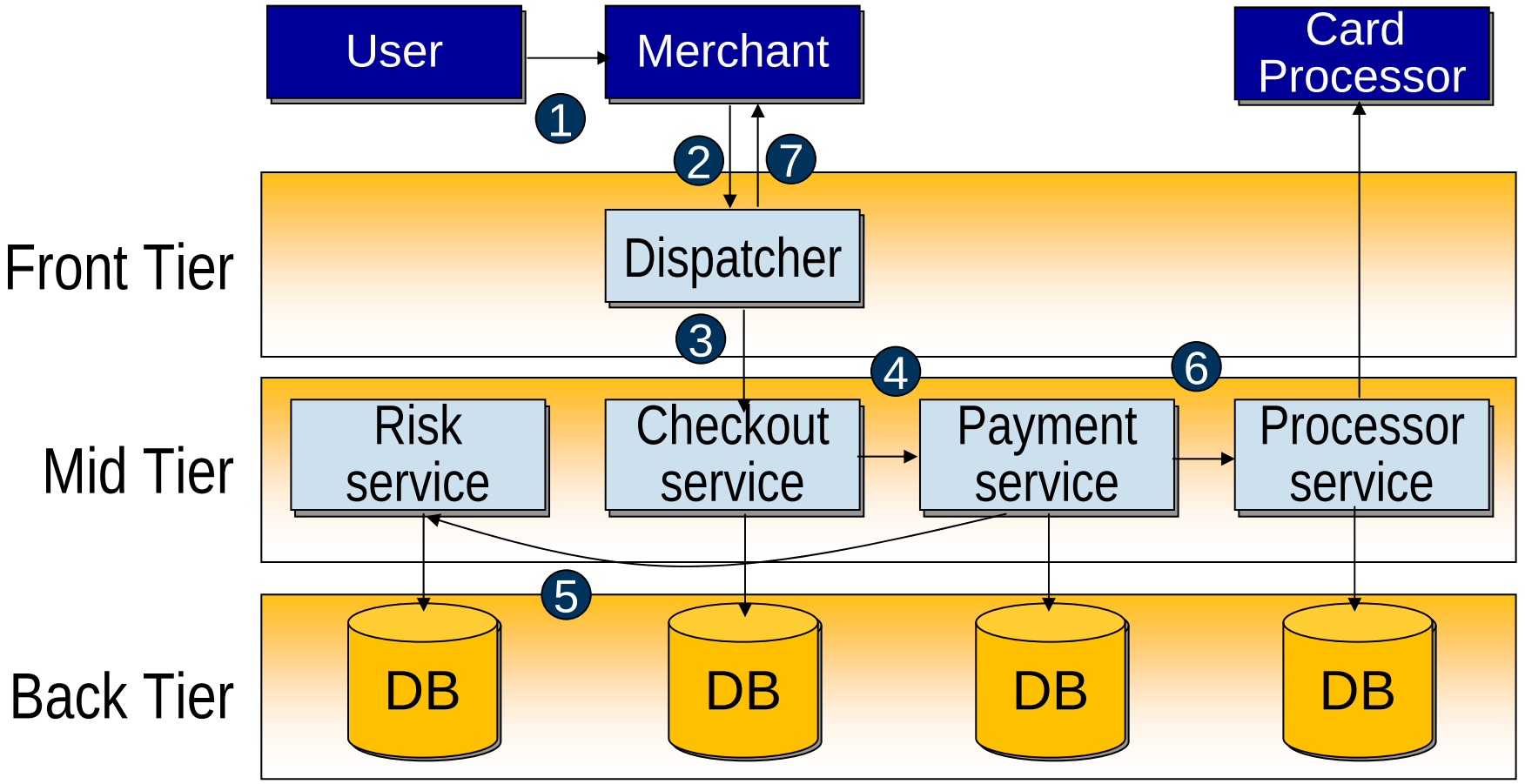
User Authorizes Payment on PayPal



GetDetails API Call



DoPayment API Call



That Ends Our Tour. We Saw…

- How PayPal protects its systems by layered service tiers
- How services are pooled behind load balancers to improve availability and scalability
- How various interactions flow through the PayPal system

Q&A

Jeff Meyer

PayPal

Thank you!

Questions?

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