CSC-370
E - Commerce
(BSc CSIT, TU)

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Digital Token based Electronic Payment Systems

- None of the banking or retailing payment methods is completely adequate in their present form for the consumer-oriented e-commerce environment.
- there may be a sufficient delay in the payment process for frauds, overdrafts, and other undesirables to be identified and corrected
- many of these payment mechanisms are being modified and adapted for the conduct of business over networks
- Entirely new forms of financial instruments are also being developed
- One such new financial instrument is "**electronic tokens**" in the form of electronic cash/money or checks
- Electronic tokens are designed as electronic analogs of various forms of payment backed by a bank or financial institution.
- Simply stated, electronic tokens are equivalent to cash that is backed by a bank

Types of Electronic Tokens

- There are three types of electronic tokens
  - **Cash or Real-Time :** Transactions are settled with the exchange of electronic currency. An example of online currency exchange is electronic cash (e-cash).
  - **Debit or Prepaid :** Users pay in advance for the privilege of getting information. Examples of prepaid payment mechanisms are stored in smart cards and electronic purses that store electronic money
  - **Credit or Postpaid :** The server authenticates the customers and verifies with the bank that funds are adequate before purchase. Examples of postpaid mechanisms are credit/debit cards and electronic checks

Electronic Cash (e-cash)

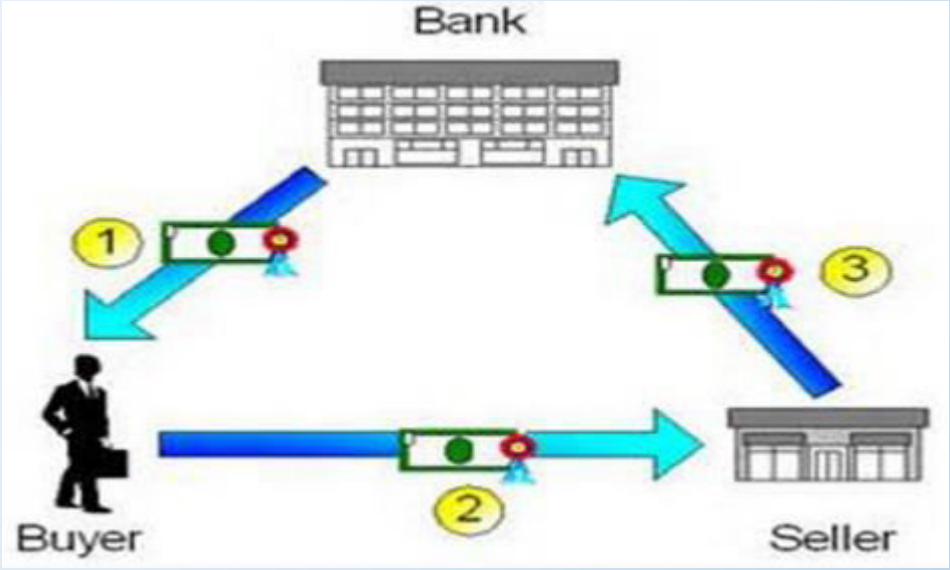
- It is a new concept in online payment systems because it combines computerized convenience with security and privacy that improve on paper cash.
- Its versatility opens up a host of new markets and applications.
- E-cash presents some interesting characteristics that should make it an attractive alternative for payment over the Internet
- It focuses on replacing cash as the principal payment vehicle in consumer-oriented electronic payments
- Cash remains the dominant form of payment for three reasons:
  - lack of trust in the banking system,
  - inefficient clearing and settlement of noncash transactions
  - negative real interest rates paid on bank deposits

Electronic Cash (e-cash)

- Electronic cash is one of the instruments that can be used to conduct paperless transactions
- Paperless transaction is a term used to describe financial exchanges that do not involve the physical exchange of currency
- monetary value is electronically credited and debited
- Often called e-cash or digital money, and is commonly used to conduct distant transactions, such as those between parties on the Internet and those between parties in different countries
- Eg. E-cash can allow a freelancer in Nepal to be paid for work that he did for a contractor present anywhere in the world. (Paypal, esewa)

Electronic Cash (e-cash)

- One advantage of e-cash is that it eliminates the apprehension that many people feel about carrying and exchanging paper currency.
- Another advantage of e-cash is that it is usually easily converted to another currency, making traveling and international business substantially easier



Transaction of e-cash

Electronic Cash (e-cash)

- Ideal properties of a Digital Cash system should be :
  1. **Secure :** Alice should be able to pass digital cash to Bob without either of them, or others, able to alter or reproduce the electronic token
  2. **Anonymous :** Alice should be able to pay Bob without revealing her identity, and without Bob revealing his identity. Moreover, the Bank should not know who Alice paid or who Bob was paid by. Even stronger, they should have the option to remain anonymous concerning the mere existence of a payment on their behalf
  3. **Portable :** The security and use of the digital cash is not dependent on any physical location. The cash should be able to be stored on disk or USB memory stick, sent by email, SMS, internet chat, or uploaded on web forms. Digital cash should not be restricted to a single, proprietary computer network. Eg. Electronic Cash Registers
  4. **Offline Capable :** The protocol between the two exchanging parties is executed offline, meaning that neither is required to be host-connected in order to proceed

Electronic Cash (e-cash)

- Ideal properties of a Digital Cash system should be :
  5. **Wide acceptability :** The digital cash is well-known and accepted in a large commercial zone. With several digital cash providers displaying wide acceptability, Alice should be able to use her preferred unit in more than just a restricted local setting
  6. **User-friendly :** The digital cash should be simple to use from both the spending perspective and the receiving perspective. Simplicity leads to mass use and mass use leads to wide acceptability

Pros and Cons of the online electronic cash system

- **Pros :**
  - Provides fully anonymous and untraceable digital cash
  - No double spending problems (coins are checked in real time during the transaction).
  - No additional secure hardware required
- **Cons :**
  - Communications overhead between merchant and the bank
  - Huge database of coin records - the bank server needs to maintain an ever-growing database for all the used coins' serial numbers
  - Difficult to scale, need synchronization between bank servers