



Payment & eBanking Conference (6 – 7 Jan 2014)

Financial Market Infrastructure Workshop



Agenda



- Introduction of FMI
- Identification of FMIs
- Relevant Core Principles of FMI
- IT services required in FMI
- Case Study – How to set up eBanking for FMI
- Q & A

FMI (Financial Market Infrastructure) Introduction



-3-

- BIS Published FMI 24 Core Principles in April 2012
 - ▣ Combined the 10 core principles for Payment System (CPSIPS) and the IOSCO recommendations for securities settlement
- BIS's Definition of FMI:
 - ▣ *"an FMI is defined as a multilateral system among participating institutions, including the operator of the system, used for the purposes of clearing, settling, or recording payments, securities, derivatives, or other financial transactions"* ... quoted from "CPSS-IOSCO – Principles for FMI April 2012"
 - ▣ FMI are categorized into:
 - Payment System
 - Scripless Securities Settlement System (SSSS)
 - Central Securities Depository (CSD)
 - Central Counterparty (CCP)
 - Trade Repository (TR)



FMI – 24 core principles (best practices)

-4-

- | | |
|--|--|
| 1. Legal Basis | 13. Participant Default Rules & Procedures |
| 2. Governance | 14. Segregation and Portability |
| 3. Risk Management | 15. General Business Risk |
| 4. Credit Risk | 16. Custody and investment risk |
| 5. Collateral | 17. Operational Risk |
| 6. Margin | 18. Access & Participation |
| 7. Liquidity Risk | 19. Tiered Participation Arrangements |
| 8. Settlement Finality | 20. FMI Links |
| 9. Money settlement | 21. Efficiency & Effectiveness |
| 10. Physical Deliveries | 22. Communication Procedures and Standards |
| 11. Central Securities Depositories | 23. Disclosure of Rules, Key Procedures, and Market Data |
| 12. Exchange-of-Value Settlement Systems | 24. Disclosure of Market Data by trade repositories |

Categories of FMI - Definitions



5

FMI	Payment Systems
Definition	A payment system is a set of instruments, procedures, and rules for the transfer of funds between or among participants; the system includes the participants and the entity operating the arrangement. Payment systems are typically based on an agreement between or among participants and the operator of the arrangement, and the transfer of funds is effected using an agreed-upon operational infrastructure.
Examples	<ul style="list-style-type: none">• RTGS (Real Time Gross Settlement System) – Large Value• ACH (Automated Clearing House System) – Low Value High Volume• Cheque Imaging & Clearing System• National ATM/POS Switch (ATM cards, debit cards, credit cards or ePurse cards)• National ePayment Gateway System• National Mobile Payment System• Forex Settlement System

Categories of FMI - Definitions



6

FMI	Central Securities Depository
Definition	A central securities depository provides securities accounts, central safekeeping services, and asset services, which may include the administration of corporate actions and redemptions, and plays an important role in helping to ensure the integrity of securities issues (that is, ensure that securities are not accidentally or fraudulently created or destroyed or their details changed).
Examples	<ul style="list-style-type: none">• Securities Depository for Government Securities (T-bills, CD, Sukuk)• Securities Depository for Stock Market/Commodity Market

Categories of FMI - Definitions



7

FMI	Scriptless Securities Systems (SSSS)
Definition	A securities settlement system enables securities to be transferred and settled by book entry according to a set of predetermined multilateral rules. Such systems allow transfers of securities either free of payment or against payment. When transfer is against payment, many systems provide delivery versus payment (DvP), where delivery of the security occurs if and only if payment occurs.
Examples	<ul style="list-style-type: none">• SSSS for Government Securities (issue, maturity & trading)• SSSS for Stock Market /Commodity Market securities (issue & trading)

Categories of FMI - Definitions



8

FMI	Central Counterparties (CCP)
Definition	A central counterparty interposes itself between counterparties to contracts traded in one or more financial markets, becoming the buyer to every seller and the seller to every buyer and thereby ensuring the performance of open contracts. A CCP becomes counterparty to trades with market participants through novation, an open-offer system, or through an analogous legally binding arrangement.
Examples	<ul style="list-style-type: none">• Stock Exchange• System Operator for Open Market Operations (Government Securities)• System Operator for Corporate Debt Market

Categories of FMI - Definitions

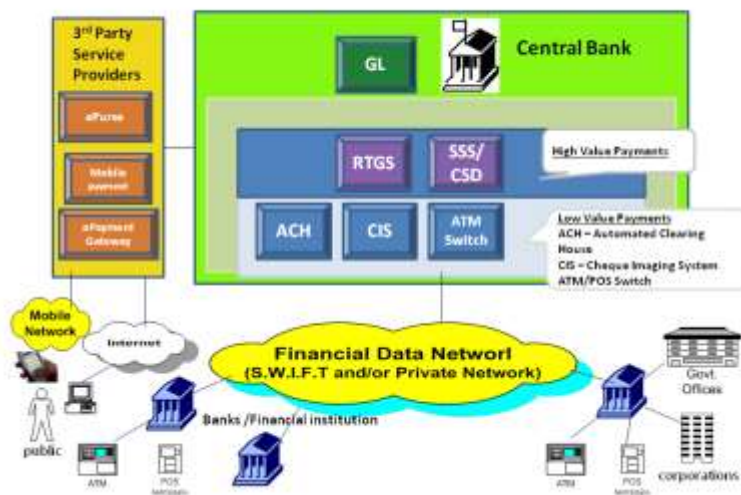


9

FMI	Trade Repository
Definition	A trade repository is an entity that maintains a centralised electronic record (database) of transaction data. By centralising the collection, storage, and dissemination of data, a well-designed TR that operates with effective risk controls can serve an important role in enhancing the transparency of transaction information to relevant authorities and the public, promoting financial stability, and supporting the detection and prevention of market abuse
Examples	<ul style="list-style-type: none"> • Over-the-Counter Securities Market Trade Repository • Trade Repository operated by Central Bank for Primary Market (Government Securities)

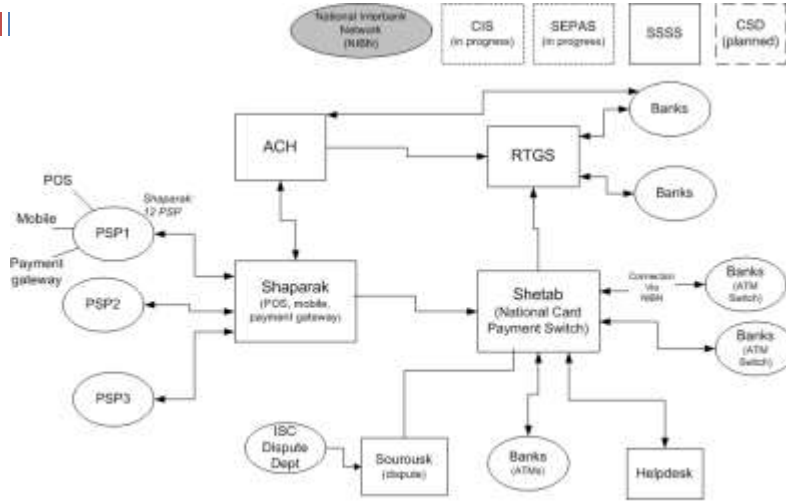
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Typical FMI in a Country



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Iran FMI under CBI Supervision



Current Payment Settlement Systems in Iran

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Identification of FMIs in Iran



-12-

- FMIs under control of CBI (operations or oversight or regulations):
 - ▣ RTGS System
 - ▣ ACH System
 - ▣ Shetab (National Cards Switch)
 - ▣ Shaparak (PSP & POS payments)
 - ▣ Cheque Imaging System (under progress of implementation)
 - ▣ SSSS (implemented but active use pending for CSD)
 - ▣ CSD (planned and not yet implemented)
 - ▣ SEPAS (ePurse/mobile money planned)

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FMI Core Principles



-13-

General Organization:

Core Principle	Description
1. Legal Basis	An FMI should have a well-founded, clear, transparent, and enforceable legal basis for each material aspect of its activities in all relevant jurisdictions. E.g. Payment Law, Settlement Finality Ordinance, eMoney Regulation, Cheque Truncation Law
2. Governance	An FMI should have governance arrangements that are clear and transparent, promote the safety and efficiency of the FMI, and support the stability of the broader financial system, other relevant public interest considerations, and the objectives of relevant stakeholders E.g. National Payment Council, EFT Steering Committee
3. Risk Management	An FMI should have a sound risk-management framework for comprehensively managing legal, credit, liquidity, operational, and other risks.

FMI Core Principles



-14-

Credit & Liquidity Risk Management:

Core Principle	Description
4. Credit Risk	An FMI should effectively measure, monitor, and manage its credit exposures to participants and those arising from its payment, clearing, and settlement processes. ..
5. Collateral	An FMI that requires collateral to manage its or its participants' credit exposure should accept collateral with low credit, liquidity, and market risks... (e.g. Government T-bill, High rating Bond/Sukuk, Central Bank Certificate of Deposit)
6. Margin	A central counterparty should cover its credit exposures to its participants for all products through an effective margin system that is risk-based and regularly reviewed.
7. Liquidity Risk	An FMI should effectively measure, monitor, and manage its liquidity risk. An FMI should maintain sufficient liquid resources in all relevant currencies to effect same-day and, where appropriate, intraday and multiday settlement of payment obligations ...

FMI Core Principles



-15-

Settlement:

Core Principle	Description
8. Settlement Finality	An FMI should provide clear and certain final settlement, at a minimum by the end of the value date. Where necessary or preferable, an FMI should provide final settlement intraday or in real time.
9. Money settlement	An FMI should conduct its money settlements in central bank money where practical and available. If central bank money is not used, an FMI should minimize and strictly control the credit and liquidity risk arising from the use of commercial bank money.
10. Physical Deliveries	An FMI should clearly state its obligations with respect to the delivery of physical instruments or commodities and should identify, monitor, and manage the risks associated with such physical deliveries.

FMI Core Principles



-16-

CSD & Exchange of Value Settlement System:

Core Principle	Description
11. Central Securities Depository	A CSD should have appropriate rules and procedures to help ensure the integrity of securities issues and minimize and manage the risks associated with the safekeeping and transfer of securities. A CSD should maintain securities in an immobilized or dematerialized form for their transfer by book entry.
12. Exchange-of-Value Settlement Systems	If an FMI settles transactions that involve the settlement of two linked obligations (for example, securities or foreign exchange transactions), it should eliminate principal risk by conditioning the final settlement of one obligation upon the final settlement of the other.

FMI Core Principles



-17-

Default Management:

Core Principle	Description
13. Participant Default Rules & Procedures	An FMI should have effective and clearly defined rules and procedures to manage a participant default. These rules and procedures should be designed to ensure that the FMI can take timely action to contain losses and liquidity pressures and continue to meet its obligations.
14. Segregation & Portability	A CCP should have rules and procedures that enable the segregation and portability of positions of a participant's customers and the collateral provided to the central counterparty with respect to those positions.



FMI Core Principles



-18-

General Business & Operational Risk Management:

Core Principle	Description
15. General Business Risk	An FMI should identify, monitor, and manage its general business risk and hold sufficient liquid net assets funded by equity to cover potential general business losses ...
16 Custody & Investment Risks	An FMI should safeguard its own and its participants' assets and minimize the risk of loss on and delay in access to these assets.
17. Operational Risk	An FMI should identify the plausible sources of operational risk, both internal and external, and mitigate their impact through the use of appropriate systems, policies, procedures, and controls. Systems should be designed to ensure a high degree of security and operational reliability and should have adequate, scalable capacity. Business continuity management should aim for timely recovery of operations and fulfilment of the FMI's obligations, including in the event of a wide-scale or major disruption.

FMI Core Principles



-19-

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Operational Risk



-20-

- Security (access, data, physical, communication)
 - ISMS (Information Security Management System)
 - PKI for encryption (e.g. 3DES, RSA) & authentication (digital signature)
 - Mobile & internet end user /channel security, incl. SSL, USSD, SIM card security
 - Multi-factor authentication (MFA):
 - Minimum 2 factors e.g. PIN & One-time Random password (mobile phone or token)
 - PCI DSS
- AML & Fraud Management
- DRP/BCP
- Capacity Planning

FMI Core Principles



-21-

Participants Access:

Core Principle	Description
18. Access & Participation	An FMI should have objective, risk-based, and publicly disclosed criteria for participation, which permit fair and open access.
19. Tiered Participation Arrangements	An FMI should identify, monitor, and manage the material risks to the FMI arising from tiered participation arrangements.
20. FMI Links	An FMI that establishes a link with one or more FMIs should identify, monitor, and manage link-related risks.



FMI Core Principles



-22-

Efficiency & Transparency

Core Principle	Description
21. Efficiency & Effectiveness	An FMI should be efficient and effective in meeting the requirements of its participants and the markets it serves.
22. Communication Procedures and Standards	An FMI should use, or at a minimum accommodate, relevant internationally accepted communication procedures and standards in order to facilitate efficient payment, clearing, settlement, and recording.
23. Disclosure of Rules, Key Procedures, and Market Data	An FMI should have clear and comprehensive rules and procedures and should provide sufficient information to enable participants to have an accurate understanding of the risks, fees, and other material costs they incur by participating in the FMI. All relevant rules and key procedures should be publicly disclosed.
24. Disclosure of Market Data by Trade Repositories	A trade repository should provide timely and accurate data to relevant authorities and the public in line with their respective needs.

IT Services Required for FMI

Core Principles	Central Bank /System Operator systems	eBanking services
1. Legal Basis	-	-
2. Governance	-	-
3. Risk Management	Risk mgmt system for RTGS, ACH, CIS, Shetab, Shaparak, CSD	Risk management System for: <ul style="list-style-type: none"> National Payment System (see below), Customer O/D & Facilities Enterprise Risk mgmt (including bank investment)
4. Credit Risk	RTGS, ACH (debit cap), intraday overdraft facilities	<ul style="list-style-type: none"> CBS Customer O/D Facilities Analysis System Debit Cap Limit function (ACH, CIS) Bilateral limits system (ACH, CIS)
5. Collateral	CSD	<ul style="list-style-type: none"> CBS Customer Collateral Module
6. Margin	CSD	<ul style="list-style-type: none"> CBS Customer Collateral Module
7. Liquidity Risk	RTGS-CSD interface for ILF, queue mgmt function, account balance monitor	<ul style="list-style-type: none"> Account balance monitor Function, Queue management Function Repo & Buyback Function
8. Settlement Finality	RTGS	<ul style="list-style-type: none"> CBS-RTGS interface
9. Money Settlement		

IT Services Required for FMI

Core Principles	Central Bank/ System Operator System	eBanking services
10. Physical Deliveries	CSD	Interface to CSD
11. Central Securities Depository	CSD	Interface to CSD
12. Exchange-of-Value Settlement Systems	RTGS-CSD interface, multi-currency RTGS	CBS-RTGS interface
13. Participant Default Rules & Procedures	RTGS,ACH, CIS, CSD, Shetab, Shaparak	Stop list (CBS)
14. Segregation & Portability	CSD	Interface to CSD
15. General Business Risk	Enterprise Risk Mgmt	-
16 Custody & Investment Risks	Enterprise Risk Mgmt	

IT Services Required for FMI

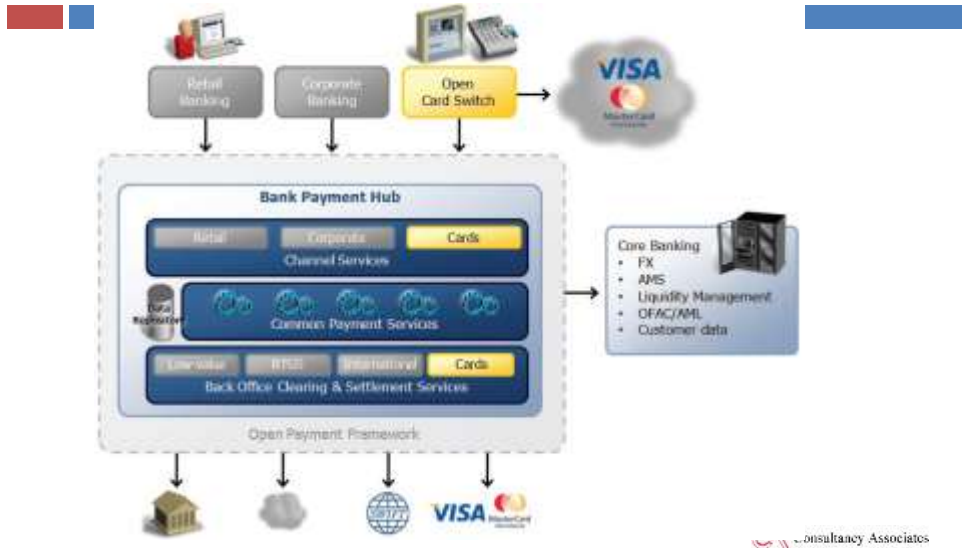


-25-	Core Principles	Central Bank/ System Operator Systems	eBanking services
	17. Operational Risk	DRP,BCP,ISMS, PKI(CBI as CA), PCI DSS, MFA, Capacity Planning, Fraud mgmt, AML	
	18. Access & Participation	RTGS,ACH, CIS, CSD, Shetab, Shaparak	CBS STP Interfaces
	19. Tiered Participation Arrangements	-	eBanking for corporate
	20. FMI Links	RTGS-CSD, ACH-RTGS, Shetab-RTGS	-
	21. Efficiency & Effectiveness	NPS interface, automated liquidity management	CBS STP Interfaces; mobile banking, internet banking
	22. Communication Procedures and Standards	Web monitoring system/Payment system portal	messaging system, SWIFT, ISO2022
	23. Disclosure of Rules, Key Procedures, and Market Data	Payment system portal	-
	24. Disclosure of Market Data by Trade Repositories	-	-

-26- Case Study

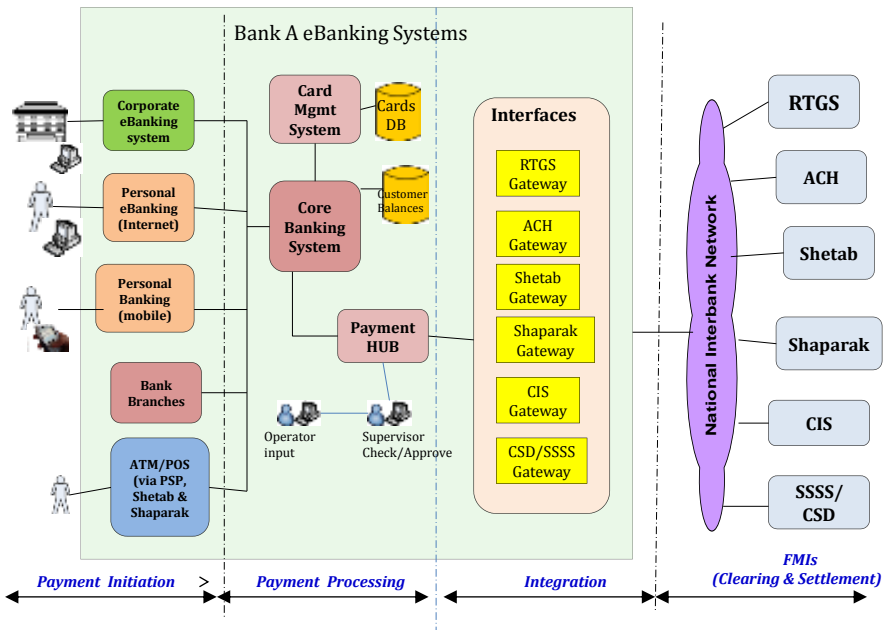
How to setup eBanking for FMI

eBanking - use of Payment Hub



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Case Study – eBanking Services for FMIs



eBanking – Payments Initiation

-29-

- What are the risks in eBanking services? What are the IT services to mitigate the risk

eBanking services/ Risks	Corporate eBanking	Personal Banking (internet)	Personal Banking (mobile)	ATM/POS/PSP (from Shetab, Shaparak)
Sender is not authorized user	PIN			
Data may have been intercepted	ENCRYPTION			
Data may have been modified/forged	AUTHENTICATIO N - DIGITAL SIGNATURE			
Sender PIN/card info may have been stolen				
Sender may not pay for the payment				
Payment info may be incorrect				

eBanking – Payments Initiation

-30-

eBanking services/ Risks	Corporate eBanking	Personal Banking (internet)	Personal Banking (mobile)	ATM/POS/PSP (from Shetab, Shaparak)
Sender not authorized user	PIN	PIN	PIN	PIN
Data may have been intercepted	Encryption, SSL	Encryption, SSL	Over The Air (OTA) encryption	Encryption
Data may have modified/forged	PKI Digital signature authentication		M-PKI	Message Authentication Code
Sender PIN/card info may have been stolen	PCI DSS, CVV 2 factor authentication			PCI DSS, Hot card/velocity check Transaction limit
Sender may not provide funds for payment	Real time A/C debit/ block collateral	Real time A/C debit		
Payment info may be incorrect	Data validation e.g. account no, date, bank, currency, etc.			

eBanking – Payments Initiation

-31-

- We have addressed FMI core principles:

Core Principles	eBanking IT services
3. Risk Management	Manage security risk, credit risk
4. Credit Risk	Real time Account balance check
17. Operational Risk	Security control: PIN, PKI encryption, digital signature (authentication), PCI DSS, multi-factor authentication Integrity control: Validation of payment information
19. Tiered Participation	Corporate payments acceptance for sending to FMI
21. Efficiency & Effectiveness	multi-channel via internet, mobile with direct integration to Core Banking

PCI DSS

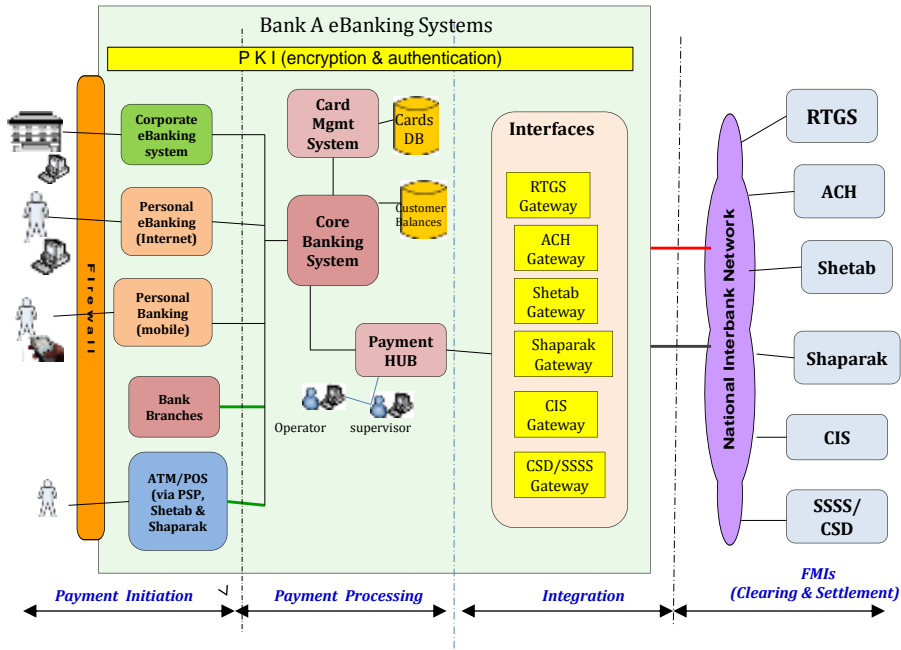


-32-

PCI Data Security Standard – High Level Overview

Build and Maintain a Secure Network	<ol style="list-style-type: none"> 1. Install and maintain a firewall configuration to protect cardholder data 2. Do not use vendor-supplied defaults for system passwords and other security parameters
Protect Cardholder Data	<ol style="list-style-type: none"> 3. Protect stored cardholder data 4. Encrypt transmission of cardholder data across open, public networks
Maintain a Vulnerability Management Program	<ol style="list-style-type: none"> 5. Use and regularly update anti-virus software or programs 6. Develop and maintain secure systems and applications
Implement Strong Access Control Measures	<ol style="list-style-type: none"> 7. Restrict access to cardholder data by business need to know 8. Assign a unique ID to each person with computer access 9. Restrict physical access to cardholder data
Regularly Monitor and Test Networks	<ol style="list-style-type: none"> 10. Track and monitor all access to network resources and cardholder data 11. Regularly test security systems and processes.
Maintain an Information Security Policy	<ol style="list-style-type: none"> 12. Maintain a policy that addresses information security for all personnel.

Case Study – eBanking Services for FMIs



eBanking – Payment Processing

-34-

- What are the risks in eBanking services? What are the IT services to mitigate the risk

Risks	Scenario	eBanking Services
Operational Risk	Failure of CBS system & site	
	Internal fraud (payment info modified, theft of password/card info, etc.)	
	CBS & staff cannot finish all today's payment	
Credit Risk	O/D limit of customers exceeded	
	End of day settlement position too high	
Liquidity Risk	Urgent payments become queued	

eBanking Services – Payment Processing

35

Q1 – Ministry ABC send payment (P4) IRR1000b, must be transferred by 1100am

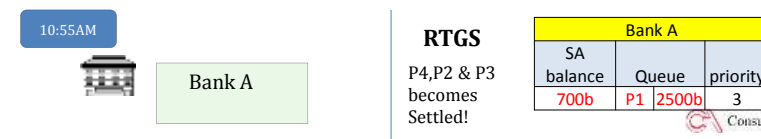
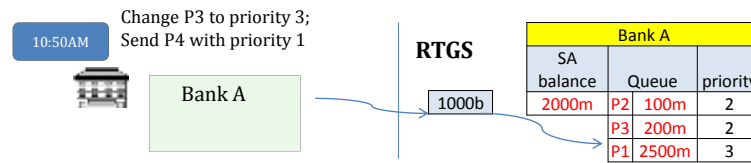


=> Liquidity Problem

eBanking Services – Payment Processing

36

Q1 – Ministry ABC send payment (P4) IRR1000m, must be transferred by 1100am

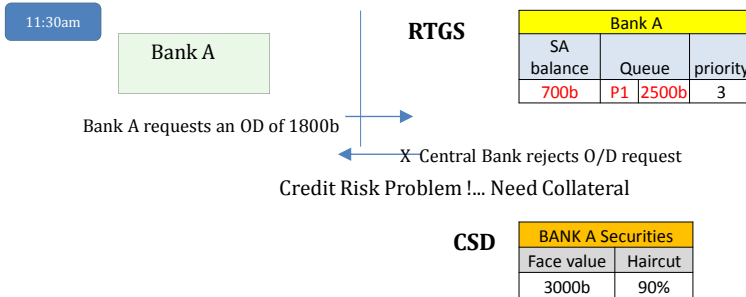


eBanking Services – Payment Processing



37

Q2 – P3 (2500b) must be settled by 12:00pm



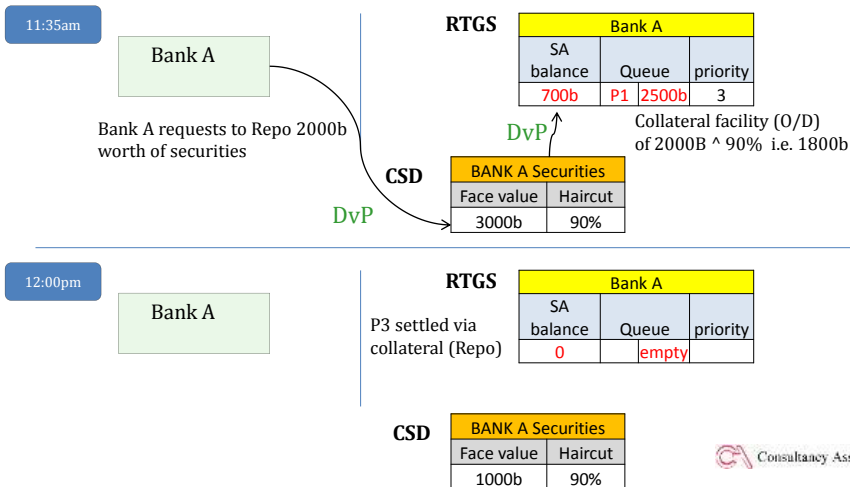
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eBanking Services – Payment Processing



38

Q2 – P3 (2500b) must be settled by 12:00pm



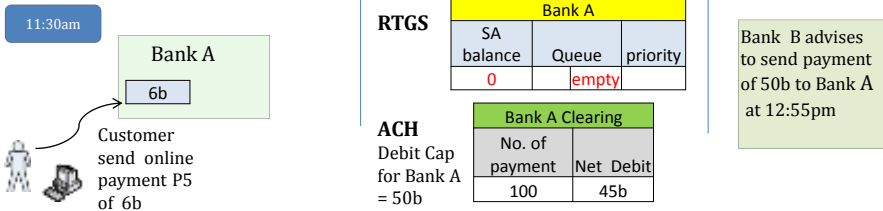
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eBanking Services – Payment Processing



39

Q3- ACH Clearing Session ends at 1:00pm for Settlement



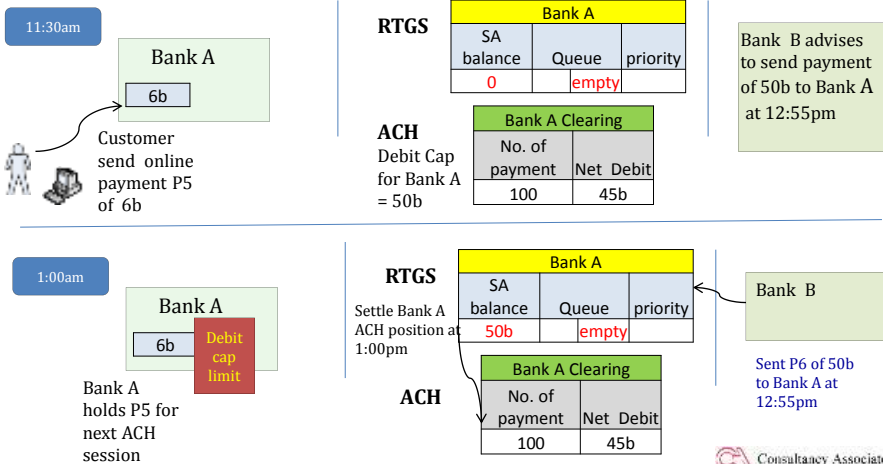
=> P6 will cause ACH settlement fail!

eBanking Services – Payment Processing

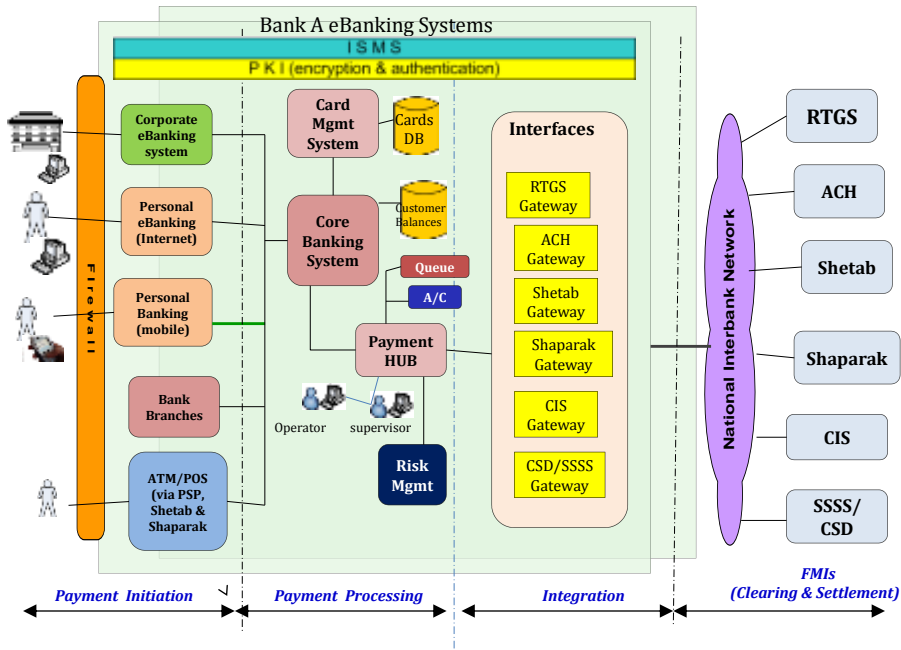


40

Q3- ACH Clearing Session ends at 1:00pm for Settlement



Case Study – eBanking Services for FMIs



Operational Risk – Information Security Management System (ISMS)



-42-

- Information security policy
- Information security infrastructure
- Asset Classification and Control
- Human Resources Security
- Equipment security
- Communication and Operation Management, including
- Access Control (to system, network, applications, operating system and mobile computing platform)
- Information system acquisition, development and maintenance
- Information system incident management
- Business Continuity Management
- Compliance with Legal, Security Policy and IT Audit

eBanking – Payments Processing

-43-

- We have addressed FMI core principles:

Core Principles	eBanking IT services
3. Risk Management	Manage security/operational risk, credit risk, liquidity risk
4. Credit Risk	Hold collateral in CSD and connects with CSD
5. Liquidity Risk	Real time monitor queues;
6. Collateral	Hold Govt securities in CSD as collateral
8. Settlement Finality	Send payment to Central Bank RTGS for interbank settlement
9. Money Settlement	RTGS settlement via bank's settlement account in Central Bank i.e. central bank's money
17. Operational Risk	ISMS; Disaster Recovery (DR) system for business continuity; capacity planning; scalable system

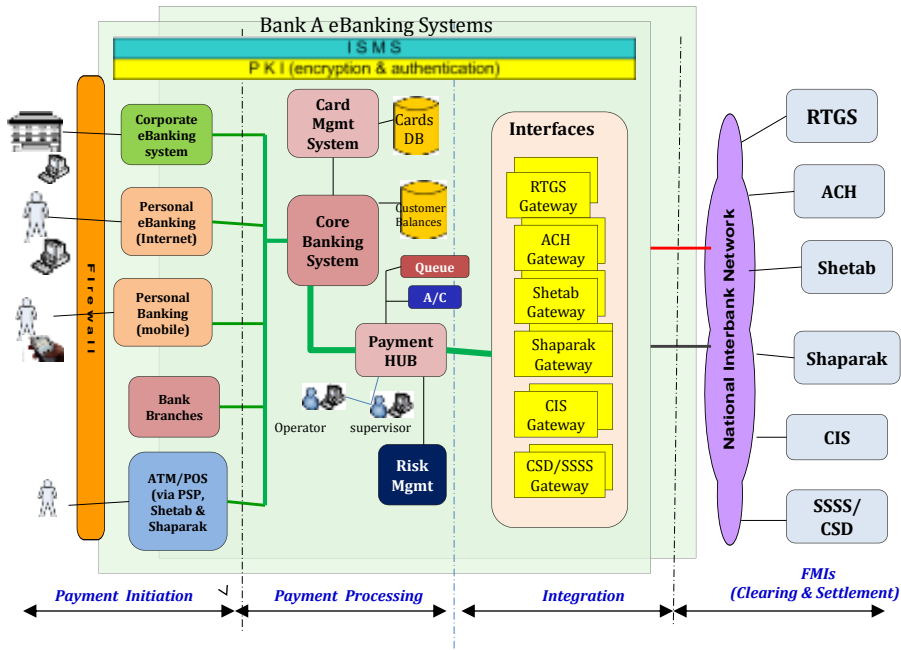
eBanking – FMI Integration

-44-

- What are the risks in eBanking services? What are the IT services to mitigate the risk

Risks	Scenario	eBanking Services
Participant Access	Single point of failure of gateway, communication line	Implement redundant/backup gateway and comms line to FMI
	Payment status and bank account positions are not visible after sending to FMI	Implement web-based real time monitor workplace (following FMI rules & procedure)
Efficiency	<ul style="list-style-type: none"> • Bulk payment e.g. cheques, ACH debit, needs time to check • Account positing to beneficiary are manually performed 	Develop STP (Straight Through Processing) interface between FMI (RTGS, ACH, CIS) and CBS to achieve automation (based on risk assessment).
Communication & Procedures	•Error /warning from FMI are not detected on time	Used message-based communication in STP.
	• request , reports e.g. clearing report, account statements are communicated via phone call	Adoption of CBI standard formats e.g. XML, SWIFT, ISO8583, ISO2022

Case Study – eBanking Services for FMIs



eBanking – FMI Integration

-46-

- We have addressed FMI core principles:

Core Principles	eBanking IT services
3. Risk Management	Manage security risk, credit risk
17. Operational Risk	Security risk via: Encryption, system authentication, digital signature, PCI DSS System contingency via: Backup gateways, backup comms line, backup users
19. Participant Access & 21. Efficiency & Effectiveness	Straight Through Processing between FMI and Core Banking System
22. Communication Procedure & standards	Messaging interface for payments, enquiry, clearing and settlement report; Web Monitor function

Q & A