Card Payment Systems

Akash Diwaker, Harsh Lathi , Satyam Sachan

IIT Bhilai

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Overview

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2. Technologies Used
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   - Contact-Based Chips
   - Contactless Chips
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Card Systems in Use

We shall focus on the three most commonly found card payment systems:

- Credit Cards
- Debit Cards
- Smart Cards

Technologies Used

The most common technologies used to carry information on cards are as follows:

- Magnetic Stripes
- Contact-Based Chips
- Contactless Chips

The standard `ISO/IEC 7810` standardizes all the physical properties (such as the dimensions and material) of the cards.

Magnetic Stripe Cards

The implementation of the cards that use the magnetic stripe and corresponding standards used while creating said cards will be disccussed.
More particularly, parts 1 through 9 of the standard ISO/IEC 7811 will be explained further within the context of the magnetic stripe cards.

Magnetic Stripe Cards

The most relevant standards are as follows:

- ISO/IEC 7810 Physical characteristics of credit card size document
- ISO/IEC 7811-1 Embossing
- ISO/IEC 7811-2 Magnetic stripe - low coercivity
- ISO/IEC 7811-3 Location of embossed characters
- ISO/IEC 7811-4 Location of tracks 1 & 2
- ISO/IEC 7811-5 Location of track 3
- ISO/IEC 7811-6 Magnetic stripe - high coercivity
- ISO/IEC 7811-7 Magnetic stripe High coercivity, high density
- ISO/IEC 7811-8 Magnetic stripe – Coercivity of 51.7 kA/m (650 Oersted)
- ISO/IEC 7811-9 Tactile identifier mark
- ISO/IEC 7813 Financial transaction cards

Contact-Based Chips

The implementation of the cards that use embedded chips and the corresponding standards used while manufacturing the cards will be discussed.
The relevant parts of the standard `ISO/IEC 7816` will be discussed with respect to the contact-based chips.

Contact-Based Chips

The most relevant standards are as follows:

- ISO/IEC 7810 / 7816-1 Physical characteristics of credit card size document
- ISO/IEC 7816-2 Dimensions and location of the contacts
- ISO/IEC 7816-3 Electrical interface and transmission protocols
- ISO/IEC 7816-4 Organization, security and commands for interchange
- ISO/IEC 7816-8 Commands and mechanisms for security operations
- ISO/IEC 7816-9 Commands for card management
- ISO/IEC 7816-15 Cryptographic information application

Contactless Chips

The implementation of the contactless (proximity and vicinity) cards and the corresponding standards used will be discussed. The defining standards `ISO/IEC 14443` (parts 1-4) and `ISO/IEC 15693` will be further expanded upon.

Contactless Chips

The most relevant standards are as follows:

- ISO/IEC 7810 Physical characteristics of credit card size document
- ISO/IEC 14443-2 RF Power and signal interface
- ISO/IEC 14443-3 Initialization and anticollision
- ISO/IEC 14443-4 Transmission protocol
- ISO/IEC 15693 Contactless integrated circuit cards - Vicinity cards

Transaction Protocols

The transaction protocols and standards specified for the above mentioned technologies and the respective PoS devices will be explained.
The standard `ISO/IEC 8583` (the standard that financial organizations use to communicate and complete card transactions whether from an ATM, a PoS device, on the Internet or on a mobile network) will be discussed.

Security Systems

The main focus of this section are the TLS/SSL (Transport Layer Security/Secure Socket Layer) protocols. These are used to secure exchanges in the transport layer of all parties in the transaction (the term 'transport layer' is from the TCP/IP layer model in networking where logical divisions are made to divide the tasks performed on the actual data before/when it is sent).