



STARCOIN

Payment scheme

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1 Introduction

1.1 Scope of this document

This document intends to describe the structure of the STARCOIN payment scheme on the level of accounts.

1.2 Versions of this document

Version	Date	Changes	Author
1.0.0	13.12.96	Definition of system structure	pan
1.1.0	10.05.97	New ECH clearing concept	pan
1.1.1	25.07.97	Service charge concept included	pan
1.1.2	03.11.97	Editorial changes	pan
1.2.0	05.05.98	Workover providing more detailed explanations	pan
1.3.0	28.01.99	Debit-POS online/offline included	pan

- Tab. 1-1 / Document versions

1.3 Abbreviations

C&A	Clearing and Administration
CBC	Cipher block chaining
DEC, dec	Decryption
DES	Data encryption standard
DES_3	Triple DES
DOWF	One way function for DES_3 key derivation
ECB	Electronic code book
ECH	Electronic cheque
ENC, enc	Encryption
_enc	Encrypted data or key
_enclmk	Under respective LMK encrypted key
HSM	Host security module (here PCSM)
ICC	Integrated circuit card
IEP	Intersector electronic purse
KM_GEN	Generation key (derived from a top level key)
KM	Master key (derived from top level key or KM_GEN)
KD	Derived key (derived from KM_GEN or KM)
KGG	Top level key ('Generation key of generation keys')
KS	Session key (derived from KD)
LMK	Local Master Key
LMK_var	Variant of a LMK (for different types of keys)
LSB	Least significant Bit/Byte
MAC	Message authentication code or function to calculate a MAC
MSB	Most significant Bit/Byte
OWF	One way function (e.g. Triple DES)
PCSM	PC - Security Module
RSA	Rivest-Shamir-Adleman cryptographic algorithm
SAM	Security application module
SOWF	One way function for single DES key derivation
TK	Terminal card (SAM)
TDES	Triple DES (DES_3)
tx	Transaction
XOR	Exclusive OR

Tab. 1-2 / Abbreviations

- The concatenation of data elements is expressed by &.

2 System structure

2.1 Pool concept (el. purse)

The management of *pools* is one of the major features of the STARCOIN system. A pool is an account in a bank, where all money, when an IEP on a customer card is loaded with electronic units, is transferred to. This money is now at the disposal of the bank. Within STARCOIN a pool represents one or several customer cards issuing banks. When all pool transactions (load/unload/payment) are cleared at the end of the day, the C&A system sends the settlement bank the pool transaction settlement advices. The settlement then manages the transfers of the amounts to the different bank accounts. Please note, that this payment scheme is done for the electronic purses (IEP). The electronic cheques (ECH) are cleared by individual recorded transactions and shadow accounts (see below).

The following figure gives an overview to the described scenario:

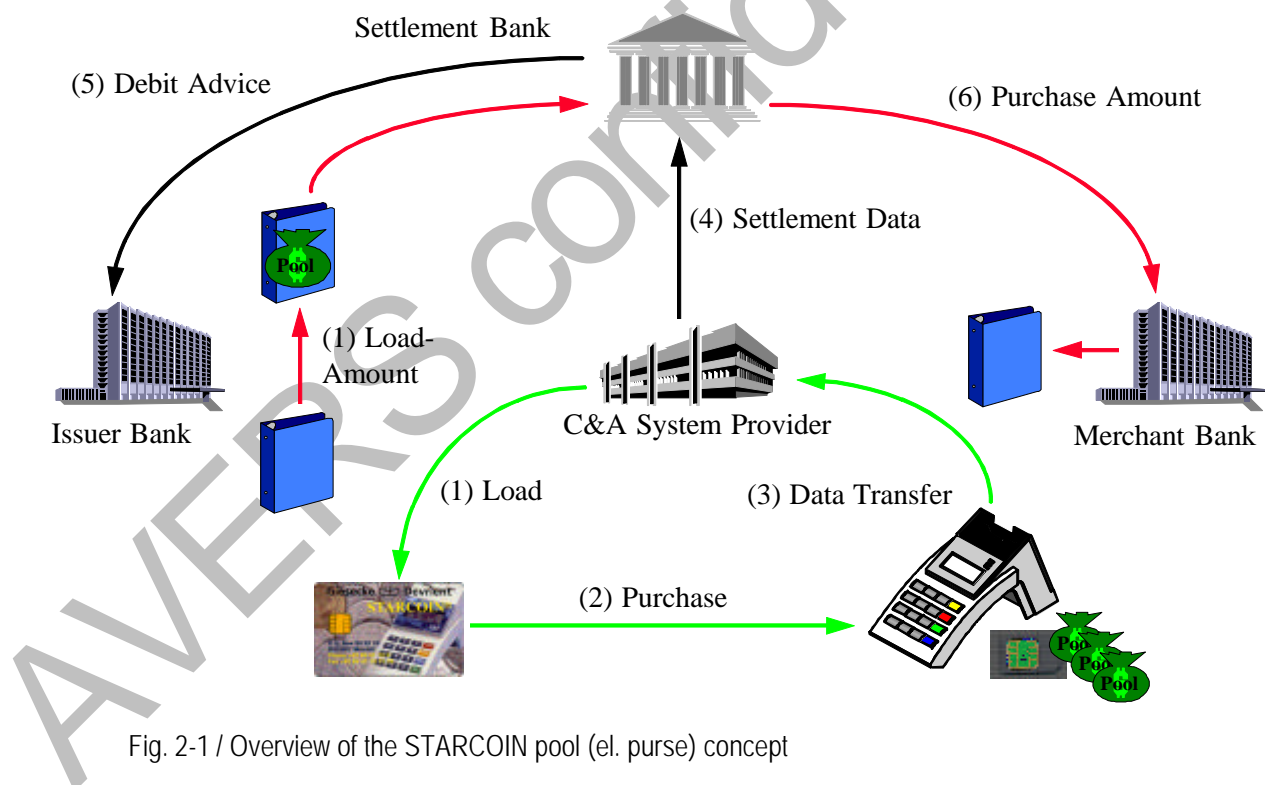


Fig. 2-1 / Overview of the STARCOIN pool (el. purse) concept

(1) Loading

The money is credited as electronic units on the customers card. The load process is done physically within a bank, but always on-line towards the C&A System as only authorising unit.

(2) **Purchase**

At purchase the respective amount is debited from the customers card and cumulated (credited) to the respective pool record of the customers card issuing bank in the terminal card of the merchant terminal. This payment can be managed completely anonymous concerning the customer, only the bank where the customer has his account is known (by the pool identifier).

(3) **Transfer of payment data**

The merchant transfers the transaction data (cumulated pools and optional individual recorded transactions) to the C&A system.

(4) **Clearing and settlement data transfer**

Load process - A settlement advice for the customers account (debited) and for the issuing banks pool account (credited) is generated with the data received from the load transaction.

Payment transaction - The pool sums on the terminal card are always incremented and never reset to zero. The processing centre substrates the transferred pool sum from the last transferred pool sum and receives this way the amount to be transferred to the account of the merchant (settlement advice). Thereby it can be assured, that no transactions are lost if one or several transactions from the merchant to the processing centre should fail. Also, no money can be gained through replay of transactions.

(5) **Settlement**

All settlement transactions are operated on the basis of the existing interbank payment schemes and are not at the discretion of STARCOIN.

The settlement bank formats the settlement data from the C&A system into the structure used by the interbank payment scheme.

(6) The loaded amount is debited from the customers account and credited to the customers card issuing bank pool account. For the payment amounts, the settlement bank receives the settlement advices from the C&A system and manages the payments between the card issuing bank and the merchant bank.

2.2 El. cheque payment concept

Additionally to the cumulating of the payment amounts in the terminal card and depending on certain parameters on this terminal card, the relevant transaction data (balance before purchase, amount, purse number,..) of a purchase can be stored in the terminal and be transferred with the pool data. This is called 'individual (single) recorded transaction'.

STARCOIN uses this feature to introduce the electronic cheque (ECH). The ECH is a purse, foreseen to be loaded with very high amounts and therefore must be additionally

secured: The purchase requires a PIN and the ECH balance (the preauthorised amount) is reflected on an extra - shadow - account in the card issuing bank.

Every ECH purchase is recorded as individual transaction not depending on the above mentioned terminal card parameters used for setting the IEP single transaction recording rate.

All individual recorded transactions are transferred to the C&A system and there used for the clearing process. That means, that for every ECH purchase an own credit/debit advice is generated for the settlement bank. The merchant doesn't receive his money from the customer card issuing bank's pool account, but from the electronic cheque account in the issuing bank.

When all pool transactions (load/unload/payment) are cleared at the end of the day, the C&A system sends the settlement bank the settlement advices for each individual transaction. The settlement then manages the transfers of the amounts to the different bank accounts.

The following figure gives an overview to the described scenario:

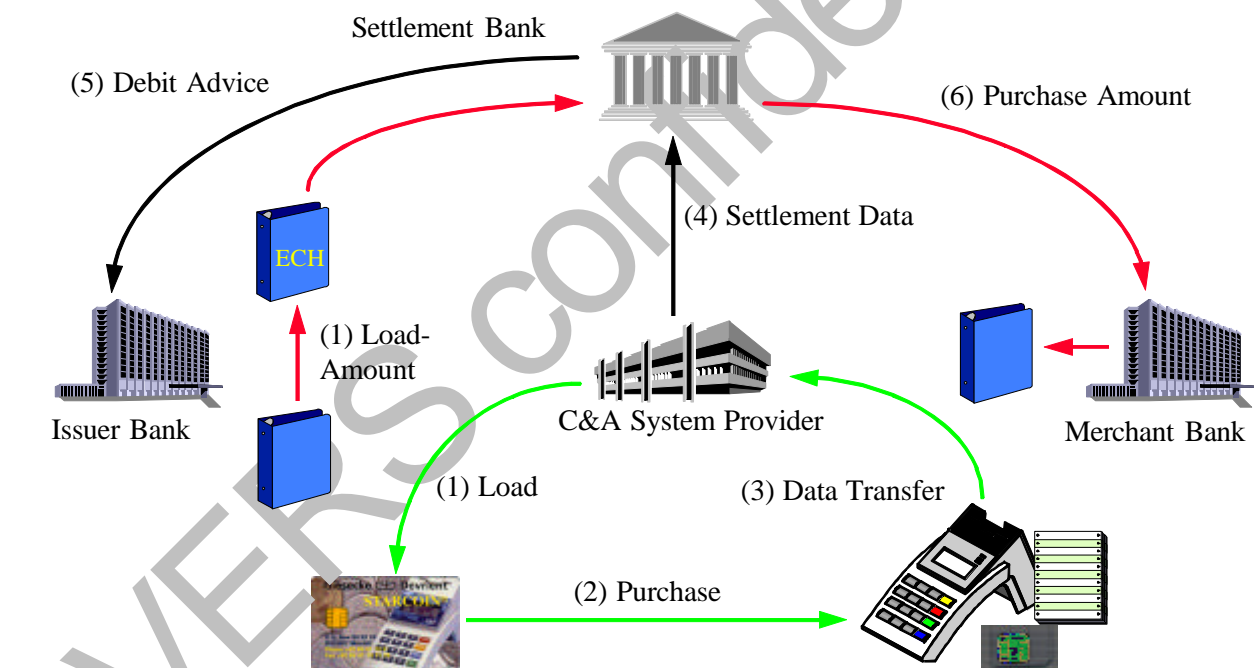


Fig. 2-1 / Overview of the STARCOIN el. cheque payment concept

(1) Loading

The money is credited as electronic units on the customers card. The load process is done physically within a bank, but always on-line towards the C&A System as only authorising unit.

(2) Purchase

At purchase the respective amount is debited from the customers card and cumulated

(credited) in a purchase record in the merchant terminal. All relevant transaction data are stored.

(3) **Transfer of payment data**

The merchant transfers the transaction data (individual recorded transactions and the cumulated 'ECH'-pool) to the C&A system.

(4) **Clearing**

Load process - A settlement advice for the customers account (debited) and for the customers ECH shadow account (credited) is generated with the data received from the load transaction.

Payment transaction - Each transferred transaction is cleared and a settlement advice is generated, upon which the ECH shadow account must be debited and the merchant's account must be credited.

(5) **Settlement**

All settlement transactions are operated on the basis of the existing interbank payment schemes and not at the discretion of STARCOIN.

The settlement bank formats the settlement data from the C&A system into the structure used by the interbank payment scheme.

- (6) The loaded amount is debited from the customers account and credited to the customers ECH shadow account. For the payment amounts, the settlement bank receives the settlement advices from the C&A system and manages the payments between the card issuing bank (debit ECH shadow account) and the merchant bank (credit merchants account).

2.3

Summary: Differences between IEP and ECH

For both ways of payment, IEP and ECH the respective pool is cumulated in the terminal card and individual transaction data are recorded in the terminal memory. Only the ECH related pool is used the same way as the individual recorded transactions are used for the IEP. It just serves as checking instance. STARCOIN handles one single pool for all issued el. cheques (even of different banks) .

Concerning the clearing process, the IEP and the ECH differ as follows:

- **IEP**

The cumulated pools of the last reconciliation are subtracted from the respective new ones. The resulting balances are used for generating the settlement advices for the settlement bank.

If individual transactions were recorded:

In case that a transaction went wrong and a customer complains, a transferred individual recorded transaction can be used to clarify if the transaction was

successful or not. Therefore all transaction relevant data are stored in the C&A system. With the sum of the amounts in the individual recorded transaction the pool balance can be checked (only for 100% recording rate).

- **ECH**

To generate the settlement advice for the settlement bank, the individual recorded transaction data are used (and here the pool sum is only used for checking reasons).

2.4 Debit-POS payment scheme

The Debit-POS payment is derived from well known magstripe debit-card payment schemes and allows a very comfortable way of parameter controlled off-line and on-line payment without former loading of the customers card.

On entry of the payment amount the customers card and the terminal card decide, if the transaction can take place off-line at the merchants terminal or must be authorised towards the C&A system. The C&A system then decides, if the authorisation of the cards issuing bank is additionally required.

Available parameters:

- Max. possible off-line amount
- Max. number of off-line transactions
- Max. days off-line
- Max. cumulated off-line amount
- Max. Debit-POS cycle limit (weekly or daily, valid for on-line and off-line payments)

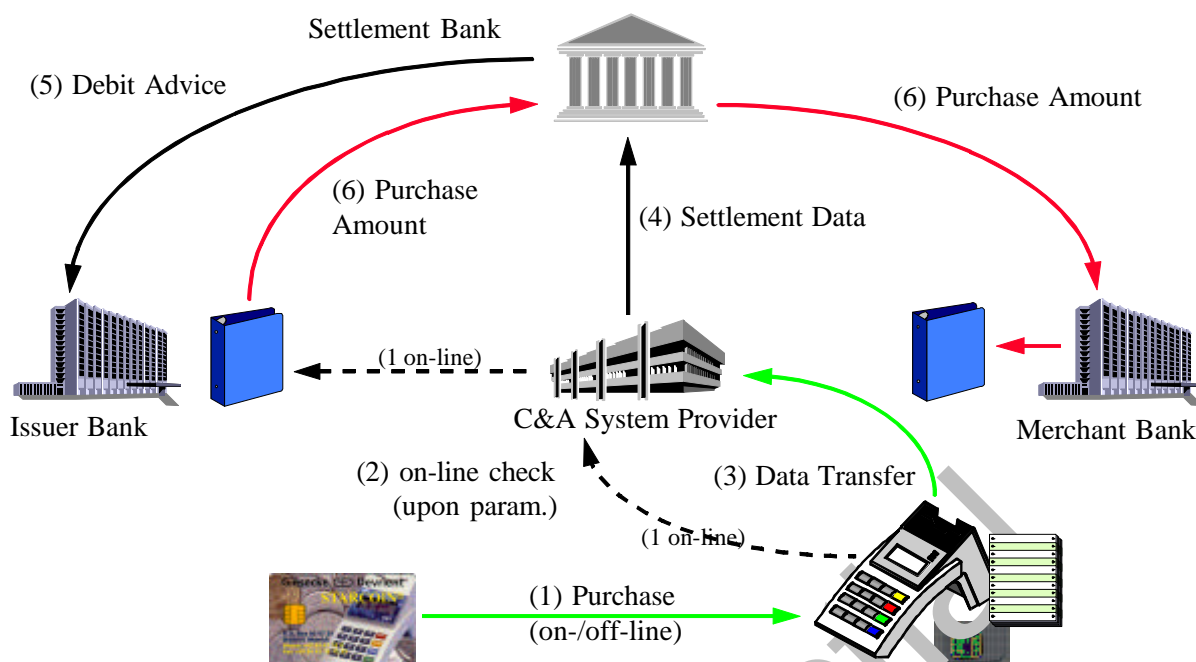


Fig. 2-1 / Overview of the STARCOIN Debit-POS on-line/off-line payment concept

(1) Purchase

Upon the available parameters customer's card and terminal card decide on on-line or off-line payment.

Off-line: At purchase the respective amount is logged in the customer's card and credited in a purchase record in the merchant terminal. All relevant transaction data are stored.

On-line: All transaction data are managed on-line, no data are stored in the terminal.

(2) On-line authorisation

If an on-line authorisation is required, the terminal connects via modem to the C&A system. Here the incoming signatures and data elements are checked. If the transaction requires an authorisation of the card issuing bank, the system provider connects to the issuing bank and requests for authorisation.

(3) Transfer of payment data (off-line tx only)

The merchant transfers the transaction data (individual recorded Debit-POS transactions) to the C&A system.

(4) Clearing

Each transferred off-line and successful on-line transaction is cleared and a settlement advice is generated, upon which the customer's account must be debited and the merchant's account must be credited.

(5) Settlement

All settlement transactions are operated on the basis of the existing interbank payment schemes and not at the discretion of STARCOIN.

The settlement bank formats the settlement data from the C&A system into the structure used by the interbank payment scheme.

- (6) The loaded amount is debited from the customers account and credited to the customers account account. For the payment amounts, the settlement bank receives the settlement advices from the C&A system and manages the payments between the card issuing bank (debit customers account) and the merchant bank (credit merchants account).

On-line Debit-POS authorisation by the issuing bank:

When the on-line authorisation of the card issuing bank is executed, the bank receives the information about the payment amount at the very moment of payment (2) and can debit the cardholders account accordingly.

The incoming settlement advice (5) must be handled then as additional confirmation for a successful payment and contains the relevant informations about the account of the merchant, where the money must be credited to.

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3 Clearing

3.1 Notations and used terms

3.1.1 Participating banks

- **Acceptor bank**

Every bank accepting STARCOIN cards for load and unload processes. An acceptor bank does not need to (but can) be a card issuing bank itself.

In this document for more detailed explanation, an acceptor bank is any bank 'accepting' a customer's card for a transaction, but is not the card issuing bank.

- **Issuer bank**

Every bank issuing cards to their customers.

- **Merchant bank**

Bank of a merchant, who accepts STARCOIN IEP or ECH cards for payments. The only needs to participate to the clearing process, but does not have to be card issuer itself.

- **Settlement bank**

For the reason that the C&A system provider does not have to be a bank, a settlement bank managing the payments between the different participating banks must be foreseen in every STARCOIN system.

-
- Please note: All described roles of a bank can be taken by only one or different banks in various combinations. This has to be defined in the system structure of the payment system and towards the requirements of existing payment schemes. STARCOIN provides full support of a multi-issuer payment scheme.
-

3.1.2 Accounts

- **Acceptor bank cash account**

All card cash loading and cash unloading amounts are transferred via this account, which is the interface between 'cash money' and 'electronic money'. It is located at the card accepting bank.

This account is always linked to the Bank Authorisation Card (BAC) of the bank clerk.

- **Acceptor bank service charge account**

To handle received and spent service charges the card accepting bank holds a service charge account.

- **C&A system provider Service account**

To receive the service charges for clearing and administration processes, the C&A system provider hold an service charge account (Svc. acc.) at a bank, where all charges are settled.

- **Customer bank account**

'Standard' account of an card holder at his card issuing bank. This is account is normally used for e.g. the customers salary, rent, Every account related load and unload transaction of an IEP or an ECH is reflected here.

- **Customer 'cash'**

'Cash money' spent/received by a card holder when loading/unloading his card.

- **Customer ECH account**

The customer electronic cheque account is the shadow account of the el. cheque and its topical balance represents the remaining preauthorised amount to be spend by the card holder. It is exclusively used to reflect all el. cheque load, unload and purchase transactions.

- **Issuer bank cash account**

All card cash loading and cash unloading amounts are transferred via this account, which is the interface between 'cash money' and 'electronic money'. It is located at the card issuing bank.

This account is always linked to the Bank Authorisation Card (BAC) of the bank clerk.

- **Issuer bank pool account**

The balance of this account represents the sum of all el. purse loadings minus the already reconciliated payments of all IEP cards of a card issuing bank. The issuing bank itself may hold this account.

Several banks can share one pool account, which is located then at one of these banks or another trusted one.

- **Issuer bank service charge account**
To handle received and spent service charges the card issuing bank holds a service charge account.
- **Merchant bank account**
Bank account of the merchant at his bank (doesn't need to be a card issuing bank) which is related to one or several terminals of the merchant (one merchant can have different accounts for different terminals or groups of terminals).
- **Merchant bank service charge account**
To handle received and spent service charges the merchant's bank holds a service charge account. This account is related to the merchant's bank.

3.1.3 Amounts and charges

- ***Differential tx amount***
Every IEP purchase is credited to the respective pool in the terminal card. At reconciliation this cumulated pool is transferred to the C&A system. The last reconciled pool is subtracted and the result is the differential transaction (tx) amount, which is credited to the merchant bank account.
- ***Load amount***
Authorised amount credited on an IEP or an ECH at loading procedure.
- ***Purchase amount***
Amount, debited from an IEP or ECH during a purchase transaction. The ECH related purchase amounts are recorded as individual transactions in the terminal. For IEP purchase transactions all single amounts are cumulated and result in the differential tx amount.
- ***Service charge***
Any kind of charge asked from the C&A system provider, for loading, unloading, clearing, card management,...
- ***Unload amount***
Amount which is debited from an IEP or an ECH to be paid out to the card holder in cash or to his account.

3.2 Service charges

3.2.1 Charged transaction and instances

For the first implementation of the STARCOIN payment system six different service charges for transactions with different instances to be charged are foreseen:

Load from account	Loading Bank*	Customer	
Load by cash	Loading Bank*	-	
Unload to account	Unloading Bank*	Customer	
Unload to cash	Unloading Bank*	-	
IEP Purchase	Merchant Bank	Merchant	
ECH Purchase	Merchant Bank	Merchant	
POS Purchase	Merchant Bank	Merchant	

* Please note, that the Loading/Unloading bank may be the card issuing bank or the acceptor bank. From C&A system point of view always the bank initiating the on-line connection is charged.

- All service charges are raised during the clearing process, according to the defined charging scheme.
- The charged instance is decided per bank at bank installation in the C&A system (Bank_SvcFlag). It can be decided who takes the service charges, while it is assumed, that a bank may be an issuing and merchant bank at the same time:
 1. Bank is charged for Load, Unload and IEP/ECH-Purchases
 2. The Bank is charged for Load and Unload only, merchant is charged for IEP/ECH purchases.
 3. Bank is not charged at all, customers pay for Load/Unload, merchants for IEP/ECH purchases.

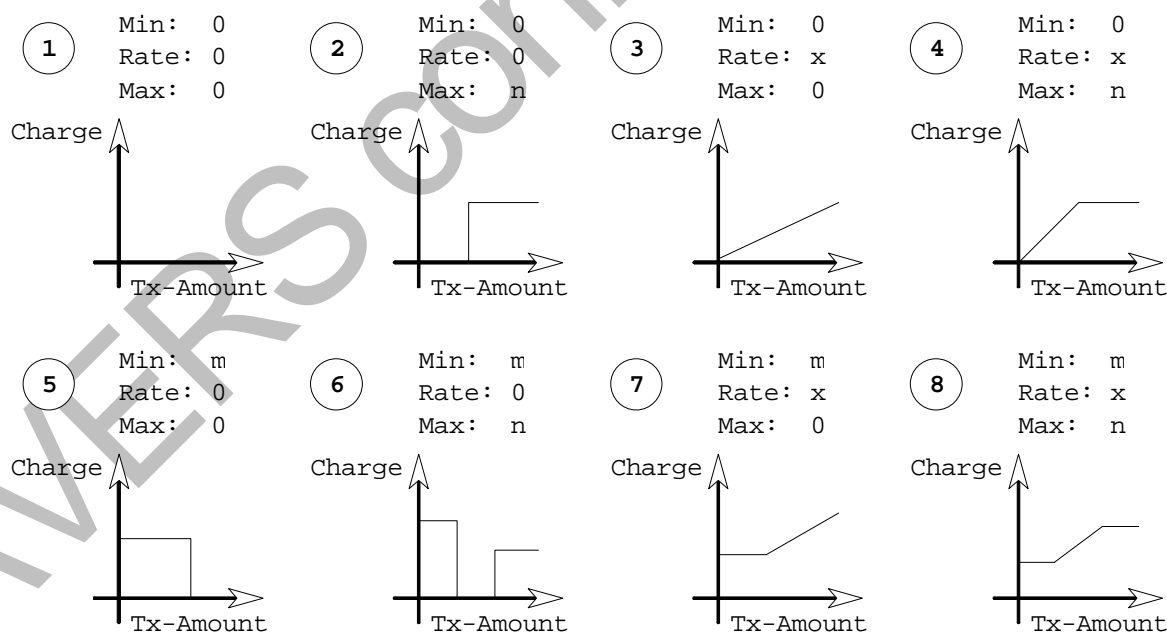
3.2.2 Service charge schemes

Every service charges raised, can be set according to the following model:

Type	Condition	Charge
Minimum Charge	$Tx\text{-Amount} < \text{Limit}$	Fixed Charge
Rate	$Tx\text{ Amount}$	% of $Tx\text{-Amount}$
Maximum Charge	$Tx\text{-Amount} > \text{Limit}$	Fixed Charge

- **Minimum Charge:**
Below a certain transaction amount the defined charge is raised.
- **Rate:**
The service charge is a percentage of the transacted amount. The limits of the transacted amount inbetween the rate depending service charge is raised, is defined only by the minimum and maximum charge depending limits.
- **Maximum charge:**
Above a certain transaction limit the defined charge is raised.

According to these conditions 8 charging schemes will be possible:



• Fig. 3-1 / Charging scenarios

Please note: Charging IEP settlement is only possible by either a rate or a fixed charge, not depending on any limit, because only the cumulated pool balance and the number of tx in this balance is known to the C&A system. Thus the available schemes are (1), (3), (4) and (7):

	Limit	Charge	Limit	Charge	Limit	Charge
Minimum Charge	0	0	0	x.yz	0	0
Rate	-	n%	-	0%	-	0%
Maximum Charge	0	0	0	0	0	x.yz

- The charge is to be defined in minor units.
- The rate has the format N(5,2).
- Calculated charges are rounded to minor units from 0.5 upwards, before downwards.

Further C&A System features

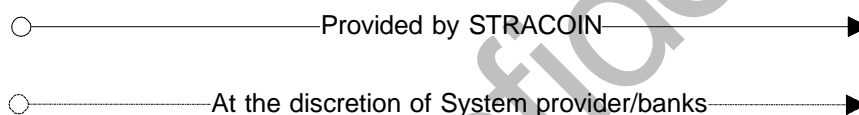
- All service charges are credited to the system provider service charge account.
- The charges are set up at system installation and are changeable at any time at the discretion of the system provider.
- An ECH shadow account is never debited with a service charge, because the mirroring of the ECH balance would fail then.
- Even if debited account and service charge account are the same (e.g. load customer card from account + debit customer with service charge), two single settlement advices are generated.

3.3 Conventions

In the figures and the Credit/Debit tables the following agreements are made:

- *Drawn trough arrows / unshadowed area:* Functionality provided in the settlement advices of the STARCOIN C&A system.
Dotted lines within the table separates two alternatives, of which one must be selected.
- *Dotted lines / shadowed area:* Functionality must be provided by organisational measures.

Credit	Debit
Functionality provided in the STARCOIN sellement advices	1. Alternative
Functionality provided in the STARCOIN sellement advices	2. Alternative
Functionality must be provided by organisational measures	...



- Please note: If two service charges are proposed, only one of them can be selected for the clearing process. It is thus not possible to charge two participants of the STARCOIN payment system for the same transaction.

3.4 Clearing of el. purse (IEP) transactions

All transfers of el. purse clearing data go to the C&A system.

Flow of the pool tx data transfer:

- All pools on the terminal card are newly signed by S5 (PSAM_COLLECT).

All cumulated pool sums (and if recorded, the single tx) are transferred to the C&A system via transfer cards. The C&A system acknowledges the receipt of the transferred transactions.

Transfer management in the C&A system:

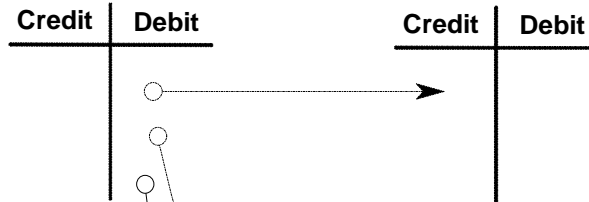
- The C&A system checks all signatures of the transactions and the plausibility of the data.
 - The C&A system generates the settlement advises for the el. purse transactions by the received transfer data.
 - As a consequence the C&A system has the information about all pool accounts of every participating bank.
 - All tx data of an el. purse tx are visible for the C&A system.
 - The C&A system manages the transfer of administrative data to the terminals (SAMs) after a tx data transfer.
-
- The C&A system is not a bank, it just generates the settlement data which are transferred then to the settlement bank handling the interbank payments.
-

3.4.1 IEP clearing - load from account at issuer bank

Payment accounts:

Customer bank acc.

Issuer bank pool acc.



Service charge accounts:

Issuer bank

C&A system provider

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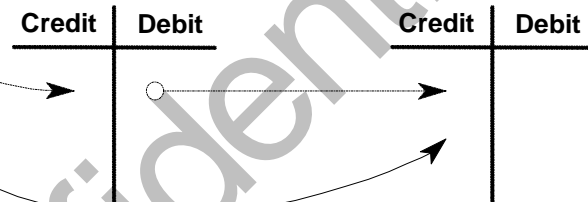
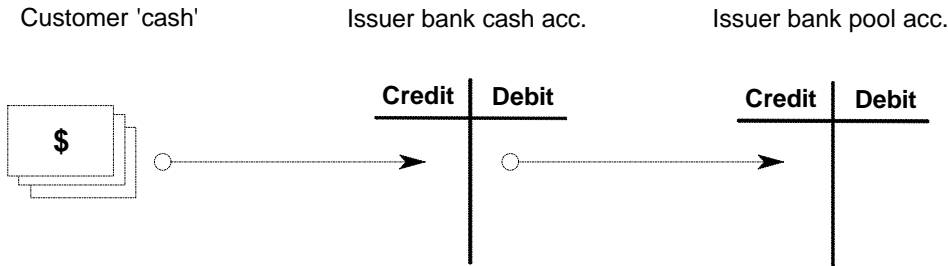


Fig. 3-1 / IEP clearing - load from account at issuer bank

Credit	Debit
Issuer bank pool account <i>Load amount</i>	Customer bank account <i>Load amount</i>
C&A system provider Svc. acc. <i>Service charge</i>	Customer bank account <i>Service charge</i>
C&A system provider Svc. acc. <i>Service charge</i>	Issuer bank service charge acc. <i>Service charge</i>
Issuer bank service charge acc. <i>Service charge</i>	Customer bank account <i>Service charge</i>

3.4.2 IEP clearing - load by cash at issuer bank

Payment accounts:



Service charge accounts:

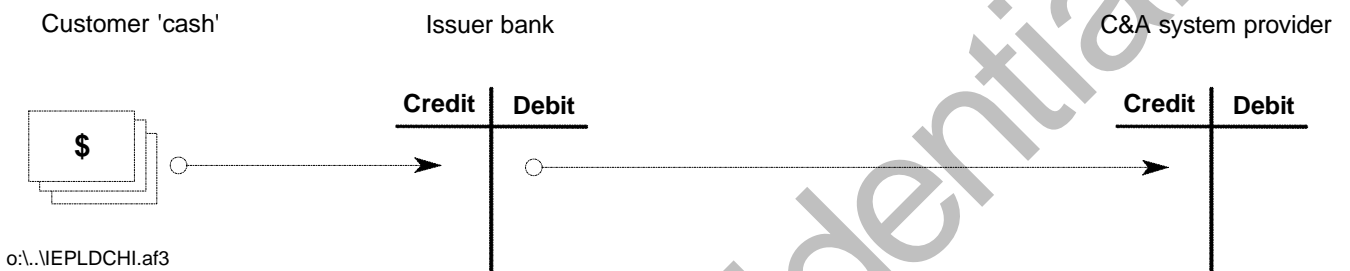


Fig. 3-2 / IEP clearing - load by cash at issuer bank

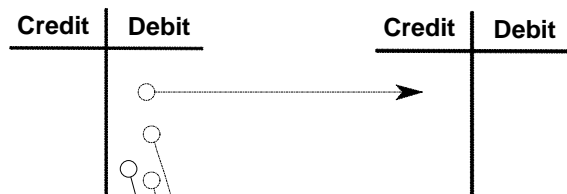
Credit	Debit
Issuer bank pool account <i>Load amount</i>	Issuer bank cash account <i>Load amount</i>
C&A system provider Svc. acc. <i>Service charge</i>	Issuer bank service charge acc. <i>Service charge</i>
Issuer bank service charge acc. <i>Service charge</i>	Customer 'cash' <i>Service charge</i>
Issuer bank cash account <i>Load amount</i>	Customer 'cash' <i>Load amount</i>

3.4.3 IEP clearing - load from account at acceptor bank

Payment accounts:

Customer bank acc.

Issuer bank pool acc.



Service charge accounts:

Issuer bank

Acceptor bank

C&A system provider

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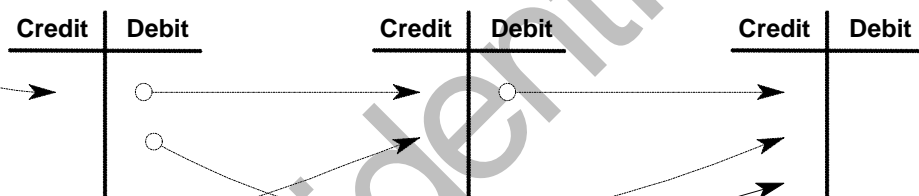


Fig. 3-3 / IEP clearing - load from account at acceptor bank

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Credit	Debit
Issuer bank pool account <i>Load amount</i>	Customer bank account <i>Load amount</i>
C&A system provider Svc. acc. <i>Service charge</i>	Customer bank account <i>Service charge</i>
C&A system provider Svc. acc. <i>Service charge</i>	Acceptor bank service charge acc <i>Service charge</i>
C&A system provider Svc. acc. <i>Service charge</i>	Issuer bank service charge acc. <i>Service charge</i>
Acceptor bank service charge acc <i>Service charge</i>	Customer bank account <i>Service charge</i>
Issuer bank service charge acc. <i>Service charge</i>	Customer bank account <i>Service charge</i>
Acceptor bank service charge acc <i>Service charge</i>	Issuer bank service charge acc. <i>Service charge</i>

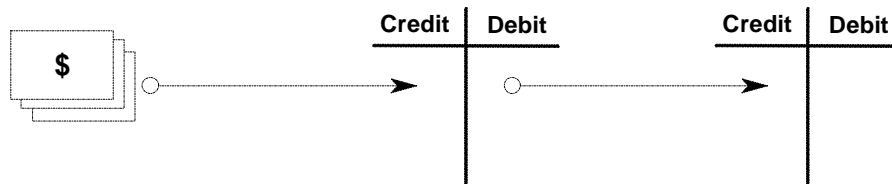
3.4.4 IEP clearing - load by cash at acceptor bank

Payment accounts:

Customer 'cash'

Acceptor bank cash acc

Issuer bank pool acc.



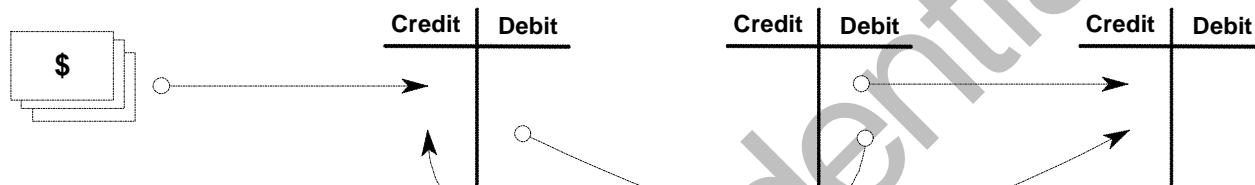
Service charge accounts:

Customer 'cash'

Acceptor bank

Issuer bank

C&A system provider



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Fig. 3-4 / IEP clearing - load by cash at acceptor bank

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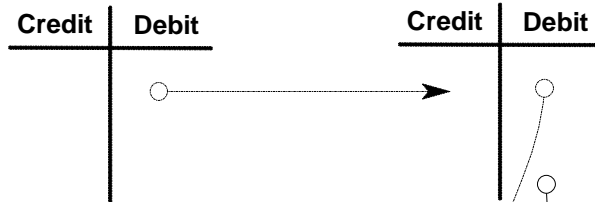
Credit	Debit
Issuer bank pool account <i>Load amount</i>	Acceptor bank cash account <i>Load amount</i>
C&A system provider Svc. acc. <i>Service charge</i>	Acceptor bank service charge acc <i>Service charge</i>
C&A system provider Svc. acc. <i>Service charge</i>	Issuer bank service charge acc. <i>Service charge</i>
Acceptor bank service charge acc <i>Service charge</i>	Issuer bank service charge acc. <i>Service charge</i>
Acceptor bank service charge acc <i>Service charge</i>	Customer 'cash' <i>Service charge</i>
Acceptor bank cash account <i>Load amount</i>	Customer 'cash' <i>Load amount</i>

3.4.5 IEP clearing - Unload to an account at issuer bank

Payment accounts:

Issuer bank pool acc.

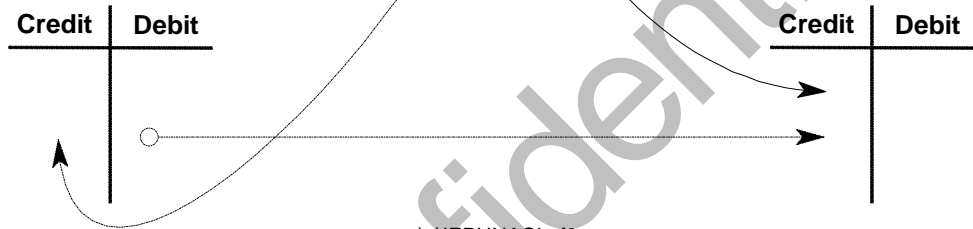
Customer bank acc.



Service charge accounts:

Issuer bank

C&A system provider



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Fig. 3-5 / IEP clearing - Unload to an account at issuer bank

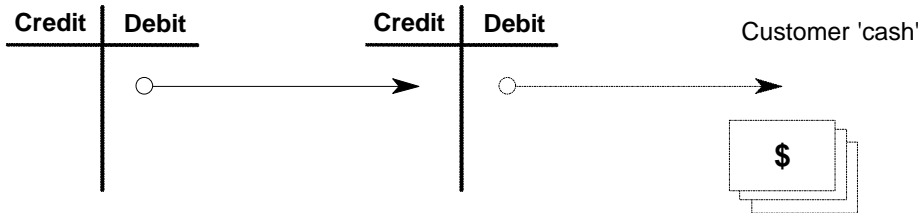
Credit	Debit
	Issuer bank pool account <i>Unload amount</i>
Customer bank account <i>Unload amount</i>	
	Customer bank account <i>Service charge</i>
C&A system provider Svc. acc. <i>Service charge</i>	
	Issuer bank service charge acc. <i>Service charge</i>
C&A system provider Svc. acc. <i>Service charge</i>	
	Customer bank account <i>Service charge</i>
Issuer bank service charge acc. <i>Service charge</i>	

3.4.6 IEP clearing - Unload to cash at issuer bank

Payment accounts:

Issuer bank pool acc.

Issuer bank cash acc.

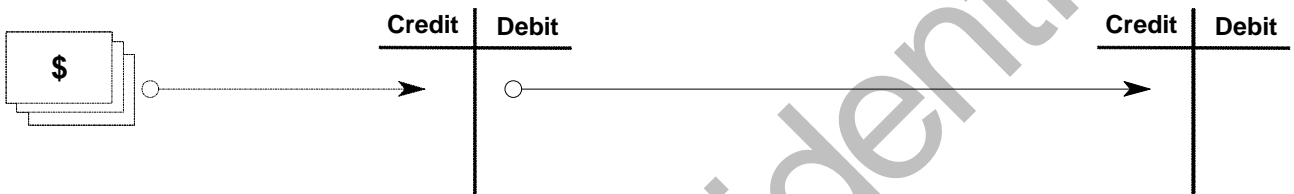


Service charge accounts:

Customer 'cash'

Issuer bank

C&A system provider



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Fig. 3-6 / IEP clearing - Unload to cash at issuer bank

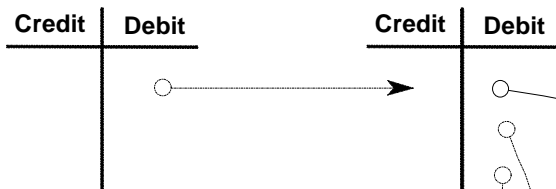
Credit	Debit
Issuer bank cash account <i>Unload amount</i>	Issuer bank pool account <i>Unload amount</i>
C&A system provider Svc. acc. <i>Service charge</i>	Issuer bank service charge acc. <i>Service charge</i>
Customer 'cash' <i>Unload amount</i>	Issuer bank cash account <i>Unload amount</i>
Issuer bank service charge acc. <i>Service charge</i>	Customer 'cash' <i>Service charge</i>

3.4.7 IEP clearing - Unload to an account at acceptor bank

Payment accounts:

Issuer bank pool acc.

Customer bank acc.

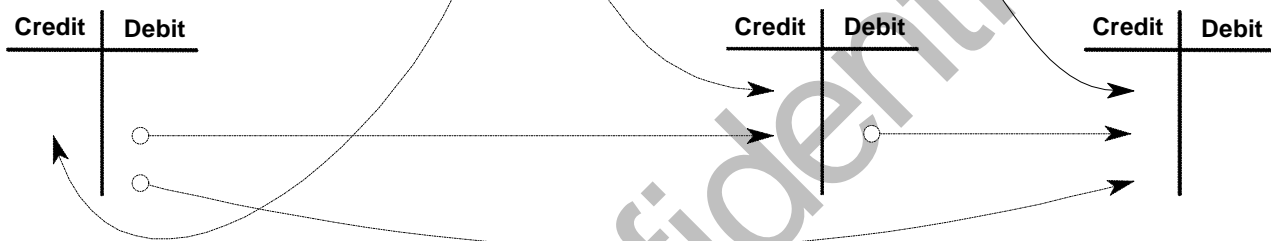


Service charge accounts:

Issuer bank

Acceptor bank

C&A system provider



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Fig. 3-7 / IEP clearing - Unload to an account at acceptor bank

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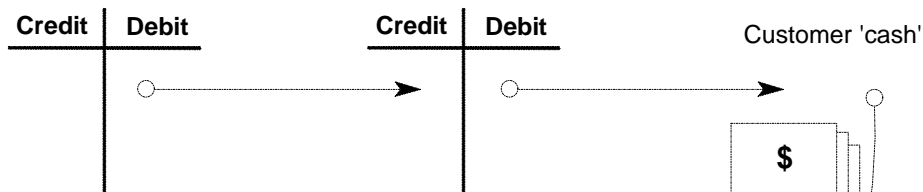
Credit	Debit
Customer bank account <i>Unload amount</i>	Issuer bank pool account <i>Unload amount</i>
C&A system provider Svc. acc. <i>Service charge</i>	Customer bank account <i>Service charge</i>
C&A system provider Svc. acc. <i>Service charge</i>	Acceptor bank service charge acc <i>Service charge</i>
C&A system provider Svc. acc. <i>Service charge</i>	Issuer bank service charge acc. <i>Service charge</i>
Acceptor bank service charge acc <i>Service charge</i>	Issuer bank service charge acc. <i>Service charge</i>
Acceptor bank service charge acc <i>Service charge</i>	Customer bank account <i>Service charge</i>
Issuer bank service charge acc. <i>Service charge</i>	Customer bank account <i>Service charge</i>

3.4.8 IEP clearing - Unload to cash at acceptor bank

Payment accounts:

Issuer bank pool acc.

Acceptor bank cash acc.

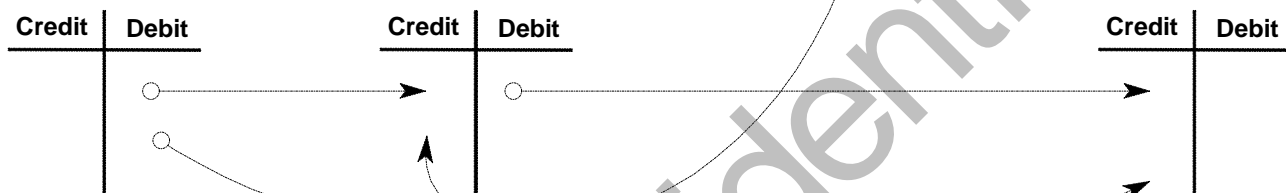


Service charge accounts:

Issuer bank

Acceptor bank

C&A system provider



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Fig. 3-8 / IEP clearing - Unload to cash at acceptor bank

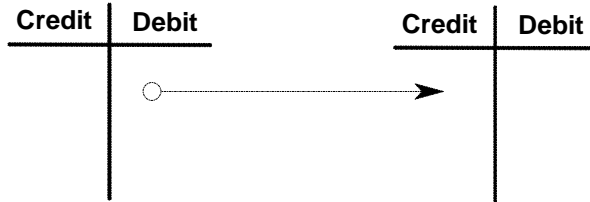
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Credit	Debit
Acceptor bank cash account <i>Unload amount</i>	Issuer bank pool account <i>Unload amount</i>
C&A system provider Svc. acc. <i>Service charge</i>	Acceptor bank service charge acc <i>Service charge</i>
C&A system provider Svc. acc. <i>Service charge</i>	Issuer bank service charge acc. <i>Service charge</i>
Customer 'cash' <i>Unload amount</i>	Acceptor bank cash account <i>Unload amount</i>
Acceptor bank service charge acc <i>Service charge</i>	Issuer bank service charge acc. <i>Service charge</i>
Acceptor bank service charge acc <i>Service charge</i>	Customer 'cash' <i>Service charge</i>

3.4.9 IEP clearing - purchase (reconciliated at merchant bank)

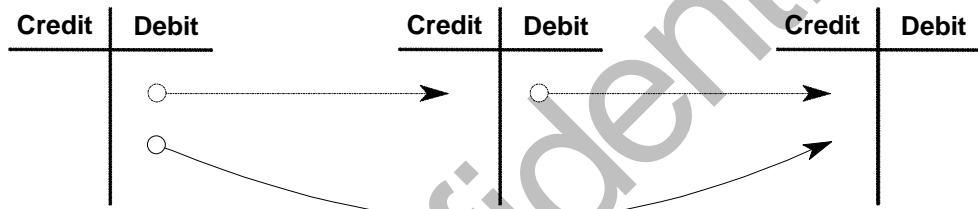
Payment accounts:

Issuer bank pool acc. Merchant bank acc.



Service charge accounts:

Merchant bank acc. Merchant bank C&A system provider



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Fig. 3-9 / IEP clearing - purchase (reconciliated at merchant bank)

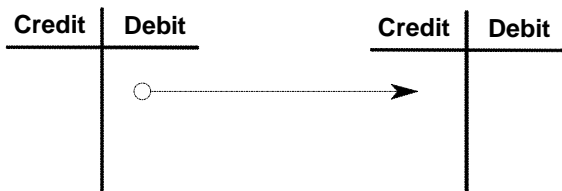
Credit	Debit
Merchant bank account <i>Cumulated tx amount</i>	Issuer bank pool account <i>Differential tx amount</i>
C&A system provider Svc. acc. <i>Service charge</i>	Merchant bank account <i>Service charge</i>
C&A system provider Svc. acc. <i>Service charge</i>	Merchant bank service charge acc <i>Service charge</i>
Merchant bank service charge acc <i>Service charge</i>	Merchant bank account <i>Service charge</i>

3.4.10 IEP clearing - purchase (reconciliated at acceptor bank)

Payment accounts:

Issuer bank pool acc.

Merchant bank acc.



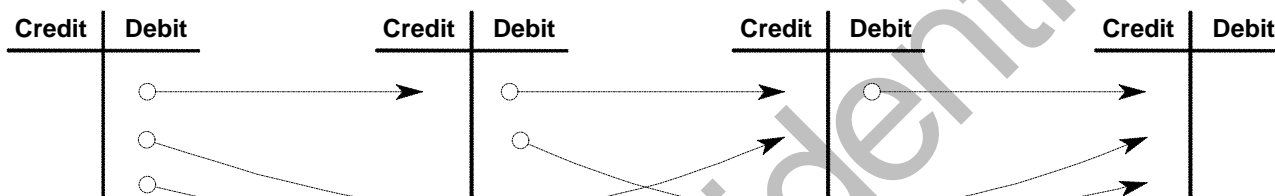
Service charge accounts:

Merchant bank acc.

Merchant bank

Acceptor bank

C&A system provider



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Fig. 3-10 / IEP clearing - purchase (reconciliated at acceptor bank)

Credit	Debit
Merchant bank account <i>Differential tx amount</i>	Issuer bank pool account <i>Differential tx amount</i>
C&A system provider Svc. acc. <i>Service charge</i>	Merchant bank account <i>Service charge</i>
C&A system provider Svc. acc. <i>Service charge</i>	Merchant bank service charge acc. <i>Service charge</i>
C&A system provider Svc. acc. <i>Service charge</i>	Merchant bank service charge acc <i>Service charge</i>
Acceptor bank service charge acc <i>Service charge</i>	Merchant bank account <i>Service charge</i>
Merchant bank service charge acc <i>Service charge</i>	Merchant bank account <i>Service charge</i>
Acceptor bank service charge acc <i>Service charge</i>	Merchant bank service charge acc <i>Service charge</i>

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3.5 Clearing of el. cheque (ECH) transactions

All transfers of el. cheque clearing datas go to the C&A system.

Flow of the pool tx data transfer:

- All single recorded ECH transactions on the terminal card are signed by S4 (customers card signature) and S6 (terminal card signature).
- All the single tx are transferred to the C&A system via transfer cards.
- The C&A system acknowledges the receipt of the the transferred transactions.

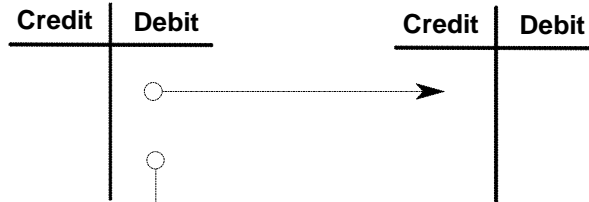
Transaction management in the C&A system:

- The C&A system checks all signatures of the transactions and the plausibility of the data.
 - The C&A system generates the settlement advices for the el. cheque transactions.
 - As a consequence the C&A system has the information about all ECH accounts of every participating bank.
 - All tx data of an el. cheque tx are visible for the C&A system.
 - The C&A system manages the transfer of administrative data to the terminals (SAMs) after a tx data transfer.
-
- The C&A system is not a bank, it just generates the settlement data which are transferred then to the settlement bank handling the interbank payments.
-

3.5.1 ECH clearing - load from account at issuer bank

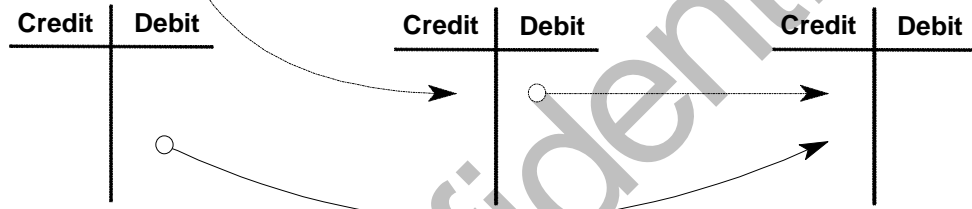
Payment accounts:

Customer bank acc. Customer ECH acc.



Service charge accounts:

Customer bank acc. Issuer bank C&A system provider



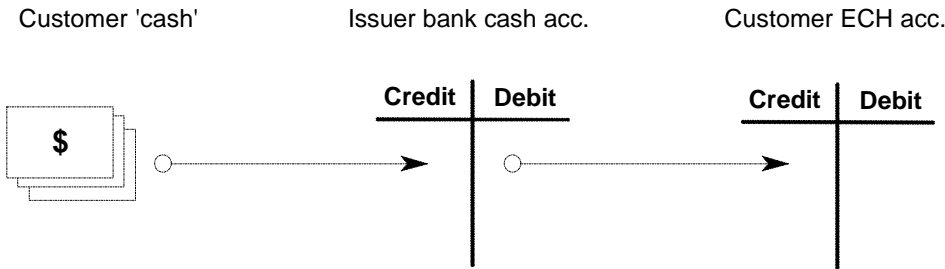
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Fig. 3-11 / ECH clearing - load from account at issuer bank

Credit	Debit
	Customer bank account <i>Load amount</i>
Customer el. cheque account <i>Load amount</i>	
	Customer bank account <i>Service charge</i>
C&A system provider Svc. acc. <i>Service charge</i>	
	Issuer bank service charge acc. <i>Service charge</i>
C&A system provider Svc. acc. <i>Service charge</i>	
	Customer bank account <i>Service charge</i>
Issuer bank service charge acc. <i>Service charge</i>	

3.5.2 ECH clearing - load by cash at issuer bank

Payment accounts:



Service charge accounts:

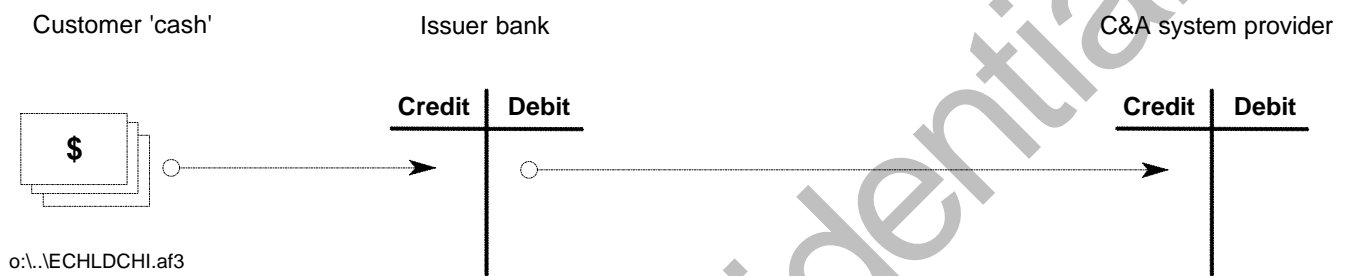


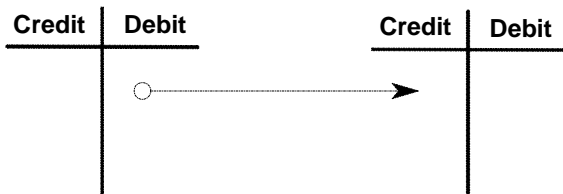
Fig. 3-12 / ECH clearing - load by cash at issuer bank

Credit	Debit
Customer el. cheque account <i>Load amount</i>	Issuer bank cash account <i>Load amount</i>
C&A system provider Svc. acc. <i>Service charge</i>	Issuer bank service charge acc. <i>Service charge</i>
Issuer bank service charge acc. <i>Service charge</i>	Customer 'cash' <i>Service charge</i>
Issuer bank cash account <i>Load amount</i>	Customer 'cash' <i>Load amount</i>

3.5.3 ECH clearing - load from account at acceptor bank

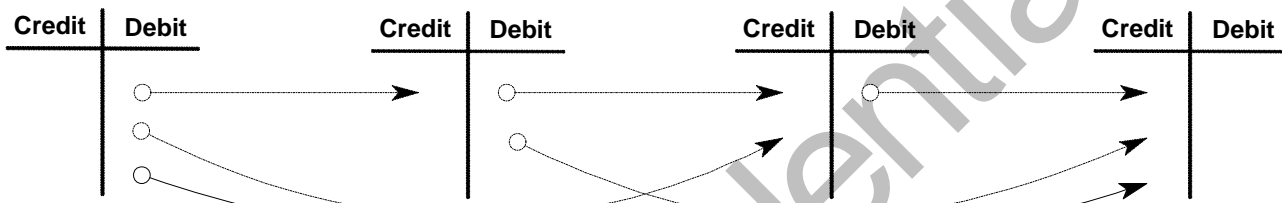
Payment accounts:

Customer bank acc. Customer ECH acc.



Service charge accounts:

Customer bank acc. Issuer bank Acceptor bank C&A system provider



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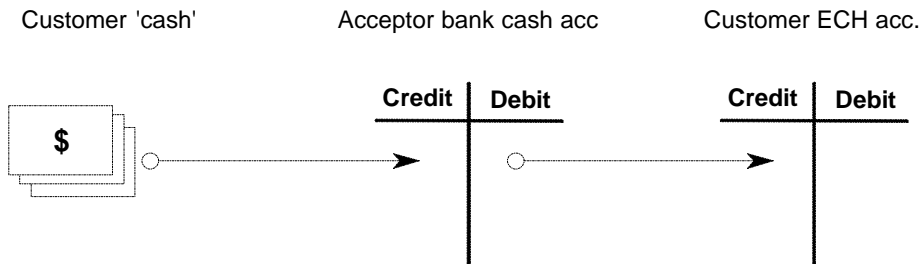
• Fig. 3-13 / ECH clearing - load from account at acceptor bank

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Credit	Debit
Customer el. cheque account <i>Load amount</i>	Customer bank account <i>Load amount</i>
C&A system provider Svc. acc. <i>Service charge</i>	Customer bank account <i>Service charge</i>
C&A system provider Svc. acc. <i>Service charge</i>	Acceptor bank service charge acc <i>Service charge</i>
C&A system provider Svc. acc. <i>Service charge</i>	Issuer bank service charge acc. <i>Service charge</i>
Acceptor bank service charge acc <i>Service charge</i>	Customer bank account <i>Service charge</i>
Issuer bank service charge acc. <i>Service charge</i>	Customer bank account <i>Service charge</i>
Acceptor bank service charge acc <i>Service charge</i>	Issuer bank service charge acc. <i>Service charge</i>

3.5.4 ECH clearing - load by cash at acceptor bank

Payment accounts:



Service charge accounts:

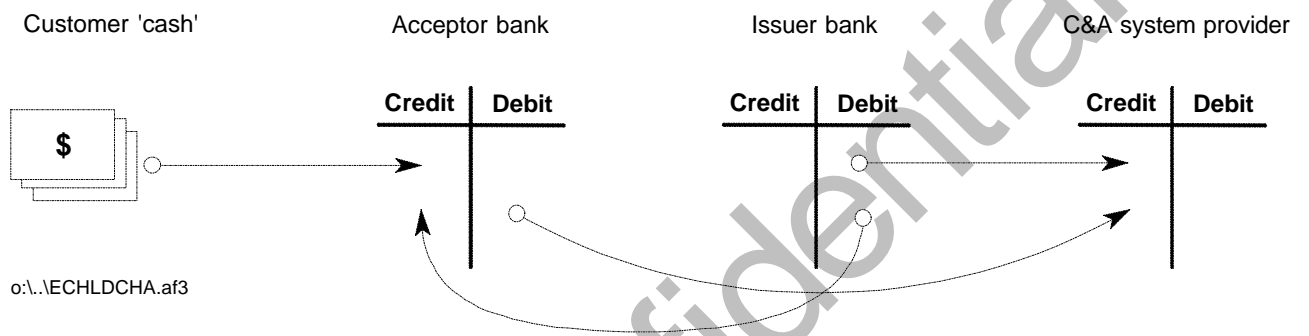


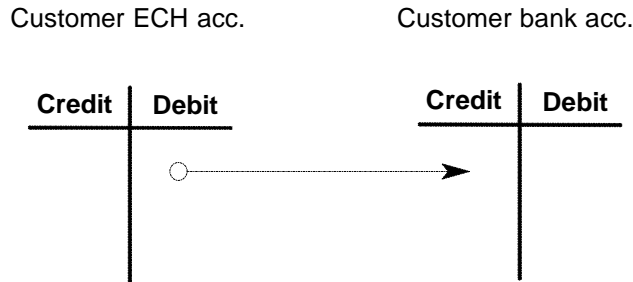
Fig. 3-14 / ECH clearing - load by cash at acceptor bank

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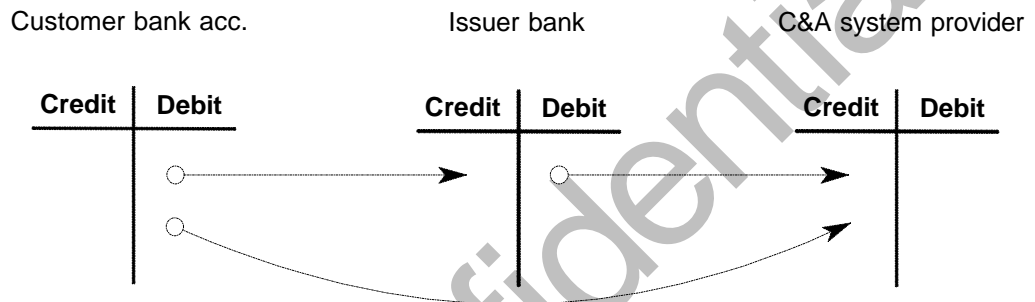
Credit	Debit
Customer el. cheque account <i>Load amount</i>	Acceptor bank cash account <i>Load amount</i>
C&A system provider Svc. acc. <i>Service charge</i>	Acceptor bank service charge acc <i>Service charge</i>
C&A system provider Svc. acc. <i>Service charge</i>	Issuer bank service charge acc. <i>Service charge</i>
Acceptor bank service charge acc <i>Service charge</i>	Issuer bank service charge acc. <i>Service charge</i>
Acceptor bank service charge acc <i>Service charge</i>	Customer 'cash' <i>Service charge</i>
Acceptor bank cash account <i>Load amount</i>	Customer 'cash' <i>Load amount</i>

3.5.5 ECH clearing - Unload to an account at issuer bank

Payment accounts:



Service charge accounts:



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Fig. 3-15 / ECH clearing - Unload to an account at issuer bank

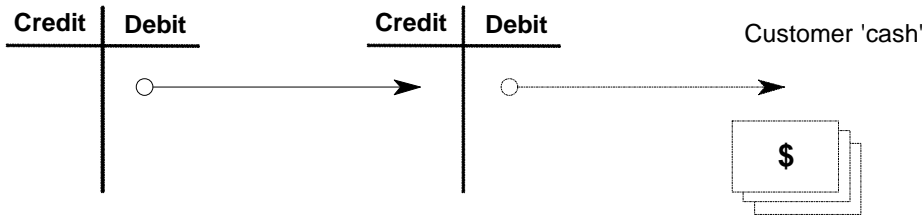
Credit	Debit
	Customer el. cheque account <i>Unload amount</i>
Customer bank account <i>Unload amount</i>	
	Customer bank account <i>Service charge</i>
C&A system provider Svc. acc. <i>Service charge</i>	
	Issuer bank service charge acc. <i>Service charge</i>
C&A system provider Svc. acc. <i>Service charge</i>	
	Customer bank account <i>Service charge</i>
Issuer bank service charge acc. <i>Service charge</i>	

3.5.6 ECH clearing - Unload to cash at issuer bank

Payment accounts:

Customer ECH acc.

Issuer bank cash acc.

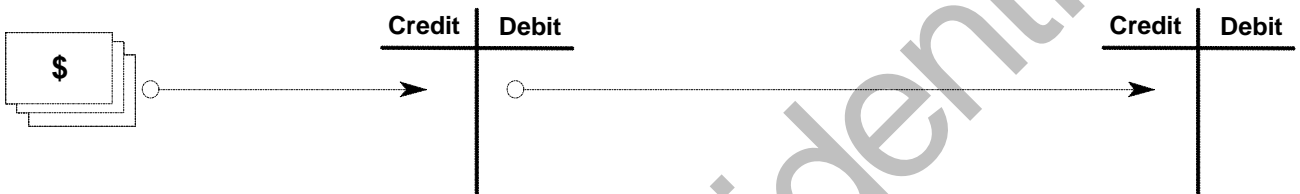


Service charge accounts:

Customer 'cash'

Issuer bank

C&A system provider



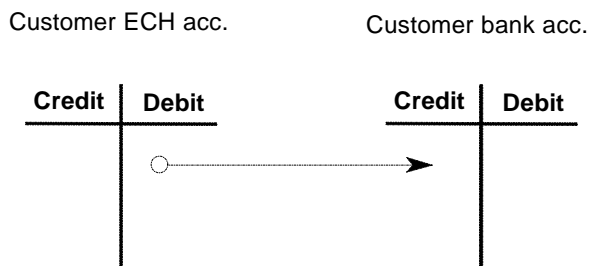
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Fig. 3-16 / ECH clearing - Unload to cash at issuer bank

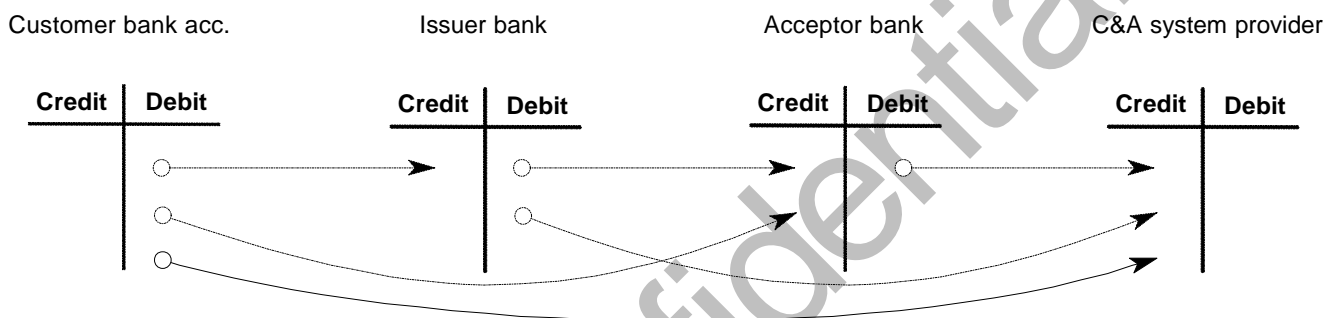
Credit	Debit
Issuer bank cash account <i>Unload amount</i>	Customer el. cheque account <i>Unload amount</i>
C&A system provider Svc. acc. <i>Service charge</i>	Issuer bank service charge acc. <i>Service charge</i>
Customer 'cash' <i>Unload amount</i>	Issuer bank cash account <i>Unload amount</i>
Issuer bank service charge acc. <i>Service charge</i>	Customer 'cash' <i>Service charge</i>

3.5.7 ECH clearing - Unload to an account at acceptor bank

Payment accounts:



Service charge accounts:



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Fig. 3-17 / ECH clearing - Unload to an account at acceptor bank

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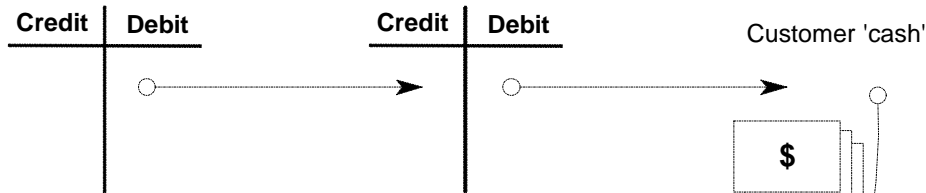
Credit	Debit
Customer bank account <i>Unload amount</i>	Customer el. cheque account <i>Unload amount</i>
C&A system provider Svc. acc. <i>Service charge</i>	Customer bank account <i>Service charge</i>
C&A system provider Svc. acc. <i>Service charge</i>	Acceptor bank service charge acc. <i>Service charge</i>
C&A system provider Svc. acc. <i>Service charge</i>	Issuer bank service charge acc. <i>Service charge</i>
Acceptor bank service charge acc. <i>Service charge</i>	Issuer bank service charge acc. <i>Service charge</i>
Acceptor bank service charge acc. <i>Service charge</i>	Customer bank account <i>Service charge</i>
Issuer bank service charge acc. <i>Service charge</i>	Customer bank account <i>Service charge</i>

3.5.8 ECH clearing - Unload to cash at acceptor bank

Payment accounts:

Customer ECH acc.

Acceptor bank cash acc.

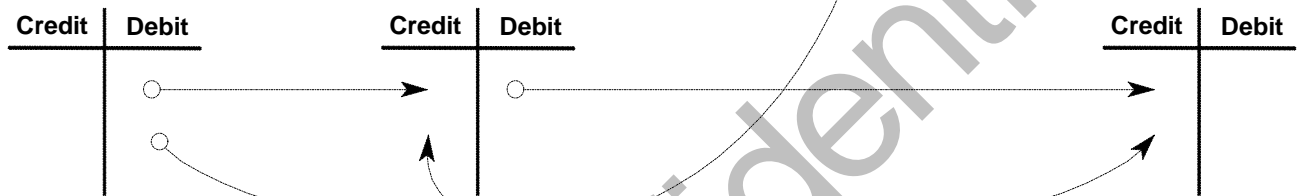


Service charge accounts:

Issuer bank

Acceptor bank

C&A system provider



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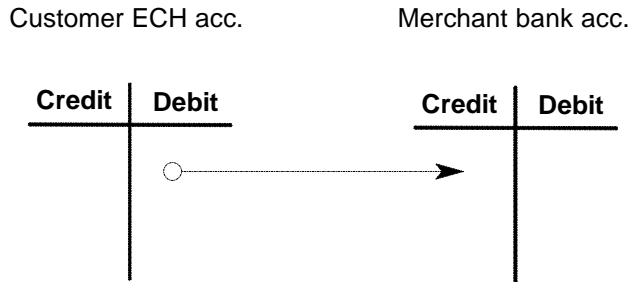
Fig. 3-18 / ECH clearing - Unload to cash at acceptor bank

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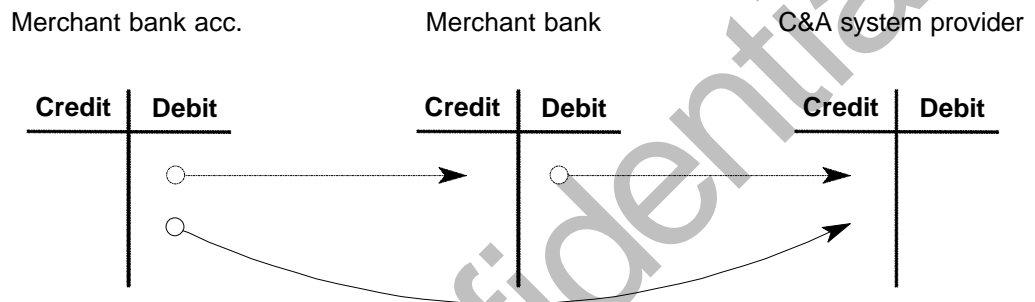
Credit	Debit
Acceptor bank cash account <i>Unload amount</i>	Customer el. cheque account <i>Unload amount</i>
C&A system provider Svc. acc. <i>Service charge</i>	Acceptor bank service charge acc <i>Service charge</i>
C&A system provider Svc. acc. <i>Service charge</i>	Issuer bank service charge acc. <i>Service charge</i>
Customer 'cash' <i>Unload amount</i>	Acceptor bank cash account <i>Unload amount</i>
Acceptor bank service charge acc <i>Service charge</i>	Issuer bank service charge acc. <i>Service charge</i>
Acceptor bank service charge acc <i>Service charge</i>	Customer 'cash' <i>Service charge</i>

3.5.9 ECH clearing - purchase (reconciliated at merchant bank)

Payment accounts:



Service charge accounts:



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Fig. 3-19 / ECH clearing - purchase (reconciliated at merchant bank)

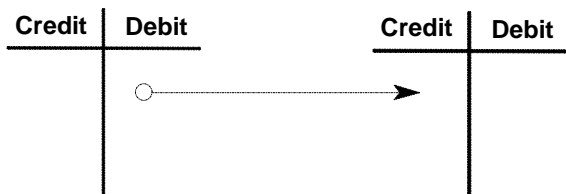
Credit	Debit
Merchant bank account <i>Purchase amount</i>	Customer el. cheque account <i>Purchase amount</i>
C&A system provider Svc. acc. <i>Service charge</i>	Merchant bank account <i>Service charge</i>
C&A system provider Svc. acc. <i>Service charge</i>	Merchant bank service charge acc <i>Service charge</i>
Merchant bank service charge acc <i>Service charge</i>	Merchant bank account <i>Service charge</i>

3.5.10 ECH clearing - purchase (reconciliated at acceptor bank)

Payment accounts:

Customer ECH acc.

Merchant bank acc.



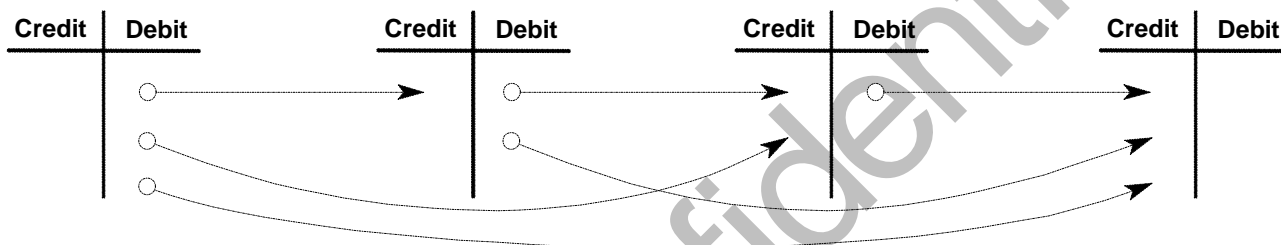
Service charge accounts:

Merchant bank acc.

Merchant bank

Acceptor bank

C&A system provider



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Fig. 3-20 / ECH clearing - purchase (reconciliated at acceptor bank)

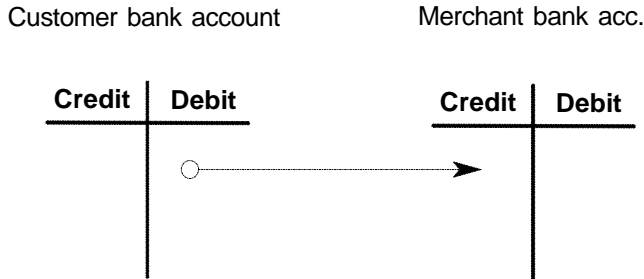
Credit	Debit
Merchant bank account <i>Purchase amount</i>	Customer el. cheque account <i>Purchase amount</i>
C&A system provider Svc. acc. <i>Service charge</i>	Merchant bank account <i>Service charge</i>
C&A system provider Svc. acc. <i>Service charge</i>	Merchant bank service charge acc. <i>Service charge</i>
C&A system provider Svc. acc. <i>Service charge</i>	Merchant bank service charge acc <i>Service charge</i>
Merchant bank service charge acc <i>Service charge</i>	Merchant bank account <i>Service charge</i>
Acceptor bank service charge acc <i>Service charge</i>	Merchant bank account <i>Service charge</i>
Acceptor bank service charge acc <i>Service charge</i>	Merchant bank service charge acc <i>Service charge</i>

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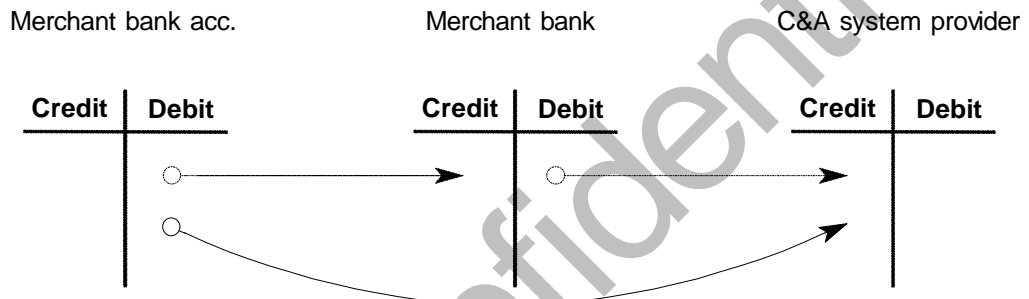
3.6 Clearing of Debit-POS transactions

3.6.1 POS clearing - purchase (reconciliated at merchant bank)

Payment accounts:



Service charge accounts:



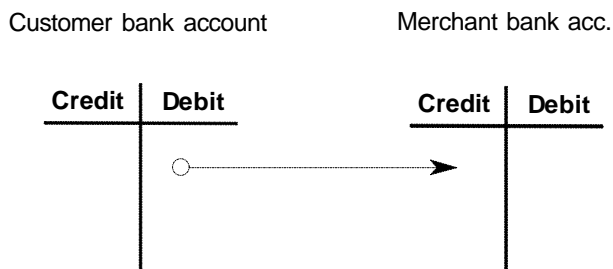
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Fig. 3-21 / POS clearing - purchase (reconciliated at merchant bank)

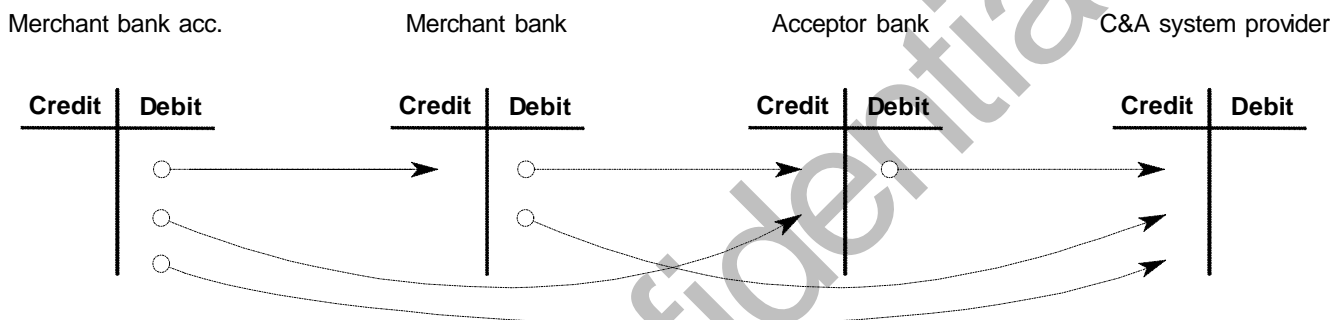
Credit	Debit
Merchant bank account <i>Purchase amount</i>	Customer bank account <i>Purchase amount</i>
C&A system provider Svc. acc. <i>Service charge</i>	Merchant bank account <i>Service charge</i>
C&A system provider Svc. acc. <i>Service charge</i>	Merchant bank service charge acc <i>Service charge</i>
Merchant bank service charge acc <i>Service charge</i>	Merchant bank account <i>Service charge</i>

3.6.2 POS clearing - purchase (reconciliated at acceptor bank)

Payment accounts:



Service charge accounts:



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Fig. 3-22 / ECH clearing - purchase (reconciliated at acceptor bank)

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Credit	Debit
Merchant bank account <i>Purchase amount</i>	Customer bank account <i>Purchase amount</i>
C&A system provider Svc. acc. <i>Service charge</i>	Merchant bank account <i>Service charge</i>
C&A system provider Svc. acc. <i>Service charge</i>	Merchant bank service charge acc. <i>Service charge</i>
C&A system provider Svc. acc. <i>Service charge</i>	Merchant bank service charge acc <i>Service charge</i>
Merchant bank service charge acc <i>Service charge</i>	Merchant bank account <i>Service charge</i>
Acceptor bank service charge acc <i>Service charge</i>	Merchant bank account <i>Service charge</i>
Acceptor bank service charge acc <i>Service charge</i>	Merchant bank service charge acc <i>Service charge</i>