GREATER CAIRO METRO
UPGRADE LINE 1&2

CONTRACT 73/METRO

Business Processes & Rules Revision

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Document Management

Revision Number	Date	Modification
Note. Grey rows are the modifications performed in the frame of line 3 phase 1-2 project. The former reference of the document was 4020_19811		
0a	01/10/2009	—
0b	24/11/2009	Update of Business Processes & Rules to keep in line with the Ticketing Rules Specification
0c	30/11/2009	Adjustments Add Annexe B for remarks on Titles manual document
A	18/03/2010	Add validation extension §4.2.5.2 Add Action List §4.2.8 Add multi validation §4.2.5.3 Complement in table Table 4-1 — Product Summary — Pre-Specified Products Add product suspension §4.2.3 Add zones in geographical validity §4.1.6
Aa	07/07/2010	List of references updated §4.1.7, table 4-1 Line restrictions added;

		§Tables 4-1, 4-2 Calendar restrictions authorized for season passes and easy trip §4.1.4.1, 4.1.4.2 Concessions based on percentages Table 1-1 Customer Profile Owner role added, only one Application Retailer (ECM) Card Issuer replaced by Card Owner, and Card Producer replaced by Card Manufacturer §2.1.2 Only the Card Owner is authorized to blacklist a card §4.1.2 Physical support deleted because it is redundant with Table 4-1 §4.1 Table 4-1, §4.1.1.1 Supplement added as prespecified product §4.1.3.1 This section is also applicable to two-weeks tickets and high value passes §6 abnormal use cases have been revisited to take in account the technical notes: - 012 – Fare Modes_review v1.pdf - 004 – Check-in & Check-out Use Cases.pdf
Ab	10/07/2010	§1 revisited to better introduce the interoperability scheme and the roles of the business participants Media and fare product interoperability inside the metro domain. §2.2.2 Apportionment of magnetic ticket is removed. §4.1.6 Geographical validity definition §Appendix B modified for abnormal CI/CO situations
Ac	03/09/2010	The version of the documents are removed from the list of references §2.6.3 “apportionment” replaced by “apportioned” Table 1 Definitions now conform to ISO 24014-1:2007 definitions Table 2 Definitions in line with Appendix A – Terms & Definitions Customer Service role added in Table 3 ISO/DIS 24014-1:2005 replaced by Standard ISO 24014-1:2007
--	31/08/16	Consolidation of the document in the frame of the line 1&2 upgrade project and the perspective of the interoperability (consistency with other interoperability documents, check of inclusion of technical memos) Reference list update Inclusion of abbreviations and terms. §2.2.2. There is no MT refund in the existing business rules. §2.5.3, §2.6.3, §3, §4.1.13 Precision on blacklisting. §3.4.4. Update of profile list. §3.4.5. Adjustment of refund process. §4.1.3. Precision on fare methods §4.1.6. Adjustment of geographical validity. §4.1.8. Adjustment of journey time validity §4.1.9. Precision on calendar validity.

		§4.1.10. Precision on transfer rules. §4.2.1. Adjustment on card sale. §4.2.3. Precision on product suspension. §4.2.5.2. Alignment ofextension to ticketing rules document. §4.2.7. Precisions on blacklisting.
-A	12/04/17	Update following NAT review. Refer to chapter 7, 'comment spreadsheet' for details.
-B	15/12/17	Update following NAT second review and workshop on open points held on 21/11/2017. Refer to chapter 7, comment spreadsheet' for details.
-C	18/03/21	Update following NAT 3rd review as per letter dated 21/12/17. Refer to chapter 7, comment spreadsheet for details.

LIST OF REFERENCES

Reference	Title
63370448-305	Ticketing Rules Specification
4020_19806	Fare Media Electrical Data Layout Specification
0050011149100RD02	Title Manual
63369660-558	Unified Interface Specification
4020_19982	Line 1&2 (Magnetic Ticket) Fare Structure
	Thales reply to SYS RNO INC _ Business Process & rules - Rev A - ed2.doc

ABBREVIATIONS

AFC	Automatic Fare Collection
API	Application Programmable Interface
AR	Anomaly Report
AR	Audit Register
ASN.1	Abstract Syntax Notation One
AV2 SAM	Ticketing Security Access Module
BO	Back Office
BR	Business Rule
BSN	Blocking Sequence Number
CA	Certification Authority
CCB	Configuration Control Board
CDRL	Contractual Data Requirement List
CI	Check-In (so-called Tag-On)
CI	Card Issuer
CIPS	Card Initialization and Personalization System
CO	Clearing Operator
CO	Check-Out (so-called Tag-Off)
CP	Card Producer
CPS	Central Processing System
CPU	Central Processor Unit
CR	Change Request
CRL	Certificate Revocation List
CSC	Contactless Smart Card
CSV	Comma Separated Value
CT	Contactless Ticket
DES, 3DES	Data Encryption Standard
DF	Dedicated file
DIS	Detailed Interface Document
DN	Distinguished name
DPS	Depot Processing System
DR	Delivery Review

EC	Electrical Cabinet
ECR	Engineering Change Request
EF	Elementary File
EFT	Electronic Fund Transfer
EMI	Electro-Magnetic Interference
EMC	Electro-Magnetic Compatibility
EOD	Equipment Operating Data
EPROM	Erasable-Programmable-Read-Only Memory
ERP	Enterprise resource planner
FAT	Factory Acceptance Test
FED	Front-End Device
FMCS	Field Maintenance Computer System
FO	Front Office
FT	Fait Technique (Problem Report)
FTP	File Transfer Protocol
FTP	Foiled Twisted Pair
GIS	Global Interface Specification
GSM	Global System for Mobile communication
HSM	Hardware Security Module
IADT	Inspection, Analysis, Demonstration, Test
ICD	Interface Control Document
IDD	Interface Data Document
IFM, IFMS	Integrated Fare Management System (Level 0 to 4)
IFS	Integrated Fare System (Level 0 to 3)
ITC	Ignore Time Check
ITF	Integrated Test Facility
IVVQ	Integration, Verification, Validation & Qualification
IVVQ-E	Integration, Verification, Validation & Qualification of Equipment/Subsystem
IVVQ-S	Integration, Verification, Validation & Qualification of System
Kab	3DES R/W keys used for mutual authentication of R/W vs. the controller part of equipment
KCK	3DES Infrastructure Key used as transportation key
KEK	3DES Key Encryption Key used as transportation key
Keq, K'eq	RSA public and private key pair
KMS	Key Management System
KPI	Key Progress Indicator
Ksession	Key created during a communication session

KTR	3DES Transport Key used as a transportation key
LAN	Local Area Network
LREF	List of Reference
LRU	Line Replaceable Unit
MAC	Message Authentication Code
MD5	Message-Digest version 5
MF	Master File
MMI	Man Machine Interface
MCBF	Mean Cycles Between Failures
MSN	Multi-Services Network
MT	Magnetic Ticket
MTBF	Mean Time Between Failures
MTTR	Mean Time To Repair
NOC	Network Operational Centre
NTP	Notice To Proceed
NTP	Network Time Protocol
OTP	One time programming
PAT	Partial Acceptance Test
PCR	Problem/Change Report
P-CSC	Personalized Card
PER	Packed Encoding Rule
PIN	Personal Identification Number
PKCS	Public Key Cryptographic Standard
PKI	Public Key Infrastructure
PKI SAM	Public Key Infrastructure Security Access Module
PM	Project Manager
POS	Point Of Sales
POST	Point Of Sale Terminal
PROM	Programmable-Read-Only Memory
PSTN	Public Switched Telephone Network
PTO	Public Transport Operator
PVU	Portable Verifying Unit
QR	Quality Review
R/W	Reader/Writer
RA	Registration Authority
RAM	Random Access Memory

RAMS	Reliability, Availability, Maintainability and Safety
RFU	Reserved for future use
RLAN	Remote Local Area Network
ROM	Read-Only Memory
RSA	Asymmetric Encryption algorithm
RSS	Remote Station Server
SAM	Security Access Module
SAPP	System Assurance Program Plan
SAT	Site Acceptance Tests
SCR	Station Controller Room
SDR	System Design Review
SF	Station Failure
SFTP	Secure File Transfer Protocol
SP	Service Provider
SPS	Station Processing System (or call also SCU)
SQL	Structured Query Language
SL	Submittal List
SRR	System Requirements Review
SRT	Single Ride Ticket
SSDD	System/Subsystem Design Document
SSS	System/Subsystem Specification
STP	Shielded Twisted Pair
SVT	Stored Value Ticket
TBD	To Be Defined
TBC	To Be Confirmed
TCF	Ticket Checking File
TCP/IP	Transmission Control Protocol / Internet Protocol
TP	Ticket Processing
TPB	Test Procedures Book
T-Purse	Transport Purse linked to a Transport Application on a contactless card
TRB	Test Results Book
TRR	Test Readiness Review
TSN	Transaction Sequence Number
TVM	Ticket Vending Machine
UD	Usage Data
UPS	Uninterruptible Power System

USN	Unblocking Sequence Number
UTP	Unshielded Twisted Pair
VAL	Validator
VCF	Validator Concentration Function
VDU	Visual Display Unit
VLAN	Virtual Local Area Network
VPN	Virtual Private Network
XDR	External Data Representation
xPS	Means CPS or SPS or DPS
WAN	Wide Area Network

CONTENTS

FIGURES

TABLES

1. OBJECT & SCOPE

1.1 DOCUMENT SCOPE

The objective of the document is to describe the Business Model on which the Cairo Metro Automatic Fare Collection (AFC) Systems are based.

The Business Model identifies the roles, responsibilities and processes performed by the Business Entities (e.g. Public Transport Operator (PTO) Organisations) involved in the Interoperability Scheme.

This Business Model is applicable either to a single PTO that operates one or several AFC Systems (mono-operator), or to PTOs sharing the same interoperability scheme (multi-operators) with a common or separate AFC Systems.

The first part of the document gives a general description of the Business Model that is based on the ISO 24014-1:2007 Standard.

The second part describes an implementation of the Business Model for the Cairo Metro Organisation acting as the Cairo Metro Operator. It provides further details regarding:

- The allocation of the business processes to the PTO and the AFC Systems
- The business rules related to cards, products and equipments

The business rules support multi-operator and multi-modal requirements

1.2 BUSINESS MODEL AS DEFINED IN ISO 24014-1:2007 STANDARD

The business model proposed for the Cairo Metro Project relies on the ISO 24014-1:2007 Standard which defines the conceptual framework for a multi-modal, multi-operator integrated fare system. The figure below illustrates the main roles defined in this business model.

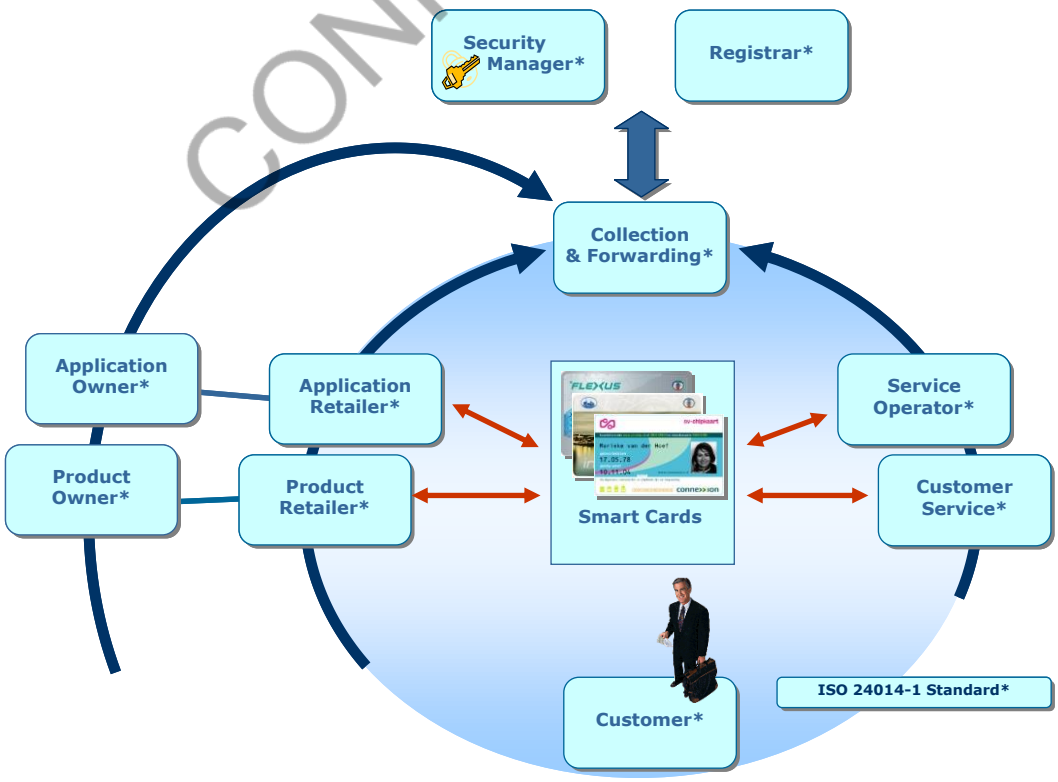

Figure 1 – ISO 24014-1:2007 IFM Model

ISO 24014-1:2007 Standard is a reference for a functional architecture of AFC Systems, identifying all relevant requirements for ensuring interoperability between several entities implementing their own system, according to defined business roles.

The table below recalls briefly the roles defined by the ISO 24014-1:2007 Standard.

ISO Entity	ISO 24014-1:2007 Role Definition
Application Owner	Entity which holds the Application Contract for the use of the application with the customer.
Application Retailer	Entity which sells and terminates applications, collects and refunds value to a customer as authorised by an application owner. This entity is the only financial interface between the customer and the IFM system related to applications.
Product Owner	Entity which is responsible for his products including functions of ownership (specifying pricing, usage and commercial rules), functions of clearing (trip reconstruction, aggregated usage data and apportionment data) and functions of reporting (detailed and summary reports regarding acquisition data, usage data, apportionment data and clearing).
Product Retailer	Entity which sells and terminates products, collects and refunds value to a customer as authorised by a product owner. This entity is the only financial interface between the customer and the IFM system related to products.
Service Operator	Entity which provides service to the customer against the use of a product.
Collection and Forwarding	Entity which is the facilitation of data interchanges of the IFM. The general functions are data collection (e.g. receiving data from Service Providers, security lists, clearing reports…) and forwarding (forwarding “on us” data to Product Owners, security lists, clearing reports…).
Security Manager	Entity which is responsible for establishing the security policy including certification of organisations, application templates, components and product templates; auditing of organisations, application templates/applications, components and product templates/products; monitoring the system; operation of the security of the IFM system, e.g. key management.
Registrar	Entity which issues unique registration codes for organisations, components, application template, product templates. This entity also issues unique identifiers or rules for generating unique identifiers for the applications, products and messages.
Customer Service	Subject to commercial agreements may provide “helpline” and any similar facilities including stolen and damaged Customer Medium replacement and consequential product reinstalling.
Customer	Holds an application. Buys products in order to travel.

Table 1 – Business Roles as defined in ISO 24014-1:2007 IFM model

However these Business Roles are not sufficient to cover all the responsibilities and roles which exist in a multi-modal and multi-operator environment. Thus additional roles have been defined to map these responsibilities.

1.3 EXTENSIONS BROUGHT TO ISO 24014-1:2007 STANDARD

ISO 24014-1:2007 IFM model was defined as a European Standard with an initial limitation as regards to cards and financial management aspects in AFC Systems. Thus additional roles (see the figure below) has been defined to cover these responsibilities.

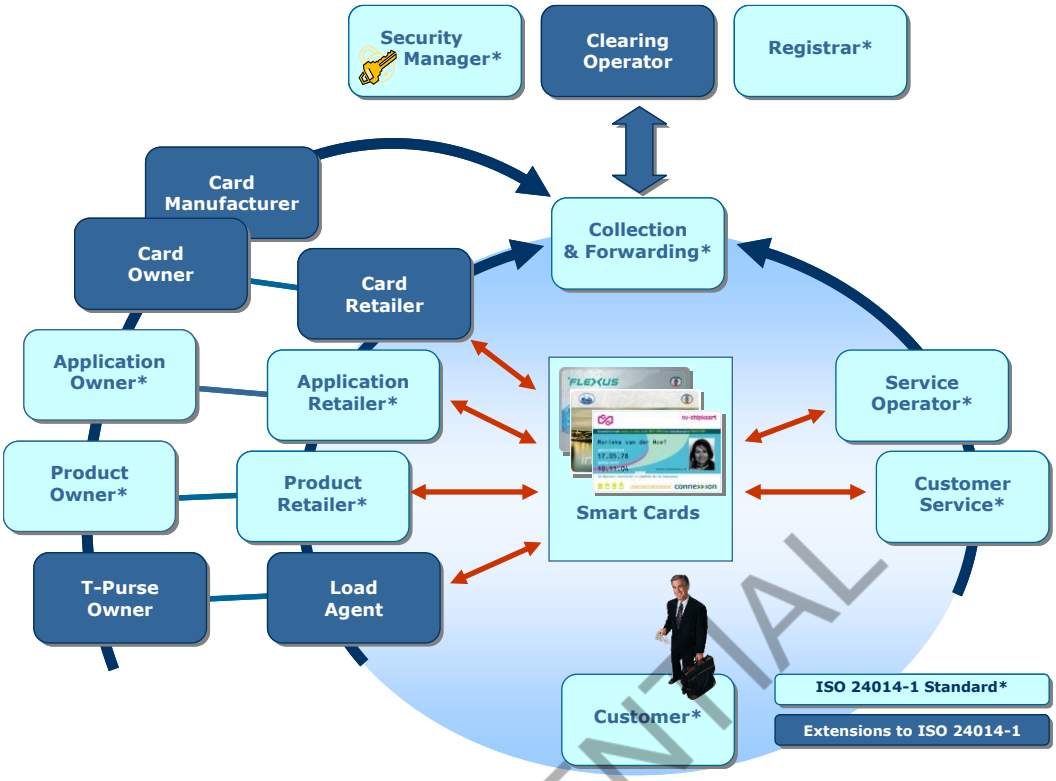

Figure 2 – Extensions brought to ISO 24014-1:2007 STANDARD

The table below defines briefly these additional roles.

Entity	Role Definition
Medium/Card Owner	Entity, which holds the Contract for the use of the Medium with the customer. This entity is responsible for the definition of graphical and electrical layouts, the sales channels (card retailers), the card blacklisting, the card refunding and replacement, the card procurement and personalisation…
Medium/Card Manufacturer	Entity, which is responsible for executing procurement, branding, graphic personalisation and electrical initialisation of media on behalf of the Card Owner.
Medium/Card Retailer	Entity, which sells and terminates media, collects and refunds value to a customer as authorised by a Medium Owner. This entity is the only financial interface between the customer and the IFMS related to media.
T-Purse Owner	Entity which is responsible for the T-Purse Product including functions of ownership (e.g. usage and commercial rules), functions of clearing and functions of reporting.
Load Agent	Entity, which is responsible for reloading the T-Purse in the Transport Application, and for collecting the payment from the Customer
Float Manager	Entity, which keeps track of all transactions related to the float including bad transactions, ensures the liquidity and solvability of the float, and calculates and allocates the interest of the float and the unclaimed float.
Clearing Operator	Entity, which clears, apportions and settles transactions related to Products including T-Purses according to business rules defined by the Product Owners and T-Purse Owner.

Table 2 – Additional Business Roles

1.4 ALLOCATION OF BUSINESS MODEL ROLES IN THE CAIRO METRO INTEROPERATBILITY SCHEME

The roles defined in the ISO 24014-1:2007 IFM model as well as the additional roles related to the card and financial activities must be allocated to the Business Entities that are involved in the interoperability scheme.

In the existing business model, limited to the metro, ECM plays all roles. This is illustrated in the table below.

		ECM
	Security Manager	X
	Registrar	X
	Collection and Forwarding	X
	Service Operator	X
Medium (CSC)	Medium/Card Owner	X
	Medium/Card Retailer	X
Transport Application	Application Owner	X
	Application Retailer	X
	Product Owner (transport)	X
	Product Retailer (transport)	X
	T-Purse Owner	X
	Load Agent	X
Financial	Float Manager	X
	Clearing Operator	X
Customer	Customer Profile Owner	X
	Customer Profile Retailer	X
	Customer Service	X

Table 3 – Allocation of business roles to business entities

The Interoperability Scheme can be extended to new business entities, e.g. ENR, that would like to join the Interoperability Scheme later on. To that extent, the business model is open to PPP concept.

See Thales presentation 'Introduction to interoperability, November 2016' for a view on the potential models.

The Interoperability Scheme can manage several Card Owners:

- A Card belongs to only one Business Entity acting as Card Owner.
- A Card includes only one Stored Value under T-Purse Owner's responsibility – Usually the T-Purse Owner is the Business Entity which is also acting as Card Owner
- There is only one Application Owner in Cairo Metro Project.

The following table illustrates a candidate allocation of roles in case of other parties would join the scheme in the future. Is this candidate model, the following business players are suggested:

- NAT as central Authority (scheme owner)
- ECM as metro operator
- LRT as tram operator

		NAT (scheme owner)	ECM (metro operator)	LRT (tram operator)
	Security Manager	X		
	Registrar	X		
	Collection and Forwarding	X		
	Service Operator		X	X
Medium (CSC)	Medium/Card Owner	X		
	Medium/Card Retailer		X	X
Transport Application	Application Owner	X		
	Application Retailer		X	X
	Product Owner (transport)	Interoperable products	Metro products	LRT products
	Product Retailer (transport)		X	X
	T-Purse Owner	X		
	Load Agent		X	X
Financial	Float Manager	X		
	Clearing Operator	X		
Customer	Customer Profile Owner	X		
	Customer Profile Retailer		X	X

		NAT (scheme owner)	ECM (metro operator)	LRT (tram operator)
	Customer Service	Back-office	Front-office	Front-office

Table 4 – Candidate allocation of business roles (future)

1.5 TERMS & DEFINITIONS

Please refer to section 5 Appendix A – Terms and Definitions for further information about terms and definitions used to describe the applicable business model in the following sections.

2. FRAMEWORK FOR EGYPTIAN COMPANY FOR METRO (ECM)

2.1 CARD MANAGEMENT & LIFECYCLE

2.1.1 Card Management

The requirements for structuring the card are based on the customers' needs, in order of importance:

- Transaction speed;
- A maximum of 8 product instances according to card data layout capacity;
- Selection of the contract in the list should be possible.

Card related transport personal data (laid on card: profiles, etc.) must be stored in the Card Master Record. Customer related transport data (name, address, etc.) must be stored in the Customers' database;

It is possible to put more than one application on a card. This is supported by the card structure and especially the management of an Application Directory. The Ticketing System is currently managing the Cairo e-ticketing application, 818000. This is detailed in the Fare Media Electrical Data Layout Specifications reference 4020-19806.

The transportation application is designed to manage different transport modes an allow interoperability. Especially the transportation application includes fields that record the identity of the company (i.e. service Provider) that loads or uses the card and the transport mode on which the card is used. Such information is reflected in the transactions recorded by the equipment.

Additional facilities will be supplied for some specific card holders (e.g. for intervention cards (so-called agent badges) used by agents to log on Level-1 equipment for maintenance or operation).

2.1.2 Card Lifecycle

Card Manufacturing

- Cards will be branded (graohically personalized) by the Card Manufacturer upon request of the Card Owner. The brand will be defined by the Card Owner (acting as Brand Owner).
- The cards are delivered to the Card Owner.

Application Initialisation(s)

- The card will be electrically initialised at the Application Owner (using the Card Initialization Machine, CIS).
- After the card has been initialised, it is ready for sale by the Card Retailer.

Sale

- For Cards (both personalized and anonymous), a Deposit can be asked by the Card Retailer.
- The Card Owner (acting as a T-Purse Owner) carries the risk of the negative balance on the card and then defines the Deposit and the Minimum Negative Value the Card Retailer will set on the card;
- Deposit value is apportioned according to Card Owner (as T-Purse Owner) business rules;

- The boundaries for a minimum negative value and maximum positive value on the T-Purse of the Card will be set by the Card Owner (acting as a T-Purse Owner), depending on legal requirements in force in Egypt;
- If the Service Operator has a ticketing system that operates in Ci/Co mode (Check-in / Check-out):
  - The Service Operator should decide on the value of the Initial Fee, if any;
  - When the Initial Fee that has to be deducted drops below the Minimum Negative Value, the extra fee that would be deducted below the Minimum Negative Value will not be deducted from the card and it will be the risk for the Service Operator (as he will not receive the full fare) to open the gate or not;
- If the Service Operator has a ticketing system that operates in Ci only mode (i.e. no check-out validation is performed), the initial fee will go to the Service Operator that has deducted this Initial Fee at "Ci";
- When the T-Purse value drops below the Minimum Operation Value (please see §3.2.3), entry into the System is not allowed anymore. The T-Purse should be reloaded.

Tracking

- All transactions for the Cards are collected by the Card Owner which is in charge of maintaining an image of the data stored on any card in circulation in order to provide information to Customers and to rebuild a new card in case of loss or steal.

Card Blacklisting & Blocking

- The Card Owner is allowed to blacklist a card when it is lost or stolen.
- The Card Owner is allowed to remove a card from card blacklist when it has been blocked. After its expiration date, the card is automatically stripped out of the card blacklist.
- When the card blocking facility is not managed by the card, the card is considered as blocked when all hosted Applications are blocked.
- Any device in the ticketing system that encounters a blacklisted card and has the capability to block it shall block it (or at least all Applications it can block).
- Service Operator, Card Retailer, Load Agent are responsible to retrieve the Card blacklist from Card Owner.

Refund and Removal (these 2 operations cannot be performed separately)

- A Card can be refunded if, and only if, all Applications have been emptied, refunded and removed. In particular, all Products in the Transport Application must have been refunded if relevant and removed.
- Standard refund for all cards: card fee is lost, but card deposit is refunded. See ticketing rules document for detailed refund rules
- Cards that are to be removed from the system (lost cards) will be put in the card blacklist until their expiry.

Card reconstruction or exchange

- A card can be rebuilt at its expiration date or if it is defective or lost.
- Its content is rebuilt using the card image maintained in the card database managed by the Card Owner.

2.2 MAGNETIC TICKET MANAGEMENT & LIFECYCLE

Note that the Magnetic Ticket is a bundle of a Medium, a Transport Application and a Product, with the noticeable characteristic that they are tightly linked. As a consequence, its management merges Medium, Transport Application and Product managements, and its lifecycle synchronises Medium, Transport Application and Product lifecycles.

2.2.1 Magnetic Ticket Management

The Magnetic Fare Product (Transport Product Rules) is defined as all other Fare Products used in Contactless Smart Cards. Please refer to section 2.6 for further details about transport product management and lifecycle.

Magnetic Ticket transactions differ from Contactless Smart Cards transactions but are collected and processed at the various levels of the system architecture.

2.2.2 Magnetic Ticket Lifecycle

Medium Initialisation

- Media will be branded and personalized by the Medium Manufacturer triggered by the Medium Owner. The brand will be defined by the Medium Owner (as Brand Owner). No magnetic stripe initialisation is required.

Application Initialisation(s)

- No magnetic stripe initialisation is required.

Transport Product Initialisation(s)

- The Transport Product is initialised when sold by the Product Retailer according to the Product Template.

Usage

- The Transport Product is used during the validation (Check-in and Check-out processes). It may be read for information or inspection.

Tracking

- Magnetic Tickets are not tracked.
- Note: the MT check-in/check-out transactions processing at the CBO is described in the system SSS use case TR-01. The MT transactions are received and stored especially for Business Intelligence processing.

Blacklisting & Blocking

- Magnetic Tickets are neither blacklisted nor blocked.

Refund and Removal: there is no refund of magnetic ticket.

Ticket reconstruction or exchange

- Magnetic Tickets are not rebuilt.
- In case of malfunction the magnetic ticket can be exchanged.

2.3 TRANSPORT APPLICATION MANAGEMENT & LIFECYCLE

2.3.1 Transport Application Management

Application management is the responsibility of the Application Owner;

2.3.2 Transport Application Rules (Application Template) Lifecycle

Transport Application definition (or creation)

- The Transport Application Owner defines the Transport Application Specification with the applicable set of rules (Application Rules) then asks Medium Owners for approval. Some restrictions may be defined during the negociations.
- The Transport Application Owner defines the Application Templates for all media selected to host the Transport Application.
- The Transport Application Owner deals with Business Entities such as Transport Application Retailers (for application sale) and Service Operators (for application use). Some restrictions may be defined during the negociations.
- The Transport Application Owner asks the Registrar to register its Transport Application Rules, Specification and Templates.

Transport Application activation

- The Transport Application Owner defines:
  - The date and time after which Transport Applications may be sold;
  - The date and time after which Transport Applications may be used.
- These dates are chronologically successive or equal.

Transport Application deactivation

- The Transport Application Owner defines:
  - The date and time after which Transport Applications may not be sold anymore;
  - The date and time after which Transport Applications may not be used anymore;
  - The date and time after which Transport Applications may not be refunded anymore.
- These dates are chronologically successive or equal.

Transport Application removal

- The Transport Application Rules are never removed (persistence of transactions). However, data and software managing Transport Application Templates after expiration of sale (production devices), usage (not refunding front-end devices) or refund (refunding front-end devices) may be removed from corresponding front-end devices.

2.3.3 Transport Application (Application Instance) Lifecycle

Transport Application Initialisation

- The Application Owner will initialise the Media (e.g. cards) with duly registered Applications, e.g. Transport Applications. This is done at the Card Initialization System (CIS).
- There is only one common Transport Application on each Medium.

- Other functionalities like access control will be placed on a separate application.

Transport Application sale

- The Application Retailer sells the Transport Application. This is combined with the card sale (i.e. the card is sold together with the pre-loaded Transport Application).

Transport Application Tracking

- The Transport Application tracking is merged with the Card tracking: there is a single Transport Application on the card managed by the system, hence the tracking is combined.

Transport Application Blacklisting & Blocking

- The Transport Application blacklisting is merged with the Card blacklisting: there is a single Transport Application on the card managed by the system, hence card blacklisting is combined with Transport Application blacklisting.
- The Transport Application Owner and Retailers are allowed to blacklist a Transport Application when a fraudulent behaviour is established. The Transport Application may be unblocked later, after regularisation, according to Business Rules.
- The Transport Application Owner is allowed to remove a Transport Application from Application blacklist when it has been blocked. Regularisation shall not occur before blocking, but the sequence blocking–regularisation–unblocking can be done at once. After its expiration date, the Transport Application is automatically stripped out of the Application blacklist.
- Any device in the ticketing system that encounters a blacklisted Transport Application and has the capability to block it shall block it.

Transport Application Refund and Removal (these 2 operations cannot be performed separately).

- The Transport Application can be refunded if, and only if, all Products, including the T-Purse, have been refunded and then removed.
- Standard refund for all Transport Applications: Application fee is lost, but Application deposit is refunded.
- Applications that are to be removed from the system (Application still active on lost or stolen media) will be put in the Application blacklist until its expiry.

Transport Application reconstruction

- The Transport Application is rebuilt when the hosting medium is rebuilt.
- Its whole content is rebuilt from medium database (e.g. Card Database) which includes the Transport Application data.

2.4 CUSTOMER PROFILE MANAGEMENT & LIFECYCLE

Note that the Customer Profile is defined as mandatory by the Application Specifications. As a consequence, Customer Profile Owner Role should be delegated to the same Business Entity as the Transport Application Owner Role.

However, this does not mean that Customer Profile Retailers are Application Retailers and vice-versa.

2.4.1 Customer Profile (Product) Management

Customer Profile management is under the responsibility of the Customer Profile Owner.

Customer Profile changes are carried by the Product Retailers.

Customer Profile is used by Product Retailers for sales (concessions, language) and by Service Operators (concessions, language).

2.4.2 Customer Profile Rules Lifecycle

Customer Profile is a mandatory Product of the Transport Application. Therefore, its Product Rules are defined with the Transport Application Rules.

2.4.3 Customer Profile Lifecycle

Customer Profile initialisation

- Customer Profile is a mandatory Product of the Transport Application. Therefore, its initialisation is synchronized with the Transport Application initialisation.

Customer Profile Tracking

- The Customer Profile change tracking is merged with the Card tracking.

Customer Profile Blacklisting & Blocking

- Customer Profile cannot be blacklisted nor blocked.

Customer Profile Refund and Removal (these 2 operations cannot be performed separately)

- Customer Profile is a mandatory Product of the Transport Application. Therefore, its refund and removal is synchronized with the Transport Application refund and removal.

Customer Profile reconstruction

- The Customer Profile is rebuilt when the hosting Transport Application and card are rebuilt.

2.5 TRANSPORT PAYMENT PRODUCT (T-PURSE) MANAGEMENT & LIFECYCLE

Note that the payment Product (T-Purse) is defined as mandatory by the Application Specifications. As a consequence, T-Purse Owner Role should be allocated to the same Business Entity as the Transport Application Owner Role.

However, this does not mean that T-Purse Retailers (Load Agents) are Application Retailers and vice-versa.

2.5.1 Transport Payment Product (T-Purse) Management

T-Purse management is under the responsibility of the T-Purse Owner;

T-Purse reloads (credits) are carried by Load Agents (Product Retailers) and Service Operators (in case of autoloads);

T-Purse debits are carried by Load Agents (Product Retailers) and Service Operators;

T-Purse credits and debits are cleared, apportioned and settled by the Clearing Operator (as T-Purse Clearer).

2.5.2 Transport Payment Product (T-Purse) Rules Lifecycle

T-Purse is a mandatory Product of the Transport Application. Therefore, its Product Rules are defined with the Transport Application Rules.

2.5.3 Transport Payment Product (T-Purse) Lifecycle

T-Purse initialisation

- T-Purse is a mandatory Product of the Transport Application. Therefore, its initialisation is synchronized with the Transport Application initialisation.

T-Purse Tracking

- The T-Purse tracking is merged with the Card tracking.

T-Purse Blacklisting & Blocking

- The T-Purse blacklisting is merged with the Card blacklisting: this is synchronized with application blacklisting.
- The T-Purse Owner and Retailers are allowed to blacklist a T-Purse when a defective payment occurs; The T-Purse may be unblocked later, after regularisation, according to Business Rules.
- The T-Purse Owner is allowed to remove a T-Purse identifier from T-Purse blacklist when it has been blocked; Regularisation shall not occur before blocking, but the sequence blocking–regularisation–unblocking can be done at once; After its expiration date, T-Purse is automatically stripped out of T-Purse blacklist;
- Any device in the ticketing system that encounters a blacklisted T-Purse and has the capability to block it shall block it.

T-Purse Refund and Removal (these 2 operations cannot be performed separately)

- T-Purse is a mandatory Product of the Transport Application. Therefore, its refund and removal is synchronized with the Transport Application refund and removal.
- Standard refund for all Products: Product fee is lost, but Product deposit is refunded;

T-Purse Reconstruction

- The T-Purse is rebuilt when the hosting Transport Application and the medium are rebuilt.
- Its whole content is rebuilt from medium database (e.g. Card Database) which includes the Transport Application data.

2.6 TRANSPORT PRODUCT MANAGEMENT & LIFECYCLE

2.6.1 Transport Product Management

Transport Product management is under the responsibility of its Product Owner, which is usually a PTO. The Product Owner delegates the product sales activities to Product Retailers.

Transport Product Initialisation is carried out at sale time by any allowed Product Retailer for this Product.

Transport Product sales and reloads are carried by allowed Product Retailers;

Transport Product usage is carried by Service Operators.

Transport Product sales, reloads and usage are cleared, apportioned and settled by the Clearing Operator (as Product Clearer).

2.6.2 Transport Product Rules (Product Template) Lifecycle

Product Template definition (or creation)

- The Product Owner defines the Product Specification with the wished set of rules (Product Rules) then asks the Transport Application Owner for approval. Some restrictions may be defined during the negociations.
- The Product Owner defines the Product Templates for all or part of card platforms where the Transport Application has an Application Template, then asks the Transport Application Owner for (technical) approval;
- The Product Owner deals with Business Entities such as Product Retailers (for product sale) and Service Operators (for product use). Some restrictions may be defined during the negociations.
- The Product Owner asks the Transport Application Registrar to register its Fare Products and Product Templates.

Product Template activation

- The Product Owner defines:
  - The date and time after which Products may be sold;
  - The date and time after which Products may be used.
- These dates are chronologically successive or equal.

Product Template deactivation

- The Product Owner defines:
  - The date and time after which Products may not be sold anymore;
  - The date and time after which Products may not be used anymore;
  - The date and time after which Products may not be refunded anymore.
- These dates are chronologically successive or equal.

Product Template removal

- The Product is never removed (persistence of transactions). However, data describing this Product after expiration of sale (sale-only devices), usage (validation devices) or refund (sale-and-refund devices) may be removed.

A new Product Template may be defined with the same set of rules and the same specifications as an existing Fare Product.

An implicit product template (usually linked to the T-Purse) shall be defined by all Service Operators. .

2.6.3 Transport Product (Product Instance) Lifecycle

The Product Instance is a proof of entitlement to use the Public Transport for the Customer.

Product Instance initialisation

- The Product is initialised when sold by its Product Retailer into the Transport Application, according to its Product Template. Some restrictions may apply, such as a short list of media types (anonymous, personalised ...), device types, locations…

Product Instance usage

- The Product is used during the validation (Check-in and Check-out processes). It may be partly or fully read during validation or on-board inspection.

Product Instance Tracking

- The Product Owner is in charge to track its related Product Instances.

Product Instance Blacklisting & Blocking

- The Product Rules define the blacklisting policy, in particular who is allowed to insert a Product into, or remove it from, blacklist, and when.
- According to that policy, the Product Owner and Retailers are allowed to blacklist a Product when a defective payment or a fraudulent usage occurs. The Product may be unblocked later, after regularisation.
- According to that policy, the Product Owner is allowed to remove a Product from Product blacklist when it has been blocked. Regularisation shall not occur before blocking, but the sequence blocking–regularisation–unblocking can be done at once. After its expiration date, the Product is automatically stripped out of Product blacklist.
- The Product blacklist management (aggregation and broadcast) is under the Product Owner responsibility.
- Any device in the ticketing system that encounters a blacklisted Product and has the capability to block it shall block it.
- The implicit Product is not hosted into the Transport Application, and thus has no identifier that allows it to be blacklisted. This Product should not be blocked, but the relevant resource, i.e. T-Purse (in case of default of payment) or the Transport Application (in case of fraudulency).
- In the EMC framework, the product blacklisting is managed via the blacklisting of the entire application (fraud case).

Product Transactions Clearing and Apportionment (supplied by a PTO organisation)

- The transactions resulting from product sale and usage will be apportioned according to a predetermined formula;
- When the system is up and running, the transaction value apportionment can be manually adjusted based on usage transactions statistics reports to be provided by the Clearing Operator (as Product Clearer);

- The usage transaction information with details on journey fare and origin/destination journeys should be sent up to Clearing Operator (as Product Clearer) and the related settlement reports can be produced;
- The usage transaction information is also used for fraud detection and missing transactions processing.

Product Instance Refund and Removal

- The refund policy of Products is under the responsibility of the Product Owner, and is part of Product Rules;
- The Product Owner authorizes any Product Retailer to remove Products from the Transport Applications based on the refund policy; In particular, when a new Product is sold, an old Product expired with no residual value (i.e. refund = zero) may be recycled.
- Product refund is cleared and apportioned by the Clearing Operator (as Product Clearer).

3. FARE MEDIA CHARACTERISTICS & RELATED PROCESSES

For Egyptian Company for Metro (ECM), two types of media are introduced:

- Smart Cards: personalized (with photo or not) and anonymous
- Magnetic Tickets.

		Magnetic Tickets	Card Types	
			Personalized	Anonymous
Card Processes	Procure Media	Ticket Roll Manufacturer	Card Manufacturer	Card Manufacturer
	Initialise Media	N/A	Card Owner	Card Owner
	Personalise Media	N/A	Card Retailer: CIPS	N/A
	Sell Media	Medium Retailer + Application Retailer + Product Retailer: TOM	Card Retailer: CIPS	Card Retailer: TOM
	Distribute Media	N/A	mailed to customer, or delivered at CIPS	N/A
	Register Lost Media	N/A	Card Owner	Card Owner
	Manage Float (T-Purse)	N/A	Card Owner	Card Owner
	Replace/Exchange Media	Customer Service	Customer Service	Customer Service
	Change User Preferences	N/A	Product Retailer, CIPS	No
	Blacklist	N/A	Card Owner	Card Owner
	Block Medium, Application	N/A	Retailers and Service Operators	Retailers and Service Operators
	Un-Block Medium, Application or Product	N/A	Retailers	Retailers
	Refund Media	No	Card Retailer	Card Retailer
	Recycle Media	No	No	No

Table 5 – Fare Media related Processes

3.1 GENERAL CHARACTERISTICS

The **Contactless Smart Card** (e.g. DESFire 4K) offers a solution for regular travellers.

It can support both Personalised and Anonymous Cards.

It can contain several tickets (e.g. up to 8 transport product instances). It contains always a T-purse which can be reloaded with money.

The **Magnetic Ticket** offers a solution to occasional travellers. It contains only one ticket.

3.2 CARD ISSUANCE

3.2.1 Card Procurement

The Card Owner will initiate card procurement orders.

The Card Owner (Brand Owner) will place orders to the Card Manufacturer.

3.2.2 Delivery of Cards (Anonymous or Personalised)

The Card Manufacturer will deliver the anonymous cards to a central store managed by the Card Owner;

The Card Retailers will take care of the distribution of the anonymous cards to all the retail locations;

The Card Manufacturer (acting as Card Owner) may also send personalized cards directly to the customers by mail or to front offices (TOM) where the card will be delivered to the customer.

3.2.3 Card Retailing

Anonymous cards may be sold at TOM.

When applying for a personalized card, a new customer must fill in a registration form personally at TOM, for identification purpose.

A customer can also send a registration form for a personalized card directly to the back office, which may forward the card request to the Card Manufacturer.

During Card Sale operation, a customer has to pay for:

A Deposit value (that is given back when the card is refunded):

- Deposit values is apportioned according to Card Owner business rules;
- Deposit is a configuration parameter.

In order to use his medium in the ticketing system, the customer has to load an initial value into the T-Purse or to purchase a pre-paid product (e.g. a single ride, a season pass).

Minimum operation value: The T-Purse can not be used when the remaining value is strictly below zero;

Minimum negative value: The T-Purse can not be used if remaining value would fall under this threshold.

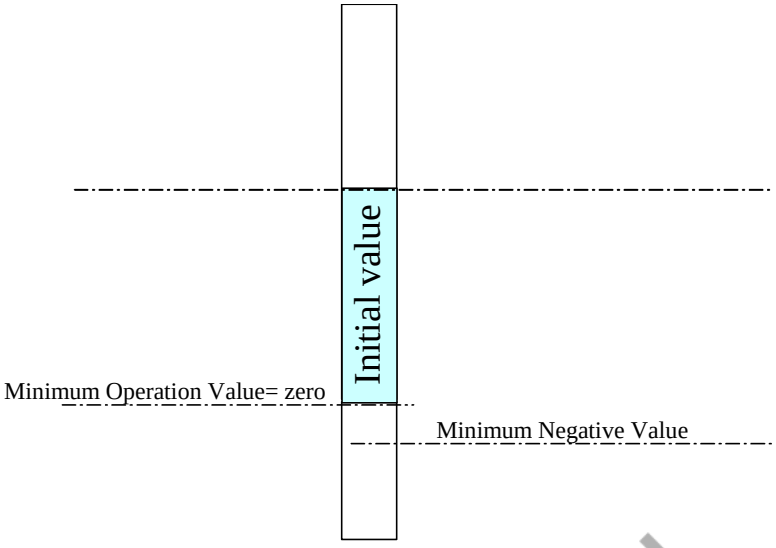

Figure 3 – Value of the T-Purse

3.3 T-PURSE MANAGEMENT

3.3.1 T-Purse Add value

The T-Purse can be reloaded via the TOM/CIPS. A minimum value and a maximum value are defined by the T-Purse owner for loading operation.

3.3.2 T-Purse Clearing

The clearing process of the T-Purse is based on actual usage and is done by the Clearing Operator.

3.4 CUSTOMER SERVICES

3.4.1 Declaration of card loss or steal

Personalised Cards will be reported as lost or stolen through the call centre or the website (if available at CCU level) or via Card Retailers' desks (e.g. TOM agents).

The lost or stolen Card will be blacklisted.

3.4.2 Card Replacement

The lost or stolen Card will be replaced by using the Card Master Record (card image) managed by the Card Owner.

Upon replacement, old cards can be captured by the Card Retailers and returned to the central store for destruction. A new card containing the same data as the previous one can be issued and delivered to the Customer.

3.4.3 Customer Data Management

Registration data can be split in:

- Nominative registration data (Customer Profile, Customer_Id…) stored by the Card Owner (as Card Owner).
- Anonymous registration data relative to the card (Card_Id) stored in the Card Master Record file at central level. These data do not contain personnel details.

Association file which links Customer_Id and Card_Id. These data are stored by the Card Owner (as Card Owner) and their access is restricted.

When a personalized card that has been issued requires replacement, a Card Retailer will reissue a new card on behalf of the Card Owner.

Card personalization will include holder profiles (e.g. student, elderly, child, etc.).

Holder profiles will not be made visual on the card, except when the card is being used as a staff card or maintenance card.

Card preference regarding the preferred language could be added to the personalisation.

3.4.4 Customer Profile Management

Customer Profile is a Mandatory Product of the Transport Application that is a Collection of data that characterises the Customer:

The table below lists all types of Customer statuses used in the ticketing system.

Status type	Status name	Description
Age based		
	Adult	EN1545-1:2005 – ProfileCodeIOP = adult(1)
	child	EN1545-1:2005 – ProfileCodeIOP = child(2)
Profession based		
	student	EN1545-1:2005 – ProfileCodeIOP = student (3)
	pensioner	EN1545-1:2005 – ProfileCodeIOP = pensioner (4)
	military	EN1545-1:2005 – ProfileCodeIOP = military (10)
	gov. & public staff	72
	ECM staff	EN1545-1:2005 – ProfileCodeIOP = staff (9)
	ENR staff	EN1545-1:2005 – ProfileCodeIOP = longDistanceTransport (14)
	Police	EN1545-1:2005 – ProfileCodeIOP = police (21)
	Family	73
	EMC worker wife	74
	ECM worker child	75
	Gold agent	76
Physical Characteristics based		
	disabled	EN1545-1:2005 – ProfileCodeIOP = disabledNotfurtherspecified (5)

Table 6 – Customer statuses used in the Ticketing system

Those profiles are used to determine the associated concessionary fare or to filter Products attached to particular profiles.

Each of these profiles is associated to a Concessionary fare level defining the percentage of reduction from the normal adult price

3.4.5 Card Refund

Concerning the Card refund policy, please refer to §2.1.2 for further details about refund rules. Card deposit can be refunded or not according to refund policy.

Direct refund of the value on the T-Purse is always possible at the TOM or CIPS;

3.4.6 Card Un-Blocking

A blacklisted Card can be blocked by a front-end device. When the Card is blocked, it can be unblocked by the Retailers.

This operation can only be done at TOM or CIPS;

Card unblocking is done on conditions defined by the Card Owner;

It provides a changing of card status (blocked to unblocked) to allow the usage of the Card.

4. PRODUCT CHARACTERISTICS & RELATED PROCESSES

Please see definition §Appendix A – Terms and Definitions

Inside the ticketing system, each Product Instance is managed and registered individually.

4.1 COMMON SPECIFICATION

For AFC Systems, commonly used products are predefined in the Fare Parameters Database.

Their main characteristics are summarised in the following table. The objective is to identify per product and per process the applicable business rules.

Table 4-1 — Product Summary — Pre-Specified Products

Product type			Period Pass		Single-ride	Multi-ride	Supplement
			Fixed	Sliding			
Product names			e.g 1 Month Pass	e.g. Daily Ticket	e.g. Single Ticket	e.g. Return Ticket Book of Ten Tickets	e.g. bicycle, ligguage
Interoperable			limited to metro	limited to metro	limited to metro	limited to metro	limited to metro
Product Owner			ECM	ECM	ECM	ECM	ECM
Medium type	Magnetic Ticket		Yes	No	Yes	No	No
	Personalized Card		Yes	Yes	Yes	Yes	Yes
	Anonymous Card		No	Yes	Yes	Yes	Yes
Validity	Geographical	Fixed at sale or while travelling	Fixed at sale	Fixed at sale	While Travelling	While Travelling	N/A
		Area	Zones, O/D, Flat	Zones, O/D, Flat	Floating zones	Floating zones	N/A
		Line restriction	Yes (authorised lines)	Yes (authorised lines)	No	No	N/A
	Temporal	Sliding	No	Yes	Yes	Yes	N/A
		Period duration	Day, month, year	Day, month	Journey duration s	Journey duration	One day
		Calendar & Time Tables	Yes	Yes	No	No	No
Fare	Discount or Concession Levels		Based on Customer's Profile	Based on Customer's Profile	Based on Customer's Profile	Based on Customer's Profile	Based on Customer's Profile (% of full fare)
	Fare Method		Zone, O/D, Flat	Zone, O/D, Flat	Floating	Floating	Flat fare
Goup facilities			Yes	Yes	Yes	No	No

Table 4-2 — Product Summary — Specified-While-Travelling Products

Product type	Implicit (*Easy-Trip*)
Product names	Easy Trip Ticket

Interoperable			Yes
Product Owner			ECM
Medium type	Magnetic Ticket		No
	Personalized Card		Yes
	Anonymous Card		Yes
Validity	Geographical	Area	Anywhere
	Temporal	Period duration	Anytime
Fare	Discount or Concession Levels		Based on Customer's Profile that grants discounts (% of full fare) to Customers
	Amount Basis		O/D

Table 4-3 — Product Summary — Application related Products

Product type			T-Purse (payment)	Customer Profile
Product names			T-Purse	Profile
Interoperable			Yes	Yes
Produc Owner			ECM	ECM
Medium type	Magnetic Ticket		No	No
	Personalized Card		5→10 EGP reloads	Yes, please read Fare
	Anonymous Card		5→10 EGP reloads	N/A
Validity	Geographical	Area	Anywhere	Anywhere
	Temporal	Period duration	Anytime	Anytime
Fare	Discount or Concession Levels		N/A	Profile grants discounts to Customers
	Amount Basis		Mandatory CSC Product.	Mandatory CSC Product.

Note that Product Codes are defined in 0052091149100ES00_Titles Manual_Ver01 page 8 §2.3.1.

4.1.1 Product categories

4.1.1.1 Pre-Specified Products

Pre-Specified Products are paid entirely during sale and they are not requiring fare computation for each trip (so-called pre-paid products).

Check-In process checks if a Product is valid at this point (e.g. station or stop point) and this time, and blocks entry if none. No Transfer Check-In. If the Product is defined with a floating geographical validity, the Check-In point is recorded as the starting point of the travel. If the Product is defined with a sliding temporal validity, the Check-In date/time is recorded as the start date/time.

Check-Out process checks if a Product is currently in use and valid at this point and this time, and blocks exit if none.

Supplements are fare products that concern all additional services that a Customer may purchase. A Supplement may concern a luggage, a dog, a bicycle. A Supplement never allows a person to travel, i.e. it shall be never considered as a Right To Travel.

4.1.1.2 Specified While Travelling Product

Specified While Travelling Products are the Products the fare of which are calculated and deducted during “Check-out” from the T-Purse according the entry/exit locations (so-called post-debit products).

The so-called Easy-Trip Product is the only product in this category: It is an implicit Transport Product linked to T-Purse. Thus:

- It is never sold.
- It is never blacklisted
- Its usage is directly linked to T-Purse activation, blocking status and balance.

4.1.1.3 T-Purse Product (payment)

T-Purse (so-called Stored Value) is a mandatory Product of Transport Application. It is never sold.

However, it can be:

- Activated – fee and deposit to be defined
- Blocked when card is surrended

4.1.1.4 Customer Profile Product

Customer Profile is a mandatory Product of Transport Application. It is never sold.

However, it can be modified:

- Status (cf. 3.4.4 “Customer Profile” au-dessus), inserted – fee to be defined;
- Preference (preferred language) – fee to be defined.

4.1.2 Profile & Personalisation

Customer Profile on a Personalised Card is used to automatically grant discounts (concession) on Products.

Customer Profile on a personalised Card hosts a preferred language which can be “ara” (Arabic) or “eng” (English). It is used by front-end devices to display information in the appropriate language on Customer’s displays.

Magnetic Tickets have no Customer Profile. Thus “ara” (Arabic) is the default language.

4.1.3 Fare Calculation

The fare calculation depends on the product, the concession level, the entry/exit locations and the fare method. The following sections present an overview of the fare methods.

4.1.3.1 Fixed zones

Each station is positioned in a given zone. The fare calculation is based on these zones.

This leads to the following fare methods.

Fixed zone (Center / radius)

This fare method applies to Period passes

Validity Space is given by a centre C, and a radius R.

The center C is a Zone number. The radius R is a number of zones.

The Customer is allowed to travel between any origin O and any destination D so that segments OC and CD do not exceed the radius R (number of zones) authorised for the selected product.

The fare is based on the value of R.

O/D zone

This fare method applies to Period passes and Easy Trip.

For Passes, the validity is given by an origin zone O and a destination zone D.

The fare is based on the number of zones between zone O and the zone D.

4.1.3.2 Floating zones

The fare is calculated based on a number of stations. This number of stations is then converted into a discrete fare called floating zones: a number of stations give a number of zones that in turn gives a price. This is based on a floating zone matrix.

This leads to the following fare methods

Floating

This fare method applies to single ride and multi-rides.

The product is sold for a given number of floating zones (e.g. 3 zones tickets). The price is based on the number of zones.

At usage, the exit gate calculates the number of stations of the travel and checks that it complies with the number of zones of the product.

O/D Station

This fare method applies to Passes and Easy Trip.

For Passes, the validity is given by an origin station O and a destination station D.

The fare is based on the number of stations between O and D that is discretized in a number of floating zones.

4.1.4 Payment means

The payment means during Product sale depend on the retail location and configuration.

The payment means can be debit cards, credit cards, cash or T-Purse.

Only one payment means is used by operation.

4.1.5 Transport Mode Validity

The transport mode is configurable according to the card layout definition.

4.1.6 Geographical validity

Product validity is based on topology description.

In case of fixed zones, each station is linked to one geographical zone.

This topological description allows to define a geographical validity for products based on:

- **NB_Zones**: Depending on the selected fare structure, the origin and destination are either STATIONS (floating zones) OR ZONES (fixed zones).

  Note: this is applicable to single, multi-rides and easy trip products.

- **Centre/Radius**: The CENTRE is a ZONE (fixed zones) the RADIUS is a NUMBER OF ZONES

  Note: this is applicable to season passes.

This topological description also allows to define line restrictions for products, i.e. a product may be valid on only one metro line, or two lines or all lines.

4.1.7 Date validity

A product can be limited for use duration.

The following methods are available to manage calculation of end of validity:

- Fixed period (valid from sale date until product duration expires).
- Sliding period (valid from first validation date until defined product duration expires).

Validity duration of the product can be date to date or calendar based:

- 1 year date to date or calendar based,
- 1 month date to date or calendar based,
- 1 week date to date,
- 1 or several days date to date.

4.1.8 Journey Time validity

The total duration of a journey can be limited in time.

The maximum journey out duration is the maximum time between first check-in of the journey and last check-out allowed without extra charge.

If a check-out is made after maximum journey an additional journey fare is charged.

4.1.9 Calendar validity

Each Product can be associated to periods of the day (time slots) in which the product is valid and the tariff is applicable.

Each day can be split into several time slots indicating at which slice of time the product is valid or indicating which tariff to apply.

Price reduction based on time slots is also applicable to Easy trip.

4.1.10 Transfer rules

Transfer or interruption of travel is possible according the journey time validity.

4.1.11 Conflict rules at sale

To avoid any conflict during validation pocess in the choice of products, conflict rules are applied during product sale: no overlap in geographical and temporal validity.

4.1.12 Promotion for passengers using anonymous cards

In order to favor the adoption of contactless cards, a number of measures and policies could be put in place. This includes especially the following:

1. Reduce card price and deposit amount
2. Provide attractive tariffs when travelling on T-Purse (cheaper that magnetic tickets)
3. Develop marketing campaigns highlighting the convenience of contactless travels (security, touchless, time saving,)
4. Offer the possibility to load only a limited amount of money on the card in order to attract travelers who cannot afford pre-paying for a large number of travels
5. Have card dispensers at the TVMs in order to make the access to cards easy (no need to queue at the sales office)
6. Provide quick reload functions at the TVM (e.g. predefined amounts), to make card top-up easy.
7. Offer dynamic tariffs such as lower fare at off-peak period.
8. Implement low initial free so that penalty in case of missing validation is limited.

4.2 COMMON PROCESS ON EQUIPMENT

4.2.1 Card & Product Sales Process

At first time, sale of personalized cards is made:

- at CIPS upon customer's request (the customer shall register himself with the relevant information and document asked for the registration),

Products can be loaded on existing cards or on magnetic tickets at TOM or CIPS.

4.2.2 Product Renewal Process

A product can be renewed at the end of its validity period for a new period with same geographical characteristics;

The product can be renewed at TOM or CIPS;

This operation is only applicable to cards.

4.2.3 Product suspension Process

A product can be suspended during its validity period for a period defined by the customer. It becomes automatically valid at the end of this suspension period.

This is to be confirmed as a function provided by the web site.

4.2.4 Customer Information Process

Information can be provided to Customers upon request:

- Information about products contained in the Card or ticket (type, validity, sale date);
- Last transactions made with the product or T-Purse.

4.2.5 Validation Process

4.2.5.1 Automatic selection

When one and only one ticket applies for entry, this ticket is implicitly selected.

When no ticket applies for entry, Easy Trip based on T-Purse is implicitly selected.

The resolution of potential ticket conflicts takes place during the sales process.

4.2.5.2 Validation extension

This mechanism is only available if the Service Operator operates a ticketing system in CI / CO Mode (Check-in / Check-out):

If a Product is valid during a "CI" and if a "CO" is performed outside of its geographical validity, Easy Trip will be used to charge the extra travel based on extra-zones. Price of this extra-travel is deducted from T-Purse.

4.2.5.3 Multi validation

For a group product, the customer(s) is (are) requested to “multi”-validate at check-in and at check-out for each traveller of the group.

4.2.6 Refund Administration

For some pre-specified products, the customer can apply for and receive a refund.

4.2.7 Blacklisting Process

4.2.7.1 Blacklisting

Only the Application owner is able to insert and/or to remove an Application in Blacklist. The main reason to put an Application in a blacklist is a fraud or misuse.

Magnetic tickets cannot be blacklisted

4.2.7.2 Blocking / unblocking Process

When an Application is found in a blacklist, front-end devices (GATE, TOM and CIPS) block the Application on the card.

The Application can be unblocked only at TOM or CIPS after applying a checking process defined by the Application Owner.

4.2.8 Action List Process

A file containing items related to IFM Applications or Products is downloaded to devices. These items are only processed by Service Operators at Gate during a Check-in validation as a first operation. The items contained in the file are related to the following operations:

- Product sale
- Product renew
- T-purse reload
- Product suspension

Note: the management of action lists is linked to the use of the web site

4.2.9 Clearing Process

Clearing process is supplied by a Clearing Operator.

5. APPENDIX A – TERMS AND DEFINITIONS

Followings are ticketing terms with their definitions as they are used in this document. Beside these terms, specific names are used to describe the applicable business model in the following section.

Action List

ISO 24014-1:2007 – section 2 (Terms and definitions):

> List of items related to IFM Applications or Products, downloaded to Medium Access Devices (MADs), actioned by the MAD if and when a specific IFM Application or Product referenced in the list is encountered by that MAD.

Actor

ISO 24014-1:2007 – section 2 (Terms and definitions):

> User playing a consistent set of roles when interacting with the system within a particular Use Case
>
> NOTE: A user can, for instance, be a human, an Organisation or another (sub)system.

Application

ISO 24014-1:2007 – section 2 (Terms and definitions):

> Implemented and initialised Application Template on a Customer Medium.
>
> NOTE 1: The Application is identified by a unique identifier.
>
> NOTE 2: The Application houses Products and other optional Customer information (Customer details, Customerpreferences).

Application «Transport» is a shell that hosts, among others, transport Products and one interoperated transport-dedicated payment Product (T-Purse = Transport dedicated e-Purse).

“Application” is never used in this document as defined in ISO7816-4:2005 or in other standard, unless explicit reference.

Application Instance

A pleonasm that stands for “Application”

Application Owner

ISO 24014-1:2007 – section 5.1 (Description of Entities):

> The Application Owner holds the Application Contract for the use of the Application with the customer.

This entity:

- Defines the shell that will include the layout and initial value on a card (including the transport e-Purse).
- Is in charge to determine issuing channels (Application Retailers*).
- Is responsible for handling application blacklisting, application rebuilding. For this purpose, it manages the Application Master Record, which records for each application the product instance list.

The Application Owner delegates the electronic cash responsibility to the Card Owner (as e-Purse Owner).

(*) Application Retailer: cf. Card Retailer and Card Manufacturer for the Ticketing System.

Application Retailer

ISO 24014-1:2007 – section 5.1 (Description of Entities):

> The Application Retailer sells and terminates Applications, collects and refunds value to a customer as authorised by an Application Owner.
>
> The Application Retailer is the only financial interface between the customer and the IFMS related to Applications.

Application Rules

ISO 24014-1:2007 – section 2 (Terms and definitions):

> Application Owner requirements

Application Specification

ISO 24014-1:2007 – section 2 (Terms and definitions):

> Specification of functions, data elements and security scheme according to the Application Rules

Application Template

ISO 24014-1:2007 – section 2 (Terms and definitions):

> Technical master of the Application Specification for implementation

Brand

Brands (visual design and logos) are printed on the Medium.

They flag visually some features associated to the Medium, allowing the holder to access to some services or locations. These features are usually associated to some Application inserted into the medium card or to some Product inside.

Brand Owner

The Entity that owns the Brand

Business Entity

Synonym for “Legal Entity” – See “Entity”

Business Rules

The set of rules that includes all Commercial Rules and all Usage Rules

Card

Should be replaced with **Medium** (physical carrier of Applications)

Card Owner

As Medium Owner this entity:

- Defines the technical card layout in accordance to requirements of all application templates that could be loaded (building access control, public transportation) for a given card template.

- Verifies that the new requirements comply to this technical card layout.
- Is in charge to determine sale channels (Card Retailers) for its Card.
- Is responsible for handling card blacklisting.
- Is responsible for card refunding and card replacement through Card Retailers. For this purpose, it manages the Card Master Record, which records for each card the application list.

As Brand Owner (or on behalf him) this entity:

- Is responsible for procurement and Personalisation of the Cards and defining the PTO brand.

As T-Purse Owner this entity:

- Is responsible for handling T-Purse Autoload transactions. It is owner of the personal data required for Autoload.
- Defines apportionment, clearing and settlement rules related to the T-Purse. In particular, the float (unspent t-purse values).

Card Manufacturer/Producer

Entity responsible for executing procurement, branding, graphic personalisation and electrical initialisation of media on behalf of the Card Owner

As Application Retailer, it carries out the electrical initialisation process of whished Applications on the card on behalf of the related Application Owners.

Certificate

A public Key certificate is a digital link binding a public key (k_{ALICE}) to a system user (*Alice*). This digital certificate is established by a trusted authority called "Certificate Authority" who guarantees the truth of the certificate information's. For that, the Certificate Authority (*Trent*) signs a message (user distinguished name, public key (k_{TRENT})) with its private key (k'_{TRENT}). This particular message (according to X.509 standard –see Chapter §.4.5 is called "(public key) certificate".

Certificate Revocation List (CRL)

A certificate revocation list is a list of certificates that have been revoked before their scheduled expiry date. There are several reasons why a certificate might need to be revoked and placed on a CRL. For instance, the key specified in the certificate might have been compromised or the user specified in the certificate may no longer have authority to use the key.

Certification Authority (CA)

The Certificate Authority is the trusted centre of a Public Key Infrastructure (PKI) as it manages public key certificates for their whole life cycle. The CA will:

- Issue digital certificates by binding the identity of a user or system to a public key with a digital signature
- Schedule expiry dates for certificates
- Ensure certificates are revoked when necessary by publishing Certificate Revocation Lists (CRL).

In addition, the CA will:

- Manage Security Access Modules (Cryptographic Modules).

Check-in (Ci)

Validation when entering paid area.

Check-out (Co)

Validation when exiting from paid area.

Clearing Operator (CO) – Clearer

Entity that clears, apportions and settles transactions related to Products. "Clearing" stands usually for "apportionment, clearing and settlement".

When clearing a transport Product, the Clearing Operator is in charge of collecting, clearing, apportioning and settling Product transactions according to related Product Owners business rules.

When clearing the transport payment Product (namely the T-Purse), the Clearing Operator is in charge of collecting, clearing, apportioning and settling T-Purse transactions according to related T-Purse Owner business rules.

Collection and Forwarding

ISO 24014-1:2007 – section 5.1 (Description of Entities):

The role of Collection and Forwarding is the facilitation of data interchanges of the IFMS. The general functions are data collection and forwarding. They contain at least the following functions.

Functions of collecting:

- Receiving Application Template from Application Owner.
- Receiving Product Template from Product Owner.
- Receiving data from Service Operators.
- Receiving data from Product Retailer.
- Receiving data from Application Retailer.
- Receiving data from other Collection and Forwarding functions.
- Receiving security list data from Security Manager.
- Receiving clearing reports from Product Owner.
- Consistency and completeness check of the data collected on a technical level.
- Receiving the address list of all Entities in the IFM from the Registrar.

Functions of forwarding:

- Forwarding "Not On Us" data to other Collection and Forwarding functions.
- Recording "Not On Us" data.
- Forwarding data with a corrupt destination address to the Security Manager.
- Forwarding "On Us" data to the Product Owner for clearing and reporting.
- Forwarding clearing reports, Application Template, Product Template and security list data to the Product Retailer and Service Operator.

- Forwarding Application Templates and security list data to the Application Retailer and Service Operator.

NOTE The “ON US and NOT ON US” concept is as follows.

- A specific Collection and Forwarding function is to collect data from one IFM Entity and forward it to other IFM Entities.
- Logically there may be several COLLECTION AND FORWARDING functions within the IFM.
- IFM Entities may be linked to different COLLECTION AND FORWARDING functions, but each Entity can only be linked to one.
- The concept of “ON US and NOT ON US” addresses this connectivity functionality: Data held by a specific COLLECTION AND FORWARDING function is either “ON US” or “NOT ON US” data.
- Data collected by a specific COLLECTION AND FORWARDING function addressed to IFM Entities directly linked to this COLLECTION AND FORWARDING function is termed “ON US” data.
- Data collected by a specific COLLECTION AND FORWARDING function addressed to IFM Entities not linked to this COLLECTION AND FORWARDING function is termed “NOT ON US” data.

Commercial Rules

ISO 24014-1:2007 – section 2 (Terms and definitions):

Rules defining the settlement and commission within the IFMS

Contract

ISO 24014-1:2007 – section 2 (Terms and definitions):

Agreement between two or more Entities

Customer

ISO 24014-1:2007 – section 5.1 (Description of Entities):

The Customer holds an Application and acquires Products in order to use the public transport services.

Cardholder who uses the services provided by the Service Operators according to the terms of the Product instance expressed by the payment means and the card issuance

Customer Medium

ISO 24014-1:2007 – section 2 (Terms and definitions):

Medium initialised with an Application through an Application Contract

Customer Profile

Mandatory Product of the Transport Application that is a Collection of data that characterises the Customer:

- Optional Customer birth date

  → age based concessions;

- Optional Customer statuses

→ other concessions (e.g. disabled, student)

→ special accesses (e.g. staff, military, police);

- Customer preferences

  → language

Customer Service

ISO 24014-1:2007 – section 5.1 (Description of Entities):

> Subject to commercial agreements, Customer Service may provide “helpline” and any similar facilities, including replacement of stolen and damaged Customer Medium and consequent Product reinstalling.

Entity

ISO 24014-1:2007 – section 2 (Terms and definitions):

> Abstract object performing a set of functions within the IFM
>
> NOTE An entity can exist in the real world (e.g. a Service Operator), in which case it is called a “Legal Entity”. It can also be a model of this real world object (“Abstract Entity”). This part of ISO 24014 deals with the second kind of entity (collection of technical functions). It covers the following sets of functions: Application Owner, Application Retailer, Product Owner, Product Retailer, Service Operator, Collection and Forwarding, Security Manager, Registrar and Customer.

... and also Medium Owner, Medium Retailer, Card Manufacturer.

In this document, “Role” is used as a synonym for Abstract Entity, and “Business Entity” as a synonym for “Legal Entity”.

Fare Product

Synonym for “Product Rules”, except that its singular form differs from its plurial form

Float Manager

Float Manager is a role played by the T-Purse Owner. This entity:

- Keeps track of all transactions related to the float including bad transactions.
- Ensures the liquidity and solvability of the float
- Calculates and allocates the interest of the float and the unclaimed float.

IFM, IFMS

Integrated Fare Management,

Integrated Fare Management System

IFM Policies

Commercial, technical and security objectives of IFM

Interchange

Synonym for “Transfer”

Interoperability

ISO 24014-1:2007 – section 2 (Terms and definitions):

> The ability of systems to provide services to, and accept services from, other systems

Interoperable product

A product which is usable in transport means operated by more than one Service Operators

Journey

Sequence of consecutives travels, linked by transfers, and associated to a single fare. Read also “Transfer” and “Travel”.

Load Agent

Product Retailer of the T-Purse – This entity:

- Is responsible for reloading the T-Purse in the Transport Application
- Is responsible for collecting the payment from the Customer.

Medium

ISO 24014-1:2007 – section 2 (Terms and definitions):

> Physical carrier of Applications

Medium Owner

Definition derived from Application Owner (ISO 24014-1:2007 – section 5.1)

> The Medium Owner holds the Contract for the use of the Medium with the customer

Medium Retailer

Definition derived from Application Owner (ISO 24014-1:2007 – section 5.1)

> The Medium Retailer sells and terminates Media, collects and refunds value to a customer as authorised by an Medium Owner.
>
> The Medium Retailer is the only financial interface between the customer and the IFMS related to Media.

Organisation

ISO 24014-1:2007 – section 2 (Terms and definitions):

> Legal Entity covering the functions and implied responsibilities of one or more of the following operational entities: Application Owner, Application Retailer, Product Owner, Product Retailer, Service Operator, and Collection and Forwarding.

... and also Medium Owner, Medium Retailer, Card Manufacturer.

Post-debit

Travel concept that says that Travel definition (origin and destination) is made at the end of the travel, during the check-out process (at exit Gate or exit validator). At this time, usually, the price is computed and debited from the Transport Application T-Purse

Pre-debit

Travel concept that says that Travel definition (origin and destination) is made at least when the travel began, at first during the sale process (at Point Of Sale Terminal or at Ticket Vending Machine).

Pricing Rules

ISO 24014-1:2007 – section 2 (Terms and definitions):

Rules defining the price and payment relationships to the customer

Product

ISO 24014-1:2007 – section 2 (Terms and definitions):

Instance of a Product Template on an Application stored in a Medium

NOTE It is identified by a unique identifier and enables the customer to benefit from a service provided by a Service Operator.

It is also the abbreviation of “Product Rules”.

Product Family

Set of similar Product Rules (i.e. similar Usage, Pricing and Commercial Rules), configurable by a set of parameters

Product Instance

A pleonasm that stands for “Product”

Product Owner

ISO 24014-1:2007 – section 5.1 (Description of Entities):

The Product Owner is responsible for his Products.

Functions of ownership:

- Specifying Pricing, Usage and Commercial Rules.

Functions of clearing:

- Trip reconstruction — Product aggregation based on received usage data using Product definition rules;
- Linking of aggregated usage data with acquisition data;
- Preparation of apportionment data based on Product Specification.
- Detailed:

  Acquisition data with no link to usage data within the reporting period;

  Usage data with no link to acquisition data within the reporting period;

  Linked aggregated Product data within the reporting period
- Summary:

  Apportionment data and clearing report
- Total acquisition data.

Product Owner is an Entity who defines and owns one or more Products. He is in charge to determine sale channels (Product Retailers) for his Products, and he owns the Customer

data related to his Products. Product Owner is responsible for Product Rules definition, and for sales, blacklisting and refund of its Product.

Product Retailer

ISO 24014-1:2007 – section 5.1 (Description of Entities):

> The Product Retailer sells and terminates Products, collects and refunds value to a customer as authorised by a Product Owner.
>
> The Product Retailer is the only financial interface between the customer and the IFMS related to Products.

Product Rules

ISO 24014-1:2007 – section 2 (Terms and definitions):

> Set of Usage, Pricing and Commercial Rules defined by the Product Owner

Transport Product Rules apply to services provided by (interoperating) Service Operator(s). Payment Product Rules (rules for the T-Purse) apply to payments debited by (interoperating) Service Operator(s).

The term “Product Rules” is usually abbreviated in “Product” when the context excludes the instance on an Application stored in a Medium.

The more intuitive term “Fare Product” stands also for “Product Rules” of Transport Application, when it refers to the sale operation.

Product Specification

ISO 24014-1:2007 – section 2 (Terms and definitions):

> Complete specification of functions, data elements and security scheme according to the Product Rules

Product Template

ISO 24014-1:2007 – section 2 (Terms and definitions):

> Technical master of the Product Specification for creating Products
>
> NOTE The Product Template is identified by a unique identifier.

PTO – Public Transport Operator

Business Entity (Legal Entity) dealing transport services into the IFMS. It endorses one or more of the following Roles (Abstract Entities): Service Operator, Product Retailer and Product Owner.

Registrar

ISO 24014-1:2007 – section 5.1 (Description of Entities):

> After the certification, the Registrar issues unique registration codes for Organisations, Components, Application Templates and Product Templates. The Registrar function also issues unique identifiers or rules for generating unique identifiers for the Applications, Products and messages.

Entity which registers inside the Ticketing System:

- Owners (Card Owner, Application Owner, …)
- Service Operators

- Ticketing devices
- Card data layouts
- Application(s)
- Product definitions

Role

Synonym for “Abstract Entity” – See “Entity”.

Seamless Travel

ISO 24014-1:2007 – section 2 (Terms and definitions):

> Opportunity for customers to move between one part of an IFMS to any other part of the same or another IFMS with the minimum of inconvenience, according to their own journey plan using any combination of transport mode and Service Operator using a single Medium

Security Manager

ISO 24014-1:2007 – section 5.1 (Description of Entities):

> The Security Manager is responsible for establishing and coordinating the Security Policy and for:
>
> - Certification of Organisations, Application Templates, Components and Product Templates;
> - Auditing of Organisations, Application Templates/Applications, Components and Product Templates/Products;
> - Monitoring the system;
> - Operation of the security of the IFMS, e.g. key management.

Security Policy

ISO 24014-1:2007 – section 2 (Terms and definitions):

> Security objectives within the IFM Policies

Service Operator

ISO 24014-1:2007 – section 5.1 (Description of Entities):

> The Service Operator provides a service to the customer against the use of a Product.
>
> Entity accepting the Customer's Card for payment and Product validation and in return providing Services to the Customers
>
> The Service Operator is responsible for certifying his own devices.

Service Provider

Obsolete name of “Service Operator” that should be avoided

Sliding Product

Product that has a validity period that is not fully defined when sold, but slides with its first usage. The validity duration is defined by the (Sliding) Product Rules as a count of slices that schedules the time (e.g. days, hours, minutes, Sunday-weeks, Monday-weeks, calendar-months).

All qualifiers of “Product” apply the same way: “Sliding Product Rules” / “Sliding Fare Product”, “Sliding Product Specification”, “Sliding Product Template”, etc.

“Sliding” may be used with Product Family names: “Sliding Pass”, “Sliding Ticket” ...

T-Purse

Mandatory Payment Product of the Transport Application

Transport Application

The Application dedicated to the Transport context of IFMS.

All qualifiers of “Application” apply the same way: “Transport Application Rules”, “Transport Application Specification”, “Transport Application Template”, etc.

Travel

Leg of a journey on a single transport mode (train, bus, etc.) and vehicle

Read also “Journey” and “Transfer”.

Transfer

Link between two consecutive travels in the same journey, where the traveller changes from one vehicle or transport mode (train, bus, etc.) to another. Read also “Journey” and “Travel”.

Usage rules

ISO 24014-1:2007 – section 2 (Terms and definitions):

> Rules defining the usage time, the usage area, the personal status and the type of service

6. APPENDIX B – NOTES ABOUT TITLES MANUAL DOCUMENT (0052091149100ES00)

Vocabulary variations:

Titles Manual document	Business Processes and rules
Title	Product
Wallet	T-Purse
Wallet titles	Easy Trip
Seasonal Titles	Period pass

P.6 §2.2.4 Validation Price:

Titles Manual document	Business Processes and rules
Maximum amount of trip will be applied if perform an exit without an entry	Validation is refused. A penalty shall be applied using the PCM or an exit ticket is bought at TOM prior to exit.
Maximum amount of trip will be applied if perform an entry without any previous trip exit	If there is a check-in after another check-in, the maximum travel price is paid (except if the second check-in is in the same station and the anti-pass back is activated – in this case the second check-in is rejected).
In all situations that are not allowing the normal exit, penalty may be applied using PCM device.	In all these cases, a penalty shall be applied using the PCM or an exit ticket is bought at TOM prior to exit.

7. APPENDIX C –COMMENT SPREADSHEETS

7.1 VERSION --

n° / *n°*	Lecteur / *Reader*	Page / *Page*	Chapitre / *Chapter*	Commentaire / *Comment*	Date / *Date*	Réponses / *Response*	Date / *Date*	State	Update tracking
1	NAT		General	The design of this document of line 1 and line 2 to be designed typically considering PPP and multi—operator concept.	30/10/2016	Refer to point 5 on system SSS review.		Closed	§ 1.4
2	NAT		General	The Business Rules in this document not support multi-operator and multi-modal requirements	30/10/2016	The proposed business model based on ISO 24014 is by nature interoperable. Section 1.4 defines the allocation of the roles to the identified business entities (NAT and ECM). In case new comers were to join the scheme, this section would have to be updated in order to reflect the allocated roles. The remaining of the document will stay unchanged. **[30/03/17] NAT + Thales** Thales will add a specific sentence saying that the busines rules support multi-operator and multi-modal requirements.		Closed	§ 1.1

3	NAT		General	The document shall include business rules for mobile ticketing using bank cards	30/10/2016	**[30/03/17] NAT + Thales** Refer to CBO SSS review #6, #7. Point will remain open until the commercial workshop		Open	na
4	NAT		General	The document shall include business rules for panned use fare media such as CT	30/10/2016	Refer to point 19 on system SSS review.		Closed	na. CT option was removed from the last line 3-phase 3 offer. Implementation is out of scope.
5	NAT		General	The document shall include polices and management of promotions for normal passengers using anonyemous	30/10/2016	Not understood. **[30/03/17] NAT + Thales** **ACTION on Thales to provide a technical memo relative to promotions** (incentive solutions so that mote travellers will use anonymous CSC).		Open	
6	NAT			The document must be sent in original format (Color coPY)	30/10/2016	Will be done for the next submission		Closed	na
7	NAT	3/55	Document Management	Why there are no signature of the system engineering manager and the engineering team write the document.	30/10/2016	In our version, there is the engineering manager signature. We will check the delivery process.		Closed	na
8	NAT	7/55	Abbreviations	This table shall be repeated in all other documents	30/10/2016	Will be done.		Closed	na. (abbreviation list added on other documents)

9	NAT	16/55	1.1 Document Scope	1.You shall refer and provide a copy of ISO24014-1 standard which issued recently (2015 en) 2.This document shall describe in subsequent chapters use cases for PTO's sharing same interoperability scheme with common or separate AFC systems (mufti-operators)	30/10/2016	1. The official delivery of ISO standards is not included the scope of the project 2.Refer to points 7 and 8 on system SSS review. **[30/03/17] NAT + Thales** 1. ACTION Thales to purchase the the ISO version on behalf of NAT. Holder at NAT to be defined. Mohamed Fahim El Sayed 2. Closed.		Closed	na
10	NAT	19/55	1.4 Cairo Inter-operability Scheme	1.The allocation of business rules in Cairo Inter-operability Scheme shall be presented as the present existing case and the other multi-operator and multi-modal schemes shall be elaborated and be presented 2.NAT is not an operator entity (for L3)	30/10/2016	[20161118] NAT + Thales - Table will be updated leaving only ECM. - A reference will be added to Thales presentation 'introduction to interoperability)		Closed	§ 1.4
11	NAT	21/55	2.1.1 Card Management	The card shall manage more than transportation application such as other city cards in all over the world	30/10/2016	[20161118] NAT + Thales There is a single transportation application.		Closed	na.

12	NAT	21/55	2.1.2 Card Lifecycle	The presented description of card manufacturing and application initialization in an alternative process than the existing case and it under study and approval	30/10/2016	This section is untouched compared to the original document version Ac. Clear that it does not comply with the effective process put in place by the 3rd party vendor. **[30/03/17] NAT + Thales** Thales will update the document in order to reflect the effective process.		Closed	§ 2.1.2
13	NAT	23/55	2.2 Magnetic Ticketing Lifecycle	Tracking of MT, Could the document clarify the MT Check-in/Check-out processes transactions will processed in CBO with the functional justifications.	30/10/2016	The MT check-in/check-out transactions processing at the CBO is described in the system SSS use case TR-01. The MT transactions are received and stored especially for Business Intelligence processing. This will be added.		Closed	§ 2.2
14	NAT	24/55	2.3.3 Transport Application Lifecycle	There are unclear statements such as; 1.Media Manufacturer (acting as an application retailer), this need clarification. 2.There is only one common Transport application in each medium 3.Transport application tracking is merged with card tracking 4.Transport application blacklisting is merged with card blacklisting The last three points (2,3&4) negate multi-modal concept and these are not acceptable	30/10/2016	This section is untouched compared to the original document version Ac. This is the Cairo ticketing scheme. 1. Means that since the manufacturer loads an application, its is considered as application retailer as far as the 24014 model is considered. 2,3,4 : the interoperability is based on the sharing of the transport application. **[30/03/17] NAT + Thales** Thales will update the document in order to reflect the effective process.		Closed	§ 2.3.3

15	NAT	30/55	3 Fare Media Characteristics & Related Processes	This Chapter shah include CT and other planned media such as mobile ticketing and bank cards	30/10/2016	Refer to points 3 and 4.		Closed	na
16	NAT	35/55	Table 4.1 product summary	Supplement should be developed and tested and able to be applied in Cairo metro when needed.	30/10/2016	Supplement has been discarded from Ticketing rules document Ah. This update was to align the business process and rules document. **[30/03/17] NAT + Thales** Thales position is that the delivery of this function is subject to additional costs (software update, integration, testing). This is not mentioned in the 850 gates contract.		Closed	

7.2 VERSION –A

No	Page	Chapter	NAT comment	Answer	Status	Update tracking
1		General	The design of this document of line 1 and line 2 to be designed typically considering PPP and multi—operator concept. [Second NAT Comments, rev -A] you shall add another table in section 1.4 describe another case if third party join to system as	Agreed.		§ 1.4

			(train,tram,....etc)			
2		General	The Business Rules in this document not support multi-operator and multi-modal requirements [Second NAT Comments, rev -A] NOT OK— as No.1	Agreed, refer to point 1		§ 1.1
3		General	The document shall include business rules for mobile ticketing using bank cards	[30/03/17] NAT + Thales Refer to CBO SSS review #6, #7. Point will remain open until the commercial workshop		na
5		General	The document shall include polices and management of promotions for normal passengers using anonyemous	ACTION on Thales to provide a technical memo relative to promotions (incentive solutions so that mote travellers will use anonymous CSC).		memo CREATER_CAIRO /LB/0335
7	3/55	Document Management	Why there are no signature of the system engineering manager and the engineering team write the document. [Second NAT Comments, rev -A] Not OK — the current version signed by program manager only	Fixed		Front page

10	19/55	1.4 Cairo Inter-operability Scheme	1.The allocation of business rules in Cairo Inter-operability Scheme shall be presented as the present existing case and the other multi-operator and multi-modal schemes shall be elaborated and be presented 2.NAT is not an operator entity (for L3) [Second NAT Comments, rev -A] NOT OK— as No.1	Agreed, refer to point 1		§ 1.4
11	21/55	2.1.1 Card Management	The card shall manage more than transportation application such as other city cards in all over the world [Second NAT Comments, rev -A] Not Ok— CBO be shall designed to manage different of transportation means like bus,tram , so the card shall manage more than transportation application	Agreed, different transportation means are supported		§2.1.1 §4.1.5
16	35/55	Table 4.1 product summary	Supplement should be developed and tested and able to be applied in Cairo metro when needed. [Second NAT Comments, rev -A] NOT OK	Refer to open point workshop held on 21/11/2017 item #3 and traceability matrix to L3P3 specifications (53M-BD-SYS-AFC-SPEC-SYS-3001-T1). Thales position is that this point is not part of the project.		na

7.3 VERSION –B

No	Page	Chapter	NAT comment	Answer	Status	Update tracking

3		General	The document shall include business rules for mobile ticketing using bank cards	Mobile ticketing is not included in the scope of delivery of the project. Thales suggests to address this topic in a separate presentation		
5		General	The document shall include polices and management of promotions for normal passengers using anonyemous	Agreed.		§4.1.12
11	21/55	2.1.1 Card Management	The card shall manage more than transportation application such as other city cards in all over the world New: According to NAT technical specifications the CSC card shall support E-Purse.	Agreed.		§2.1.1
13		2.2 Magnetic Ticketing Lifecycle	The magnetic ticket must be tracked by CBO and LCU.	Agreed. Magnetic ticket and CSC transactions are processed		§2.2.1
16	35/55	Table 4.1 product summary	Supplement should be developed and tested and able to be appliedin Cairo metro, when needed. New: This requirement is in the scope , refer to point 3.1.1.4.5 page 12 in the unification document .	Agreed.		§4.1

END