Society for Worldwide Interbank Financial Telecommunication

Engr. Abdul-Rahman Mahmood
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Microsoft Certified Professional
ALISON Certified
Teaching skills, Project Management
VC++, VB, ASP
Course portal

- http://alphapeeler.sf.net/me

Engr. Abdul Rahman – IT / Security Consultant

"Those who surrender freedom for security will not have, nor do they deserve, either one."

IBP-CGB-2016

The Institute of Bankers Pakistan

Students registered in the course of “Certified General Banking” at The Institute of Bankers Pakistan, during Fall 2016 session, please download your lectures, tutorials and web resources from here:
http://alphapeeler.sourceforge.net/ibp-cgb-2016/

Facebook group for the course is here:
https://www.facebook.com/groups/1768954626709031/

Group Email: ibpcgp2016@wiggioemail.com
Class Management & Policies

Engr. Abdul Rahman is expecting each student to follow Classroom / Lab Policies, & Procedures listed below:

A. Note from Engr. Abdul Rahman: I have established a few simple policies to lead a respectful and disciplined classroom. You are responsible to comply with the policies. If you fail to comply, there will be serious consequences.

B. Class / Lab Rules:

1. **Strict attendance policy:** Students are required to maintain 100% attendance throughout the session. 5 Minutes margin will be given after that student will be marked absent.

2. **No space for plagiarism:** Incase, if any of the assignment/project deliverables found plagiarized, the whole assignment/project will be marked ‘ZERO’.

3. **Late submission:** Within 1 day after deadline => 25% marks will be deducted. After 1 day => 50% marks will be deducted. After 2 days, ‘ZERO’ credit will be given.

4. **Submission of Assignment:** Students will submit their assignments within due date. If a student has an excused absence from class he or she is responsible for the assignments/homework that missed. It is up to the student to inquire about missed work and tests. Zero will be given if a student fails to make up work within an acceptable period. Following elements are mandatory for an assignment file:
   1. Assignment must be submitted in a proper file cover, and must be labeled properly.
   2. On cover page following items should be printed: Student name, Roll no, Date of submission.
   3. Attach print of the assignment question paper issued by the instructor after cover page.
   4. Attach hand written assignment after question paper.

5. **Consultation Time:** Students are advised to meet Engr. Abdul Rahman during the consultation time of the course only with prior appointment. Refer to the procedure for consulting hours from this url: http://alphapeeler.sourceforge.net/me/?page_id=158

6. **Project Submission:** The course requires a proper project which will be submitted in Week 12. In this project, a proper report of at least 40 pages will be submitted after which a viva will be conducted in front of Engr. Abdul Rahman / HoD.

7. **Hand-held devices:** It is generally not acceptable to use cell phones, pagers, iPod/MP3 players, computers, etc. during lectures, except with the permission of Engr. Abdul Rahman and for reasons directly related to class activity.

8. **Lab assignments:** Assignments are checked only within lab timings. Lab files will not be entertained after lab timings.

9. **Courtesy and respect to all:** Students will exhibit courtesy and respect toward all other students at all times. Hateful comments concerning race, gender, sexuality, political views, appearance, or of any other type will not be tolerated; this applies to serious as well as “joking” comments.

10. **Leave the Food at Home:** Students may not eat in the classroom. This includes gum and candy. Drinks are also not permitted.

11. **Make-Up Tests:** There is no official policy defined for make-up tests, if you are absent or have not appeared in test then zero marks will be given to you.

12. **Final Year Students:** Students who are engaged in FYP, are responsible to demonstrate their work at least twice a week in FYP lab, otherwise I may send unsatisfactory report to the FYP coordinator.

13. **Leave policy:** Application of leave is not entertained by the class teacher, it should be notified to the HoD, and CC to Director Academics / Examination & Manager Student affairs. Even if the leave is approved, your class teacher will not mark you present on the basis of sick leave or any other type of leave. If you fail to maintain 75% attendance, you may not be eligible to sit in exams.
14. **Class compensation:** Engr. Abdul Rahman will notify the CR of the class in case of any class missed due to holidays or extra class required for students. It is the responsibility of class CR to schedule extra class by after reviewing the time table of class and teacher’s time table and book the classroom from administration block.

15. **Late arrival application:** No application will be considered for late arrival after the class has been dismissed. Students need to submit their late arrival application on the same date during the class. Teacher has the right to dismiss the late arrival apology application in case of regular late arrivals.

16. **Entering the Classroom Procedure:** Enter the classroom quietly and in advance of class starting time. Class start time means that you are in your seat and working on your exercise. Class CR is responsible to turn on the multimedia projector before the class starts.

17. **Classroom Exit Procedure:** Wait for me to dismiss you.

C. **Exam policies:**
1. Read all questions carefully first and then ask for clarifications.
2. Question paper related queries will not be entertained after 30 minutes after start of paper.
3. Do not write anything on question paper unless until specifically asked for.
4. Fill the required information and return the question paper along with the answer script.
5. Write your name, and enrollment number, otherwise you may not remain eligible for exam.
6. Get your paper signed from invigilator against your enrollment number; else your paper will not be checked.
7. Only attempt questions assigned to your column, otherwise you may disqualify from exam.
8. In case of MCQs, only circle one choice, otherwise you may disqualify from exam.
9. Any kind of miss-conduct/miss-behavior/cheating will disqualify the candidate.
10. Warning will be issues only once, along with -1 score, after that you will lose your eligibility for exam.

D. **If YOU CHOOSE to Break a Rule:** Punishments will always fit the crime. Of course there are behaviors that will warrant a Vice Principal’s Referral immediately. Examples of this include gross insubordination or violent behavior.

Behaviors that are less severe, but in violation of the basic rules of the class will be dealt with in the manner described below. This format is in no way all inclusive and is subject to change:

1st Incident — Teacher/Student Conference
2nd Incident — Teacher/Student Conference, Parent Notification by phone or email, review behavior grade per grading policy.
3rd Incident — Referral to Administration / discipline committee.

**Note:** All students are required to print a copy of this page and submit to the class teacher with their signatures in order to make sure that all rules are communicated to the students.
Society for Worldwide Interbank Financial Telecommunication

By Engr. Abdul Rahman Mahmood
Understanding SWIFT

- These types of international transfers are typically facilitated by SWIFT.

- But Swift does not actually transfer funds.
Understanding SWIFT

- John wants to wire money to Tina who lives in England.
Understanding SWIFT

- SWIFT just provides a network for secure interbank messages.
Understanding SWIFT

These messages are like payment orders and gives the receiving bank the information they need to fulfill the order.

To settle these orders financial institutions must have a third party acting as an intermediary to help settle accounts between the two financial institutions.
Understanding SWIFT

John’s Bank

Exchange rate

John’s local branch

Interbank Clearing House

Tina’s bank
Understanding SWIFT

Bitcoin, a financial messaging network and money transfer network in one.
SWIFT Introduction
SWIFT Organization

- Society for Worldwide Interbank Financial Telecommunication founded in 1973
- Developed for bank-to-bank communication
- Provides messaging service in a secure, standardized and reliable environment
- The financial standardization body (e.g. ISO 20022)
- Is considered one of the backbones of the international banking system
- Since 1998 the Swift network has been gradually opened for corporate customers of the banks.
SWIFT Developments for Corporates

- **SCORE** – Standardised Corporate Environment
  - SCORE is a participation model (rules and legal framework) specifically created by SWIFT to allow Corporates to join and to connect to financial institutions.
  - Once registered to use SCORE, a financial institution can interact with any corporate that is also registered.

- **CGI** – Common Global Implementation
  - An initiative defined by major banks, corporates, system vendors and SWIFT to simplify the implementation for corporate users.
  - Promotion of ISO20022 as the common XML standard.
Corporate Access to SWIFT

![Graph showing the number of corporates accessing SWIFT from 2007 to 2013. The number of corporates increases significantly from 2007 to 2013.](image-url)
SWIFT for Corporates: Single Standardised Gateway

Multiple bank channels

- Corporate
  - Accounts payable
  - Accounts receivable
  - Treasury
  - Other
    - e-banking Y
    - e-banking Z
    - host to host X
    - VAN
    - Leased line
    - Internet

Single, standardised gateway

- Corporate
  - Accounts payable
  - Accounts receivable
  - Treasury
  - Other
    - Standardised gateway
    - SWIFT
SWIFT elements

Membership
- Treasury Counterparty
- MA-CUG
- SCORE

Standards
- MT
- ISO

Messaging Channels
- FIN
- FileAct

Connectivity
- Private Infrastructure
- Shared Infrastructure
- Alliance Lite

SWIFT Member Administered
Closed User Groups (Service)
Standardised Corporate Environment
SWIFT Connectivity Options
SWIFT Connectivity Options

### Direct connection
- Global corporate (25+bn Revenue)
- Millions payments/year
- Manage your own SWIFT connection

### Indirect connection
- Very large corporate (1–25 bn Rev.)
- Hundred thousands payments/year
- Outsource SWIFT connection

### Alliance Lite 2
- Large corporate (0.5–1 bn Rev.)
- +/- 200 transactions/day
- Simple solution
SWIFT Service Bureaus (SSB)

- Outsourcing of the SAG network connectivity to a certified Swift Service Bureau
- In order to connect via a SSB, a company would only need a VPN or leased line connection with e.g. industry standard encryption technology
- Some SSBs are more experienced in connecting ERPs (SAP / Oracle) infrastructures to SAG. This experience helps reducing project risk at implementation
- SSBs audited regularly by SWIFT
- New compliance conditions introduced by SWIFT under the Shared Infrastructure Programme (SIP) (April 2013)
SWIFT Alliance Lite2

- Direct competition to the SSBs
- An Internet-based solution aimed at any SWIFT customers that want to connect to SWIFT easily and securely
- Access to SWIFT via web, connectivity established through AutoClient which must be installed on a PC or Windows server
- Connectivity - Internet, VPN and Leased Line are all options
- Security is established through a personal USB-token
SWIFT Alliance Lite2 Process
## Service Bureau vs SWIFT Alliance Lite2

<table>
<thead>
<tr>
<th>SSB</th>
<th>SAL2</th>
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<tr>
<td>+Help with managing complex on-boarding process</td>
<td>+Cost efficient solution for corporates with limited volumes</td>
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<tr>
<td>+Auxiliary services</td>
<td>+Easier implementation</td>
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<tr>
<td>+No/limited in-house expertise required</td>
<td>+Fewer links in the chain</td>
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<tr>
<td>+Customized service</td>
<td>-No dedicated support team</td>
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<td>+Cost in function of your volume</td>
<td>-No priority to customer base</td>
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<tr>
<td>+One-time implementation cost</td>
<td>-Building experience with connectivity to ERP systems</td>
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<tr>
<td>+Increased security as PKI certificates stored on HSM</td>
<td>-Customised support excluded from initial price</td>
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<tr>
<td>-Sharing of financial data/information with 3rd party</td>
<td>-Security certificates stored on USB token</td>
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<tr>
<td>-Counterparty risk towards single provider</td>
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<td>-Sometimes own propriety software installation required</td>
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Benefits of SWIFT

• One interface to banks:
  • SWIFTNet is single window, standard secure messaging
  • Cost reduction in maintaining various EB systems

• Process efficiency:
  • automation, standardization of process and communication channel and full STP integration
  • Reduce operational cost of retrieving balances from multiple EB systems
  • Enhanced confirmation messaging status (ACK/NAK)

• Efficient use of liquidity:
  • SWIFT have +ve impact on cash visibility via 1 system

• Transparency & Control:
  • Implementing a SWIFT solution can increase internal and external compliance
Implementation Guidance
Defining your project scope

Which applications to connect to SWIFT?
How to connect?
What formats & messaging to use?
Which banks to connect to?

FIN for payments (MT101), statements (MT940/2) and FX confirmations (MT3xx)

SWIFTNet connectivity

FileAct as file transfer to transport any format: domestic, ISO 20022, ACH, BAI, ...
High-level implementation areas

- Define business requirements
- Define functional specifications
- Explore SWIFT channel with banks
- Identify tools & integration reqts.

2 - 6 months

- Join SWIFT
- Order & implement SWIFT connectivity (direct or bureau)
- Interface to back office applications
- Train personnel

2 - 5 months

- Connectivity with ONE pilot bank
- Interfaces with applications
- Back-up infrastructure and procedures

1 month

Implementation to live: 3 - 6 months
What is SWIFT?

- Limited liability Co-operative Society with head office in Belgium

- Initial Objective: To create a central point for the passing of secure and standardized messages coming from banks that are mainly interested in payment messages.

- Today over 200 different SWIFT messages exist, including:
  - Credit and Debit Instructions
  - Buy and Sell Orders
  - Documentary Credits
  - Collections, Guarantees, interbank transfers etc.
SWIFT Users

- **Nearly 10,300 users**

- **Members**: have a number of shares in the capital of the Company, which shall be proportional to the usage of the message transmission services of the Company. (2,400 live members)

- **Sub-members**: are organizations, at least 50 percent directly or 100 percent indirectly owned by a Member, with full management control. (3,342 live sub-members)

- **Participants**: any organization may be permitted to make use of specific services of the Company as Participant, not be entitled to shares in the capital of the Company. (4,569 live participants)
S.W.I.F.T. Organizational Structure
SWIFT

- The broader SWIFT community also encompasses corporates as well as market infrastructures in payments, securities, treasury and trade.

- SWIFT is neither a Financial Institution nor a payment system: SWIFT is solely a carrier of messages.

- SWIFT does not hold assets nor manage accounts.

- Information in messages transmitted through SWIFT is controlled exclusively by the sending and receiving financial institutions.
SWIFT partners

• Solution partners
  • Helps achieve SWIFT customers end-to-end automation by SWIFT-enabling third-party software products.
  • Providers of SWIFT-related services.
  • Providing advice on finding potential solutions.

• Service partners
  • Deliver consultancy services with SWIFT Certified Experts.
  • SWIFT Software Implementations.
  • SWIFTNet Connectivity Implementations.
  • Upgrades of SWIFT software & SWIFTNet & Migration Assistance.
SWIFT partners

- Business partners
  - Acts in selected countries or regions on SWIFT's behalf, called SWIFT business partners.
  - North America: S.I.D.E. America Corp.
  - Middle East & Gulf: Eastern Networks Dubai.

- Network partners
  - SWIFT adopted a multi-vendor model for its secure IP network (SIPN).
  - The key aspect of this architecture is the co-existence of multiple IP network partners.
  - SWIFT uses four network partners, each with a standard offering of managed IP-VPN services
    - AT&T, BT Infonet, Colt, Orange Business Services
SWIFTNet

- SWIFTNet is SWIFT internet protocol (IP) based messaging platform
- SWIFTNet offers four messaging services:
  - SWIFTNet FIN
  - SWIFTNet Interact
  - SWIFTNet FileAct
  - SWIFTNet Browse
SWIFTNet

- **SWIFTNet FIN:**
  - enables the exchange of messages with the traditional SWIFT MT standards.
  - MT is short for “Message Type” and all SWIFT messages start with MT.
  - This is then followed by a 3 digit number.
  - The first digit represents the Category. A category denotes messages grouped together because they all relate to particular financial instruments or services.
Group Messages:

- MT0nn System Messages
- MT1nn Customer Payments
- MT2nn Financial Institution Transfers
- MT3nn FX, Money Market & Derivatives
- MT4nn Collections and cash letters
- MT5nn Securities Markets
- MT6nn Precious Metals & Syndications /GOLD
- MT7nn Documentary Credits & Guarantees
- MT8nn Travellers Cheques
- MT9nn Cash Management & Customer Status
SWIFTNet FIN– Message Types

The second digit represents the Group denoting that the messages are related to similar parts of a transaction's lifecycle.

- MT200 Financial Institution Transfer, Own Account
- MT202 Financial Institution Transfer, Third Party
- MT521 Receive (Securities) Against Payment
- MT523 Deliver (Securities) Against Payment
The last digit is the Type and denotes the individual message. There are several hundred message types across the categories in total.

A special subset of Messages is known as the Common Group because the last two digits represent the same message in each category.

- MTn99 Free format
- MT299 Free format relating to transfers
- MT599 Free format relating to securities
- MT999 General free format
SWIFTNet FIN

- SWIFT’s core message service
- Allows financial institutions exchange individual structured financial messages securely and reliably
- Works in “store-and-forward” mode:
  - The correspondent may not be online at the time of transmission
  - SWIFT stores the message and delivers it as soon as the recipient is ready to receive it
SWIFTNet FIN

Security:

- Offers authentication and integrity control based on proprietary smart cards and bilateral key exchange (BKE)
- Each message is controlled for compliance with the predefined message exchange, non compliant messages are not delivered
SWIFTNet FIN

- Non-repudiation:
  - In case of a dispute, SWIFT is able to confirm that a message exchange did take place as claimed

- Delivery Notification
  - Confirmation that the correspondent has received the message

- Non-delivery warning:
  - Informs that a message remains undelivered after a certain period of time
SWIFTNet

- The same connectivity infrastructure can be used for any SWIFTNet messaging services
- SWIFTNet messaging supports straight-through processing through messaging standards and technical interoperability
SWIFTNet Security

- SWIFTNet runs on SWIFT’s secure Internet Protocol network (SIPN), a protected, private network
- Offers:
  - Encryption
  - Authentication Control
  - Integrity Control
  - Non-repudiation
Message Addressing

- In order to ensure error-free identification of parties in automated systems, SWIFT developed the Bank Identifier Code (BIC).

- The Bank Identifier Code is a unique address which, in telecommunication messages, identifies precisely the financial institutions involved in financial transactions.

- BICs are meant for universal usage and not just on the SWIFT network.
The anatomy of a BIC

BANK identifies the bank, banque BNP-Paribas. This four-character code is called the Bank Code. It is unique to each financial institution and can only be made up of letters.

CC is the ISO country code for France. The country code identifies the country in which the financial institution is located.

LL stands for Paris. It is the Location Code. This 2-character code may be alphabetical or numerical. The location code provides geographical distinction within a country, e.g., cities, states, provinces and time zones.

4+  2+  2
  = 8 characters
More definitions

- **BIC8**: A bank identifier code composed of 8 characters, representing the following three components: bank code, country code and location code.

- **BIC11**: A bank identifier code composed of 11 characters, representing the following four components: bank code, country code, location code and branch code.
Message Addressing

General Format of a BIC Address.

AAAA  BB  CC  (D)
(EEE)

- The first four characters represent the Bank code, for example NWBK (NatWest), DEUT (Deutsche Bank).
- The next two characters represent the ISO Country code, for example GB (United Kingdom), DE (Germany).
- The next two characters are the location code with some larger financial centres such as London and New York having two, 2L and 22, 33 and 3N respectively.
- These characters, the first 8, represent the mandatory portions and commonly within the body of a message this will be the normal format, for example NWBKGB2L (NatWest London), DEUTDEFF (Deutsche Bank Frankfurt).
SWIFTNet

- SWIFTNet is SWIFT’s advanced Internet Protocol (IP)-based messaging platform, comprising a portfolio of products and services that address the key requirements for
  - interactive messaging,
  - interactive file transfer,
  - information browsing,

in a fully managed and secure environment. This IP-based Network is separated from internet.
Market & Technology Trends

- Avoid X.25 obsolescence
- Mission-critical systems such as risk management applications must be enhanced in order to offer interactivity
- Market Infrastructures require real-time operations
- Financial industry requires highly standardized and secure financial messaging using more flexible standards.
SWIFTNet Security

- Application layer
- Messaging layer (SNL)
- Network layer
Security Layers of Swift

1. User/Application Layer:
   - Protects transactions against repudiation and internal attacks.

2. Messaging Layer:
   - Protects data against insertion and modification.
   - Protects against attacks on the IP equipment.

3. IP Tunnel:
   - Provides secure communication channels.
Application Layer

- The application layer provides transaction level capabilities, secured by a Public Key Infrastructure (PKI). It protects against fraud, with SNL providing Application Programming Interfaces (APIs) that enable applications to encrypt and sign individual transactions.
Messaging Layer (SNL)

- SWIFTNet Link provides data security between SWIFTNet Link nodes. This security is complementary to and completely independent of the Secure IP Network security. SNL is a mandatory software to access SWIFT’s services on the SIPN network. It embeds SWIFTNet PKI.
Network Layer

- IP Packet Authentication and Integrity is used for authentication between the M-CPE and the POP
- IP Packet Confidentiality is ensured with link encrypters
- Router Authorisation is used by implementing IP packet filters on all Secure IP Network routers. Attacks within or outside the network is countered and external originated messages are filtered.
Connection Types

- Dialup Connection
- Dial-I Connection
- Dual-P Connection
- Multi-Line Connection
The WebStation or SNL uses a single VPN box with dial access via one or more network partners. PSTN is the default technology.
Dial-I Connection

- Two VPN boxes in active/standby mode. The active box is connected to a router with a leased line connection; the standby VPN box offers ISDN/PSTN access to the same or a different network partner.
Dual-P Connection

- Two VPN boxes in active/standby mode. Each is connected to a dedicated router with a leased line connection to either the same or a different network partner.
Two independent leased lines. It uses mechanisms at the level of SWIFTNet Link and/or SWIFTAlliance Gateway to handle all resilience aspects. It is a cost effective, fully resilient connectivity solution.
SWIFTNet Messaging Services

- SWIFTNet InterAct
- SWIFTNet FileAct
- SWIFTNet Browse
SWIFTNet InterAct

- Provides secure and reliable exchange of individual structured financial messages.
  - Store-and-forward messaging
  - Real-time messaging
  - Real-time query and response
  - SWIFTNet PKI security
  - Closed User Group (CGU)
  - Message validation
  - Configurable central routing
SWIFTNet FileAct

- Provides secure and reliable transfer of files, such as batches of structured financial messages or large reports.
  - Store-and-forward file transfer
  - Real-time file transfer
  - Real-time file retrieval
  - SWIFTNet PKI security
  - Closed User Group (CGU)
  - User-defined priority
  - Configurable central routing
SWIFTNet Browse

- Provides secure browser-based access to other SWIFTNet services. Access is made using a standard browser (such as Microsoft Internet Explorer or Netscape Navigator) and standard browsing protocols (https).
  - Browsing security
  - Integration with SWIFTNet InterAct and SWIFTNet FileAct
  - Closed User Group Control
  - User-defined priority
  - Configurable central routing
Different Platforms

- SWIFTNet can run on different types of platforms such as:
  - Intel – Windows 2000
  - IBM – AIX (Unix)
  - SUN Solaris
Sample SWIFTNet Interfaces

Operator: superkey
Password: ********
Active Instance: Primary Instance

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APPLICATION Interface
Correspondent Info
Message Creation
Monitoring
SWIFT Interface
System Management
BK Management
Event Journal
Message Modification
Routing
SWIFT Support
USE Support
Calendar
Message Approval
Message File
Security Definition
SWIFTNet Support
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For Help, press F1

Messages in queue : 389, In list : 389, In selection : 1
The SWIFT Price changes

Price (eurocents)

- '92: 42.4, 48%
- '93: 30.3
- '94: 27.5
- '95: 25.4
- '96: 25.4
- '97: 22.3 (21% increase)
- '98: 19.5
- '99: 17.6 (50% increase)
- '00: 15.7
- '01: 13.6
- '02: 11.3
- '03: 9.4
- '04: 8.8
- '05: 8.8
- '06: 8.8

Announcement of SWIFTNet

Move to SWIFTNet

80%
Structure of a Message

- A typical S.W.I.F.T. user-to-user message may consist of:
  
  {1: BASIC HEADER BLOCK}

  {2: APPLICATION HEADER BLOCK}

  {3: USER HEADER BLOCK}

  {4: TEXT BLOCK}

  {5: TRAILER BLOCK}
SWIFT

- Society for Worldwide Interbank Financial Telecommunication
- Can be made in a variety of currencies
- Uses several methods such as cash, checks, electronic payments and cards.
- Uses cash-substitutes, such as checks or electronic messages, to create the debits and credits that transfer value.
Conclusion

Thanks for listening!