



Chapter 4

E-commerce Security and Payment Systems



4.5 E-COMMERCE PAYMENT SYSTEMS

E-commerce Payment Systems

- In this section, we provide an overview of the major e-commerce payment systems in use today
- **Alternative payment methods:**
 - ❖ Credit cards
 - ❖ Debit cards
 - ❖ Online stored value payment system (PayPal)
 - ❖ Other alternatives: Amazon Payments, and Bill Me Later
 - ❖ Mobile payments
 - ❖ Social/mobile peer-to-peer payment systems
 - ❖ Digital cash and virtual currencies
 - ❖ Cash on delivery (COD)



ONLINE CREDIT CARD TRANSACTIONS

■ **Credit cards:**

It enables its holder to charge items (and pay later), or obtain cash up to the cardholder's authorized limit. With each purchase, the credit card holder receives a loan from the credit card issuers.

■ **Debit cards:**

Payments made with a debit card are withdrawn from the holder's checking or savings account. The actual transfer of funds usually takes place in real time from the holder's account.

E. x., MasterCard and Visa.

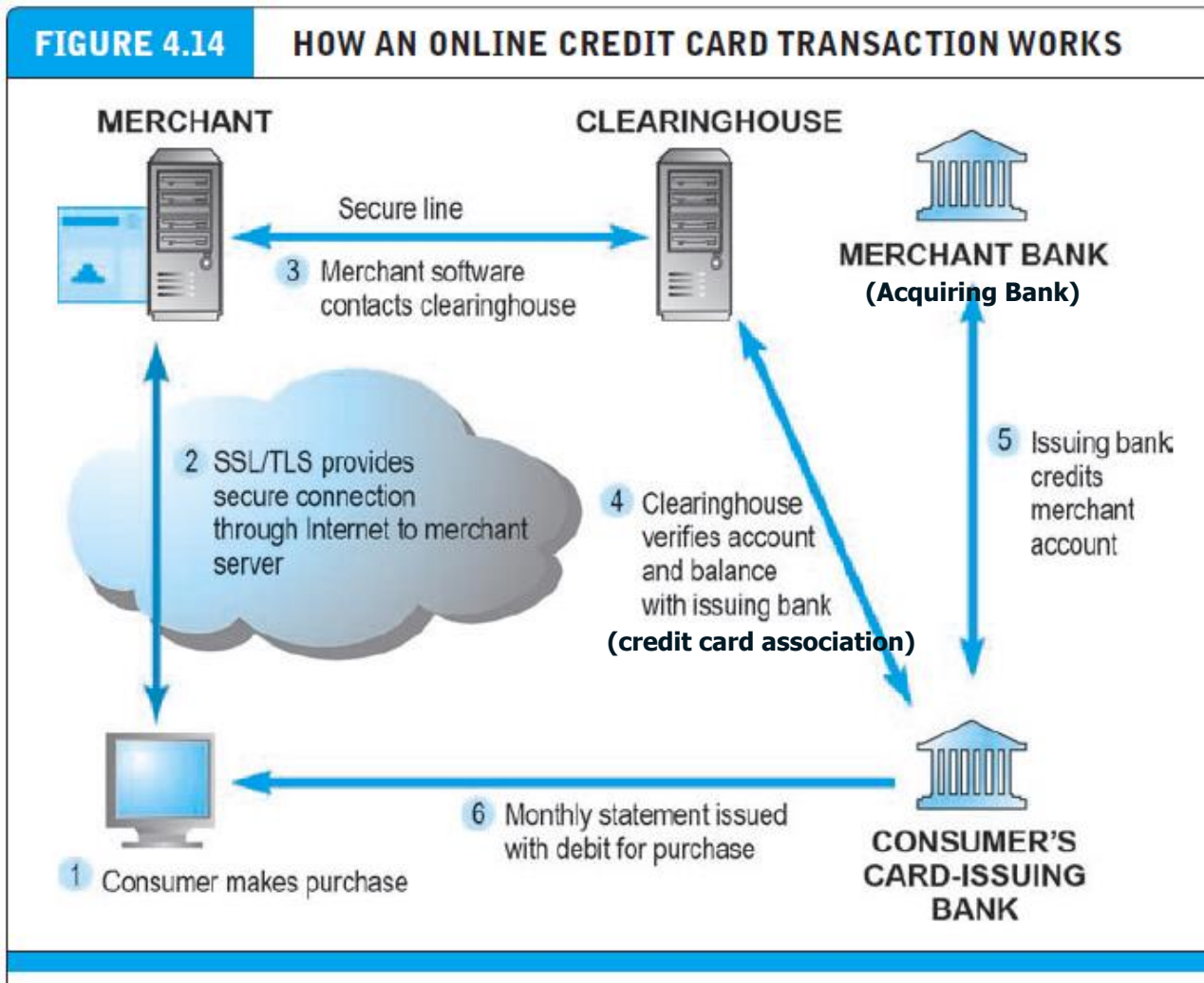
- **Credit cards** 46% of online payments in 2014 (United States)
- **Debit cards** 32% online payments in 2014 (United States)



ONLINE CREDIT CARD TRANSACTIONS

- These types of purchases are also called Cardholder Not Present (CNP) transactions
- Following figure illustrates the online credit card purchasing cycle. (5 parties involved)
- **Merchant account** is simply a bank account that allows companies to process credit card payments and receive funds from those transactions.
- **Clearinghouse** is a financial intermediary that authenticates credit cards and verifies account balances

How an Online Credit Transaction Works





Credit Card E-commerce Enablers

- **Internet Payment service provider (payment gateways)** is the company that provides electronic connections and transaction services among all the parties involved in electronic Payments. It Provide both a merchant account and the software tools needed to process credit card purchases online
- **Examples:**
 - ❖ Authorize.net
 - ❖ CyberSource (international firm which is part of VISA)



PCI-DSS Compliance

- The **PCI-DSS (Payment Card Industry-Data Security Standard)** is a data security standard instituted by the five major credit card companies (Visa, MasterCard, American Express, Discover, and JCB).
- Every online merchant must comply with the appropriate level of PCI-DSS in order to accept credit card payments. Those that fail to comply and are involved in a credit card breach may ultimately be subjected to fines and other expenses.
- PCI-DSS has various levels, related to the number of credit/debit cards processed by the merchant each year



PCI-DSS Compliance

- It requires the merchant to:
 - a. build and maintain a secure network
 - b. protect cardholder data
 - c. maintain a vulnerability management program
 - d. implement strong access control measures
 - e. regularly test and monitor networks
 - f. maintain an information security policy.

- Each of these six broad control objectives has further specific requirements that must be met.

- See <https://www.youtube.com/watch?v=iiGwE7A4VzM>



E-commerce Payment Systems

Limitations of online credit card payment

- ❖ Security,
- ❖ merchant risk
- ❖ Administrative cost
- ❖ Transaction cost
- ❖ Social equity



Alternative Online Payment Systems

Online stored value systems:

- Permits consumers to make instant, online payments to merchants and other individuals based on value stored in an online account
 - ❖ Example: PayPal

Alternative Online Payment Systems

Other alternatives:

- Which enable consumers to shop online at a wide variety of merchants without having to provide credit card information each time they make a purchase.

Examples:

- ❖ Amazon Payments (see: <https://www.youtube.com/watch?v=ajwREuLVa1w>)
- ❖ Visa Checkout (see: <https://www.youtube.com/watch?v=3DxyHmrrans>)
- ❖ Bill Me Later
- ❖ WUPay, Dwolla, Stripe

Mobile Payment Systems (Mobile Wallet)

- Using a mobile device as a vehicle for e-commerce and as a payment method at physical point-of-sale
- Use of mobile phones as payment devices established in Europe and Asia and is now exploding in the United States.
- **Near field communication (NFC)**
 - ❖ set of short-range wireless technologies used to share information among devices within about 2 inches of each other (50 mm).
 - ❖ NFC devices are either powered or passive
 - ❖ NFC peer-to peer communication is possible where both devices are powered.
 - ❖ An NFC-equipped smartphone, for instance, can be swiped by a merchant's reader to record a payment wirelessly and without contact



Mobile Payment Systems (Mobile Wallet)

■ Expanding in United States

- ❖ Apple Pay (see: https://www.youtube.com/watch?v=ez-2M3C_4wU)
- ❖ Android Pay
- ❖ PayPal
- ❖ Square

SOCIAL/MOBILE PEER-TO-PEER PAYMENT SYSTEMS

In addition to using a mobile device as a vehicle for e-commerce and as a payment method at physical point-of-sale, another type of mobile payment transaction is becoming increasingly popular:

Social/Mobile peer-to-peer payments.

- Services such as Venmo, Square Cash, Snapcash, Google Wallet, and the new Facebook Messenger Payment service all enable users to send another person money through a mobile application or Web site.

Venmo (see: <https://www.youtube.com/watch?v=QIJwgiN3ICY>)



Digital Cash and Virtual Currencies

■ Digital cash

- ❖ Based on algorithm that generates unique tokens that can be used in “real” world
- ❖ Example: Bitcoin (see: <https://www.youtube.com/watch?v=Um630Qz3bjo>)

■ Virtual currencies

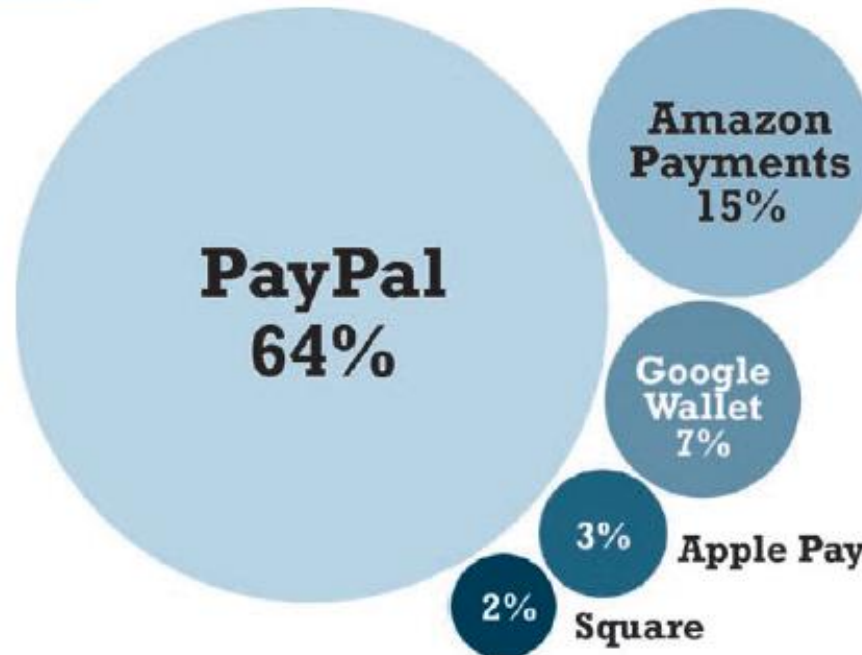
- ❖ Circulate within internal virtual world
- ❖ Example: Linden Dollars in Second Life, Facebook Credits

TABLE 4.8**MAJOR TRENDS IN E-COMMERCE PAYMENTS 2015–2016**

- Payment by credit and/or debit card remains the dominant form of online payment.
- Mobile retail payment volume skyrockets.
- PayPal remains the most popular alternative payment method online.
- Apple introduces Apple Pay, a mobile payment service that uses near field communication (NFC) chips, with strong support from banks and credit card companies. Samsung and Google follow, with Samsung Pay and Android Pay, respectively.
- Square gains further traction with a smartphone app, credit card reader, and credit card processing service that permits anyone to accept credit card payments.
- Google refocuses Google Wallet, which had met with tepid response, solely on sending and receiving money.
- Mobile P2P payment systems such as Venmo take off.

FIGURE 4.13

**ALTERNATIVE PAYMENT METHODS USED BY CONSUMERS
IN THE UNITED STATES IN 2015**



PayPal is still, by far, the most popular alternative payment method.



■ Only section 4.5

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