
**Information technology — Software
measurement — Functional size
measurement —**

**Part 4:
Reference model**

*Technologies de l'information — Mesurage du logiciel — Mesurage de la
taille fonctionnelle —*

Partie 4: Modèle de référence



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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.ch
Web www.iso.ch

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

The main task of technical committees is to prepare International Standards, but in exceptional circumstances a technical committee may propose the publication of a Technical Report of one of the following types:

- type 1, when the required support cannot be obtained for the publication of an International Standard, despite repeated efforts;
- type 2, when the subject is still under technical development or where for any other reason there is the future but not immediate possibility of an agreement on an International Standard;
- type 3, when a technical committee has collected data of a different kind than that which is normally published as an International Standard ("state of the art", for example).

Technical Reports of types 1 and 2 are subject to review within three years of publication, to decide whether they can be transformed into International Standards. Technical Reports of type 3 do not necessarily have to be reviewed until the data they provide are considered to be no longer valid or useful.

Technical Reports are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Attention is drawn to the possibility that some of the elements of this part of ISO/IEC 14143 may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC TR 14143-4, which is a Technical Report of type 2, was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 7, *Software engineering*.

ISO/IEC 14143 consists of the following parts, under the general title *Information technology — Software measurement — Functional size measurement*:

- *Part 1: Definition of concepts*
- *Part 2: Conformity evaluation of software size measurement methods to ISO/IEC 14143-1:1998*
- *Part 3: Verification of functional size measurement methods*
- *Part 4: Reference model*
- *Part 5: Determination of functional domains for use with functional size measurement*

Annexes A and B form a normative part of this part of ISO/IEC 14143. Annex C is for information only.

Introduction

The user of an FSM Method must establish that the FSM Method is appropriate to quantify the functional size of the software. The conformity to ISO/IEC 14143-1:1998 will be necessary but may not be sufficient. An evaluation process of an FSM Method will have to consider practical evidence of the performance of the FSM Method. Such an evaluation may require benchmarking the chosen FSM Method to compare its results for a collection of known Reference User Requirements (RUR) with those obtained from a Reference FSM Method.

Part 4 of ISO/IEC 14143 provides standard RUR together with guidance on Reference FSM Methods. Figure 0.1 shows how these are used to establish reference results. The FSM Method to be evaluated determines functional size results for a collection of appropriate RUR. The same collection of RUR is measured by one or more Reference FSM Methods and these reference results are then compared with the results obtained from the FSM Method to be evaluated.

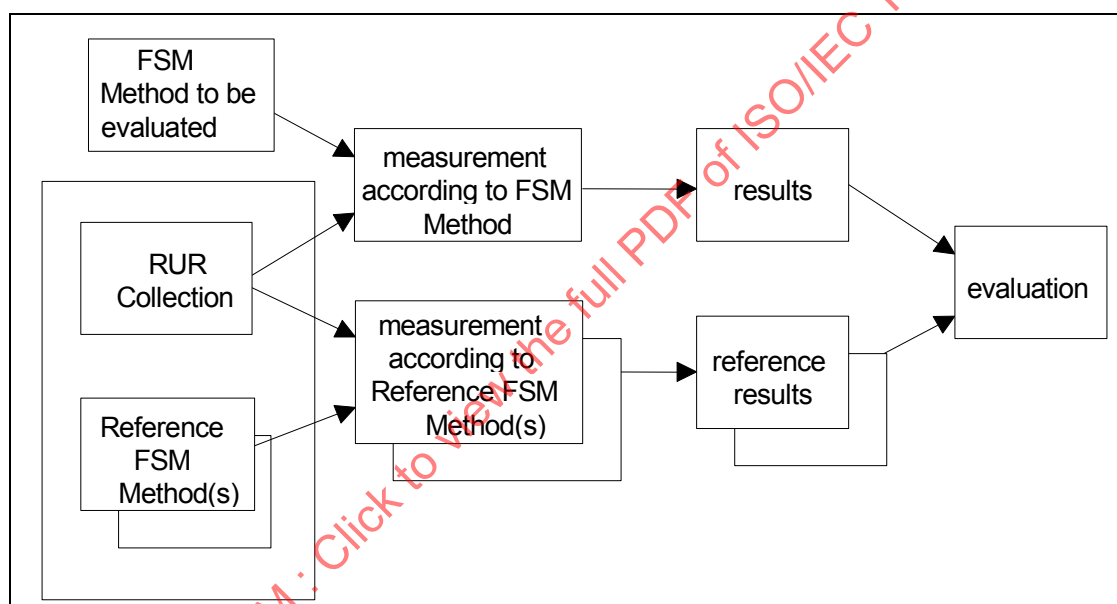


Figure 0.1: Use of RUR and Reference FSM Methods

Clause 5 of this part of ISO/IEC 14143 defines a framework for identifying, classifying and selecting RUR. Annexes A and B provide examples of such RUR in two different domains. While it would be desirable to have an exhaustive set of such RUR, the size of such collection would be prohibitive. Further RUR can be found in the RUR reference list presented in Annex C. Additional appropriate RUR may be constructed according to the basic guidelines stated in clause 5 RUR.

Clause 6 of this part of ISO/IEC 14143 introduces the general requirements for Reference FSM Methods. The reference FSM Methods provide reference points, against which other FSM Methods can be compared.

Information technology — Software measurement — Functional size measurement —

Part 4: Reference model

1. Scope

Part 4 of ISO/IEC 14143 defines the reference model (Figure 0.1) to be used when verifying a Functional Size Measurement (FSM) method.

The reference model consists of two components:

- a classification framework of Reference User Requirements (RUR) which can be sized using an FSM Method. Included are examples of such RUR as well as references to further publications of User Requirements (UR) which can be used for RUR, and
- guidance on selecting Reference FSM Methods, against which an FSM Method can be compared.

The reference model is an input to the evaluation process of an FSM Method. The formulation and execution of evaluation tests and the interpretation of their results is outside the scope of this Technical Report.

The RUR and additional references contained in this Technical Report only represent examples of UR in some domains and situations. Additional RUR and UR for domains and situations not covered by Annex A, B, or C may be generated with the assistance of the framework described in this Technical Report.

The requirements for Reference FSM Methods may assist in selecting Reference FSM Methods.

2. Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC 14143. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO/IEC 14143 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO/IEC 14143-1:1998, *Information technology — Software measurement — Functional size measurement — Part 1: Definition of concepts*.

ISO/IEC 9126:1991, *Information technology — Software product evaluation — Quality characteristics and guidelines for their use*.

3. Terms and definitions

For the purposes of this Technical Report, the terms and definitions given in the normative references and the following apply. Figure 3.1 describes the composition of User Requirements, RUR, and RUR Collection.

3.1

Functional User Requirements (FUR)

A sub-set of the User Requirements. The Functional User Requirements represent the users practices and procedures that the software must perform to fulfil the users' needs. They exclude Quality Requirements and any Technical Requirements.

NOTE As defined by ISO/IEC 14143-1:1998.

3.2

Quality Requirements (QR)

Any requirements relating to software quality as defined in ISO/IEC 9126.

NOTE As defined by ISO/IEC 14143-1:1998. Quality Requirements are a subset of the User Requirements.

3.3

Reference FSM Method

An FSM Method to be used for comparison reasons when verifying the Functional Size Measurement results. It conforms to the requirements as specified in 6.1.

3.4

Reference User Requirements (RUR)

A standard set of User Requirements which conforms to the requirements as specified in 5.1.1.

NOTE Figure 3.1 shows the relationship of UR and RUR.

3.5

Reference User Requirement Collection (RUR Collection)

A subset of RUR which is selected to match the purpose in a specific evaluation. The selection requirements are specified in 5.1.2.

NOTE Figure 3.1 shows the relationship of RUR and RUR Collection.

3.6

Technical Requirements (TR)

Requirements relating to the technology and environment, for the development, maintenance, support and execution of the software.

NOTE As defined by ISO/IEC 14143-1:1998. Technical Requirements are a subset of the User Requirements.

3.7

User Requirements (UR)

The complete description of the set of user needs for the software to be provided. User Requirements include Functional User Requirements, Technical Requirements and Quality Requirements.

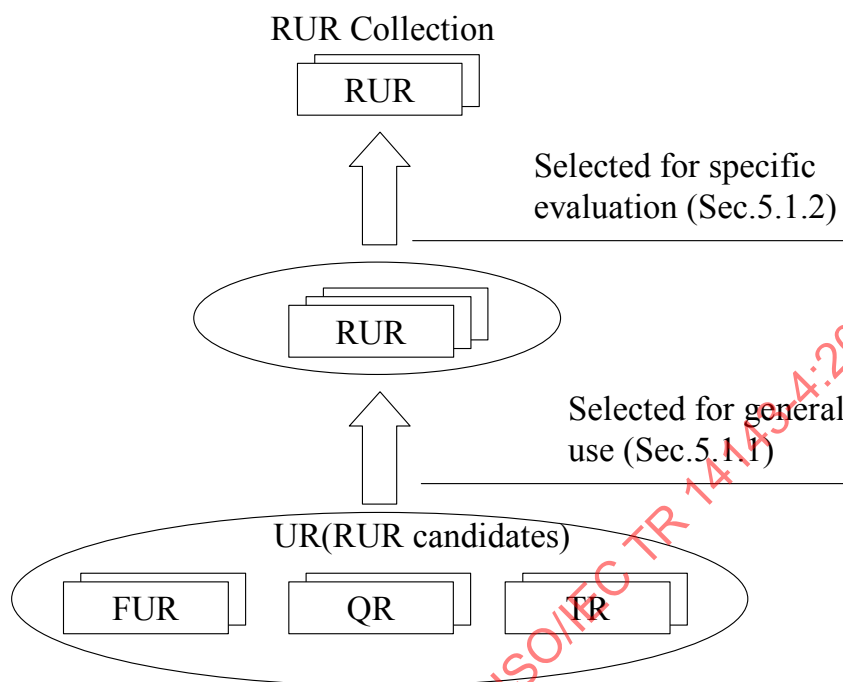


Figure 3.1: Composition of User Requirements and RUR (informative)

4. Abbreviated terms

FSM	Functional Size Measurement
FUR	Functional User Requirements
QR	Quality Requirements
RUR	Reference User Requirements
TR	Technical Requirements
UR	User Requirements

5. Reference User Requirements

5.1. General requirements

To be acceptable for the evaluation of an FSM Method, the RUR Collection shall consist of RUR complying with 5.1.1 and which are selected according to the rules stated in 5.1.2.

5.1.1. RUR requirements

Individual RUR shall:

- a) be documented in such a form that they can be understood by a human user specialised in the area addressed by the RUR,

NOTE The RUR should be representative of the user requirements. Acceptable presentation formats include textual and graphical descriptions of the functionality, acceptable to the users in the particular Functional Domain. Examples of unacceptable forms of documentation are technical design documentation, computer program listings, or terminology representative of Information Technology.

- b) represent a complete and self contained user practice or procedure, and

NOTE The RUR should provide all requirements necessary to perform a user practice or procedure but need not provide a complete set of requirements as would be needed for a practical system. Different FSM Methods will have different methods of identifying Base Functional Components. RUR containing only a subset of a user practice or procedure may therefore distort the results. An example of partial FUR would be the data entity requirements only (A.1.3) for the Hotel Accommodation System in RUR A1, or the screen layout of the RES function in A.1.2.2.1 of RUR A1.

- c) be tested and be free of ambiguities and inconsistencies.

NOTE Acceptable compliance with this requirement would be that the RUR has been successfully implemented as a software product, been published in a refereed textbook or journal, or been used successfully in an Functional Size Measurement.

5.1.2. RUR Collection selection requirements

RUR selected for a RUR Collection shall:

- a) be representative of the Functional Domain for which the FSM Method is evaluated,

NOTE The RUR should represent the Functional Domain(s) selected for evaluation of the FSM Method. The functionality should be consistent with the characteristics of the Functional Domain.

- b) not biased to a particular FSM Method or evaluation process,

NOTE The RUR should be constructed or selected without any bias. They should not favour, or discriminate against, a particular FSM Method or evaluation process.

- c) include example FUR with equal, unequal, and significantly unequal Functional Size,

NOTE The RUR should have example functions of different Functional Sizes to enable an FSM Method to distinguish between small and large functionality. In the absence of an absolute Functional Size indicator such distinctions can only be rough and at the order of magnitude level. Selection criteria could be user perception or any quantifiable functional characteristic such as number of data fields, decision alternatives, business rules or data references.

- d) include User Requirements not restricted to Functional User Requirements as defined in ISO/IEC 14143-1:1998.

NOTE Some RUR should include requirements such as Quality Requirements or Technical Requirements. Examples of non-functional requirements include reliability, cost, development time, or computer architecture constraints.

- e) when assessing an FSM Method for independence from technology or implementation techniques include different versions of the same user requirement with different:
 1. implementation technologies,
 2. development methodologies, or
 3. documentation levels,

NOTE The RUR should enable the FSM Method to demonstrate its independence from implementation technology and development methodology and its coverage at various stages of software development.

and

- f) include examples of changes of requirements when assessing an FSM Method for software enhancement measurement.

5.2. Examples

Annexes A and B include examples of RUR for the areas of business application and real time / control. Annex C provides references to published User Requirements, which in addition could be used as RUR. The references in Annex C, however, have not been formally checked against the rules stated in 5.1.1.

5.2.1. Business application

Annex A lists 8 RUR: RUR A1 to RUR A8. The first 6 RUR describe part of a hotel reservation system but do so in different forms and functionality. As such they provide an example for the requirements 5.1.1.a) (documentation), 5.1.1.b) (completeness), 5.1.1.c) tested and unambiguous, 5.1.2.c) (range of functional size), 5.1.2.e) (implementation independence) and 5.1.2.f) changed requirements:

- RUR A1 includes a detailed specification of the layout of the user interfaces,
- RUR A2 provides a more general description of the same requirement, but lacks some of the details shown in RUR A1,
- RUR A3 has the same user interface as RUR A1 but only simulates the business functions rather than executing the business logic of the operations,
- RUR A4-A6 describe several modifications to RUR A1, and
- RUR A7 and RUR A8 are examples of complex RUR, describing sections of actual requirements used by a financial organisation.

5.2.2. Real Time /control

Annex B contains several RUR of different size and implementation. These RUR provide examples for the requirements 5.1.1.b) (completeness), 5.1.2.c) (range of functional size), and 5.1.2.d) (non-functional requirements):

- RUR B1 sets the baseline for RUR B2 to B7,
- RUR B2 should have a substantially larger functional size compared with RUR B1 since it contains three times the number of functions of RUR B1. RUR B3 again should be larger in functional size when compared with RUR B2 since additional functions are performed,
- RUR B4, RUR B5, and RUR B6 describe three different non-functional technical or implementation requirements for RUR B3,
- RUR B7 describes a different use for the requirement of RUR B3,
- RUR B8 addresses a process control application, which continuously monitors and controls a communication line,
- RUR B9 describes a valve control application, and
- RUR B10 is an example of a complex RUR for a communication control system.

6. Reference FSM Method

Reference FSM Methods in combination with RUR can be used to establish a known baseline of results (see figure 0.1). This will then allow a benchmark to be performed for an FSM Method (see figure 0.1). Compared with results of a Reference FSM Method, an FSM Method can establish its position relative to that Reference FSM Method.

A Reference FSM Method may be valid for only some Functional Domains. It will provide a reference point for the relative evaluation of a chosen FSM Method for a specific situation.

6.1. General requirements

A Reference FSM Method itself shall:

- a) conform to ISO/IEC 14143-1:1998 according to ISO/IEC 14143-2,
- b) cover the same Functional Domain as that described within the FSM Method to be assessed,
- c) be publicly available, and
- d) be verified for its minimum effectiveness to the purpose of the evaluation.

6.2. Example Use of Reference FSM Methods

Using several different Reference FSM Methods will provide a range of references in relation to which FSM Methods can be positioned. Suitable Reference FSM Methods for the creation of such a range of reference results would be a superficial Reference FSM Method at one end of the range and a comprehensive Reference FSM Method at the other end.

6.2.1. Superficial Reference FSM Method

A superficial Reference FSM Method would formally conform to ISO/IEC 14143-1:1998. Verification according to PDTR 14143-3, however, should reveal a very limited capability of measuring Functional Size. Such a superficial Reference FSM Method could be the starting point of an evaluation scale.

6.2.2. Comprehensive Reference FSM Method

A comprehensive Reference FSM Method would have an enhanced capability of identifying Functional Size in a wide range of instances. Compared with a superficial Reference FSM Method, its performance parameters, as established by PDTR 14143-3, should be substantially improved.

Annex A (normative)

Business application RUR

A.1 RUR A1: Hotel Accommodation System (Reservation)

A.1.1 Overview

The hotel reservation system is part of an accommodation system of a general hotel system. This section provides an overview of the requested system. The detailed functionality of the hotel reservation system together with the navigation to reach it within the hotel system will be described in the next section.

The reservation system supports the following business functions related to the letting of hotel rooms:

- maintain reservations
- confirm reservations

Room data used relates to room type, price, and description (in Dutch, English, French, or German), and anyone can make a reservation for a room type. The System confirms a reservation in either English, Dutch, German or French. It is possible to cancel a reservation.

The system uses a number of general data entities, which are maintained by other parts of the hotel accommodation system:

- HOTEL, data includes: name, address, telephone, telex, fax, hotel manager name,
- COUNTRY, data includes country code and country name, and
- ROOM and ROOM TYPE, describe a hotel room and the various room classes.

The hotel reservation system ensures consecutive numbering by storing the last issued reservation number in a file called "PARAMETERS."

The following general requirements apply to all parts of the hotel accommodation system:

- help information must be available on screen level and field level,
- error messages are standard on Line 24 of the screen.

A.1.2 Detailed specifications

To identify the type of data entered into the accommodation system the menu layouts in this specification use a string of "9" to denote numeric and a string of "x" to denote alphanumeric data.

A.1.2.1 Navigation

A.1.2.1.1 Main menu of hotel system

The main menu of the hotel system offers two choices: accommodation and invoice & payment. The reservation system is part of the accommodation system.

Screen layout for the main menu:

< Hotel name > **HOTEL SYSTEM**

1 ACCOMMODATION
2 INVOICE & PAYMENT

Choice: < S> F10
End

Functions:

F10 : Exit application

Screen elements:

Menu choice, Hotel name

A.1.2.1.2 Accommodation menu selections

Screen layout for the accommodation menu:

< Hotel name > **ACCOMMODATION SYSTEM**

1 RESERVATION
2 CHECK-IN
3 CHECK-OUT
4 CANCEL RESERVATION
5 MAINTAIN ROOM DATA

Choice: <S> F10
MENU

Function:

F10 : Return to Main menu

Screen elements:

Menu choice, Hotel name

NOTE The reservation system functions are reached via the first option: Reservation.

A.1.2.2 Functions

A.1.2.2.1 Function: RES Reservation

A reservation request can be entered using the screen RES. All data except the reservation number is entered. When changing the reservation data using screen RES, the reservation number can be found by name, or part of a name. All data, except reservation number, can be changed. If there is more than one reservation with the same name, the selection - screen (SEL- RES) is shown.

The system further checks if the stated quantity of rooms for the desired room type is available in the desired period (not occupied or not reserved). "Being occupied" is checked on the basis of the data: room type, start date, number of days, and quantity of reserved rooms.

If necessary more room types can be stored for the same period. Only room type and quantity of rooms can be entered.

If the request can be met, the acceptance screen ACP-RES stores the reservation and a confirmation of the reservation (CON-RES) is produced for the billing address. If the request cannot be met, room type report (RT-REP) is called to look up an alternative choice.

Used screens: RES (request for reservation), SEL-RES (selection reservations), ACP-RES (accept reservation), RT-REP (room type report), CON-RES (confirmation of reservation).

Screen layout for RES(ervation) function:

< Hotel name >		RESERVATION	
Reservation number:	999999		
Arrival date:	DD/MM/YYYY		
Number of days:	99		
Room type & quantity:	xx	99	
Name:	XXXXXXXXXXXXXXXXXXXXXXXXXXXX		
Street & number:	XXXXXXXXXXXXXXXXXXXXXXXXXXXX		999
Post code, City, Country:	99999	XXXXXXXXXXXXXXXXXXXX	xx
Telephone number:	999999999999		
Language code:	xx		
F1	F2	F3	F10
Continue	Confirm	Change	Menu

Functions:

- F1 : Continue reservation for the same period
- F2 : Confirm reservation
- F3 : Change reservation data (except reservation number) of this reservation number
- F10: Return to previous menu

Screen elements:

Arrival date	Street	Number of days
Street number	Telephone number	Quantity
Name	Country code	Reservation number
City	Hotel name	Room type
Post code	Language code	

A.1.2.2.2 Function: ACP-RES Accept reservation

This function is performed by function RES when a reservation request can be met. It displays the reservation details and the assigned reservation number. An accepted reservation can then be confirmed.
Screen layout for ACP-RES function:

< Hotel name >

ACCEPT RESERVATION

Reservation number: 999999

Name: xxxxxxxxxxxxxxxxxxxxxxxxxxxx

Arrival date: DD/MM/YYYY

Number of days: 99

Room type & quantity

xx99

xx99

xx99

xx99

xx99

Room type & quantity

xx99

xx99

xx99

xx99

xx99

F1Continue

F2Accept

F10Menu

Functions:

- F1 : Continue reservation
- F2 : Accept reservation, print confirmation, and return to previous menu
- F10: Return to previous menu

10

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Screen elements:

Arrival date	Number of days	Reservation number
Name	Quantity	Room type
Hotel name		

A.1.2.2.3 Function: SEL-RES Select Reservation

Reservation report based on the partial name of the one who makes the reservation. This function is activated by RES when a reservation is accessed by billing name and there is more than one reservation stored for that name. Screen layout for SEL-RES function:

< Hotel name >		SELECT RESERVATION	
Name	City	Arrival Date	Res.no.
XXXXXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXX	DD/MM/YYYY	999999
XXXXXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXX	DD/MM/YYYY	999999
XXXXXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXX	DD/MM/YYYY	999999
XXXXXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXX	DD/MM/YYYY	999999
XXXXXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXX	DD/MM/YYYY	999999
XXXXXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXX	DD/MM/YYYY	999999
XXXXXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXX	DD/MM/YYYY	999999
XXXXXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXX	DD/MM/YYYY	999999

F1	F9	F10
Select	Prior	Menu

Functions:

- F1 : Select a reservation and return to previous screen
 F9 : Return to previous screen
 F10 : Return to previous menu

Screen elements:

Arrival date	City	Reservation number
Name	Hotel name	

A.1.2.2.4 **Function: RT-REP Room Type Report**

This report is provided when a requested room type is not available. Room type report shows the quantity of rooms which:

- are not occupied, and
- are not reserved

Screen layout for RT-REP function:

< Hotel name >

ROOM TYPE REPORT

Arrival Date: DD/MM/YYYY 999999

Number of days: 99

Room type

Quantity

xx99

xx99

xx99

xx99

xx99

xx99

F9

F10

Prior

Menu

Functions:

F9 : Return to previous screen

F10: Return to previous menu

Screen elements:

Arrival date	Quantity	Room type
Hotel name	Number of days	

A.1.2.2.5 **Function: CON-RES Confirmation of the reservation**

This function is performed when an accepted reservation is confirmed. The confirmation can be made in four languages (EN, FR, GE, or NL).

Report layout for CON-RES function:

<1>

<2>

<3> <4>

Phone: <5>

Fax: <6>

<7>

<8>

<9> <10>

 $\langle 11 \rangle$

CONFIRMATION OF RESERVATION

Reservation Number: <12>

Date: <13>

Dear Madam/ Sir,

We have made the following reservation:

Number of days: <14> Arrival Date: <15>

[illegible]

Kind Regards

Hotel Manager

<19>

Report elements:

<1> hotel name	<7> name	<14> number of days
<2> hotel street address	<8> street address	<15> Arrival date
<3> postcode – hotel	<9> postcode	<16> room type
<4> city - hotel	<10> city	<17> quantity
<5> telephone number – hotel	<11> country	<18> description of room type
<6> fax - hotel	<12> reservation number	<19> hotel manager
	<13> date (system)	

A.1.3 Description of Entities

The following business entities will be used by the Hotel Reservation System.

A.1.3.1 BILLING ADDRESS

A person or institution that will pay or has booked a reservation. The person or institution is identified by a system generated Billing-identification.

Data elements:	Billing-identification (key)	6
	name	25
	street address	30
	post code	4
	city	20
	telephone number	12
	country code	2

A.1.3.2 ROOM

Contains data about a room that can be let. There is at least 1 room and at most 30 rooms per room type.

Data elements:	Room number (key)	3
	Room type	2

A.1.3.3 HOTEL

Contains data concerning the hotel that uses the system. The entity contains only one occurrence and can never contain more.

Data elements:	Hotel name (key)	30
	Street address	30
	City	20
	Post code	7
	Telephone number	12
	Telex	12
	Fax	12
	Hotel manager	25

A.1.3.4 ROOM CLASS

Indicates the quality and price of a number of similar rooms. There are at most 10 room types.

Data elements:	Room type (key)	2
	Price of accommodation	6
	Description-EN	30
	Description-FR	30
	Description-GE	30
	Description-NL	30

A.1.3.5 COUNTRY

Country where the person, who has made/ paid the reservation, lives. Do not confuse Country code with language. There are 4 languages supported by the system but the customers may live in many more countries.

Data elements:	Country code (key)	2
	Country-EN	25
	Country-FR	25
	Country-GE	25
	Country-NL	25

A.1.3.6 PARAMETERS

Parameter data for reserving rooms and producing invoices.

Data elements:	Last issued reservation number	6
	Last issued invoice number	6
	Last issued payment number	6

A.1.3.7 RESERVATION

The number of rooms of a certain type that have been promised for a reservation. Language code can be one of the 4 supported languages (EN, FR, GE, NL).

Data elements:	Reservation number (key)	6
	Start date	10
	Number of days	2
	Billing-identification	6
	Language code	2

A.1.3.8 RESERVATION DETAIL

Denotes the quantity in a certain room type that has been promised for a reservation.

Data elements:	Reservation number (key)	6
	Room type	2
	Quantity	2

A.2RUR A2: Hotel Accommodation System (Reservations) - Initial Requirement

A.2.1 Business Functions to be supported

The system supports the following administrative functions of a hotel business in relation to the letting of hotel rooms:

a) maintain reservations

- 1) create a reservation: obtain a reservation no. and enter all reservation details
- 2) update a reservation: change any reservation details except reservation number
- 3) continue a reservation: continue a complex reservation of more than one input screen
- 4) accept a reservation: finalise a reservation

b) confirm reservations

- 1) letter to client confirming the reservation details

c) reports

- 1) room type report: lists room availability from an arrival date for a number of days
- 2) reservation report: lists arrival date and reservation number for the reservation's billing name and address.

Room data used relates to room type, price, and description (in Dutch, English, French, or German).

Anyone can make a reservation for a room type. The System confirms a reservation in English, Dutch, German or French.

A.2.2 General requirements

The accommodation reservation system has to ensure consecutive and unique numbering of the reservation number.

The following general conventions apply to the accommodation system:

- identification – each functional screen should list the hotel name and the function name,
- navigation – function keys should be used to select, confirm, change, scroll, or continue business processes,
- help information must be available on screen level and field level, and
- error messages should be displayed when applicable on each screen.

A.2.3 Data Model

The general data files used by the accommodation reservation system include HOTEL, COUNTRY, ROOM, and ROOM TYPE.

These data files are maintained by other parts of the hotel system.

Entity Descriptions are as follows:

BILLING ADDRESS - A person or institution that will pay or has booked a reservation,

HOTEL - Data concerning the hotel that uses the system. The entity never contains more than one occurrence,

ROOM - A room, which can be let. There is at least one room and at most 30 rooms per room type,

ROOM CLASS - Indication of quality and price of a number of similar rooms. There are at most 10 room types,

COUNTRY - Country where the person, who has made/ paid the reservation, lives,

RESERVATION - Promise to a customer that during a certain period a stated number of rooms for stated room types can be accommodated, and

RESERVATION DETAIL - Number of rooms in a certain room type that has been promised for a reservation.
The data model of the hotel reservation system is shown in Fig.A.1.

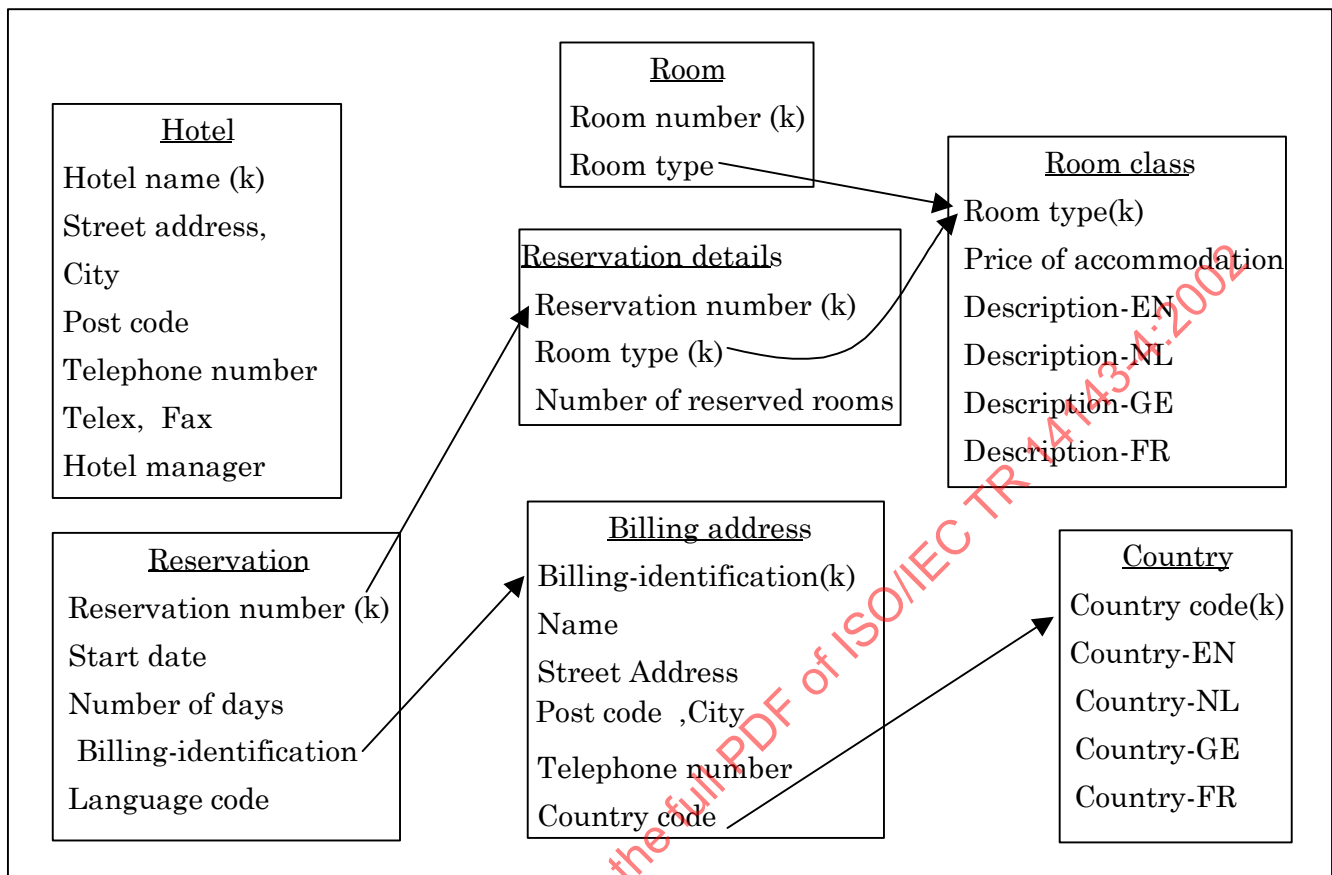


Figure A.1 — Data model of Hotel Reservation System

A.3 RUR A3: Hotel Accommodation System (Reservations) – Mock-up

A.3.1 Requirement

A.3.1.1 Overview

For demonstration purposes, a mock-up version is requested to illustrate the functions of the reservations part of a Hotel Accommodation System. The demonstration system should provide the “look and feel” of the application, emulating the user interfaces of all functions of the Hotel Accommodation System (Reservations) as defined as RUR A1 in Annex A.1. It should emulate all file access but it should not perform any calculations or logical operations. Instead, any information presented is made up just to conform to the interface format.

A.3.1.2 Details

The mock-up Hotel Accommodation System (Reservations) contains all entities described in A.1.3. Each entity, however, can only store up to three entries or records. The first entry in an entity would always be used by any function for updating purposes. No referential integrity, verification or format checks are performed for data entered into the mock-up system.

All data is displayed as on file or, if derived, made up irrespective of the actual values. The mock-up system shows only the correct format, but not the correct values. Error messages are only displayed in the appropriate locations as “error messages are shown here”. Help functions are implemented as showing “help information is displayed here”.

All data is accepted and stored in the first entry of the respective entity as entered. No data validation of any form is made. Data stored in such a way will be displayed by appropriate display functions including all mistakes, which may have been entered.

A.4 RUR A4: Adding automatic name look-up to Hotel Reservation System

Once the original Hotel Reservation System described in RUR A1 has been completed, the following facility should be added to the Hotel Reservation System:

In function RES, when entering the name into the reservation screen, the system should check if that exact name already exists in a previous reservation. If so, the system should automatically enter the details (street address, post code, city, country, telephone number, language code) into the new reservation.

If there are several different addresses for the same name the system should choose the details of the most recent reservation.

The reservation address details can be corrected if necessary.

A.5 RUR A5: Adding automatic name look-up to Hotel Reservation System

Once the original Hotel Reservation System described in RUR A1 has been completed, the following facility should be added to the Hotel Reservation System:

In function RES, when entering the name into the reservation screen, the system should check if that exact name already exists in a previous reservation. If so (and when no other name exists), the system should automatically enter the details (street address, postcode, city, country, telephone number, language code) into the new reservation.

If there are several different addresses for the same name the system should show all duplicates in a pop-up window, allowing the user to select the appropriate choice.

The reservation address details can be corrected if necessary. Alternatively the user could reject all choices and enter the data manually.

A.6RUR A6: Adding automatic name look-up to Hotel Reservation System

Once the original Hotel Reservation System described in RUR A1 has been completed, the following facility should be added to the Hotel Reservation System:

In function RES, when entering the name into the reservation screen, the system should check if that exact name already exists in a previous reservation. If so (and when no other or similar name exists), the system should automatically enter the details (street address, postcode, city, country, telephone number, language code) into the new reservation.

If there are several different addresses for the same name (or for a similar name) the system should show all candidates in a pop-up window, allowing the user to select the appropriate choice.

A name should be considered as similar when the differences result from:

upper and lower case presentation,

fillers such as space, full stop, or dash, or

abbreviations and the shorter name can be matched with parts of the longer name.

Phonetically similar names should also be included in the candidate list.

The reservation address details can be corrected if necessary. Alternatively the user could reject all choices and enter the data manually.

A.7RUR A7: TRAX Transaction Reporting

The purpose of this document is to document and agree the rules for transaction reporting through TRAX, i.e., the reporting mechanism of the International Securities Market Association ("ISMA"). The rules covered include the rules of ISMA, the Securities and Futures Authority ("SFA"), the Amsterdam Stock Exchange ("ASE") and the Bank of England ("BoE").

The document is structured by general product area and then within that the rules which apply to the relevant reporting bodies.

A.7.1 Overview of the ISMA Requirements

- members of the council of reporting dealers must report to ISMA every transaction in International Securities entered into with another member of the council or any other TRAX subscriber;
- members in the UK must report to ISMA every transaction in international securities whether or not entered into with a member of ISMA (XXBANK is based in the UK);
- transaction reporting must be effected by electronic transmission through ISMA's TRAX system (unless exempted by ISMA due to the small number of transactions, i.e., under 50 transactions per calendar month). In the case of manual transmission, reporting must be within 20 minutes of execution. However this exemption is not applicable to XXBANK and XSSA as the number of transaction in any one calendar month exceeds 50.

A.7.2 Overview of the SFA Requirements

SFA requires that members report all transactions in Investments, which it effects through an approved reporting mechanism unless the Investment or transaction is exempted.

A.7.3 Overview of ASE Requirements

The ASE requires that members report all transactions in ASE listed bonds (i.e. both corporate and government). XXBANK is a Special Corporate Member of the ASE and has elected to report its transactions using ISMA's TRAX system.

A.7.4 Overview of BoE Requirements

The BoE requests that all participants in gilt repo report their transactions either manually or through TRAX. XXBANK is a participant in the gilt repo market and decided to voluntarily report its transactions using ISMA's TRAX system.

A.7.5 Reporting Requirements

A.7.5.1 Convertibles, Warrants & GDRs

A.7.5.1.1 Product definition

- A **Convertible bond** gives its owner the privilege of exchange for other securities of the issuing company at some future date and under prescribed conditions.
- A **Warrant** confers on the holder the right, but not the obligation, to purchase or sell a fixed amount of an underlying asset at a fixed price and at a fixed future date. Similar to an OTC option except that they are usually have a longer maturity, and options usually grant rights over assets, which are currently available. For example the exercise of a warrant issued by a company will usually lead to the creation of new equity capital in that company.
- A **Global Depository Receipt (GDR)** is a receipt for shares in a foreign based corporation traded in capital markets around the world. GDRs allow companies in Europe , Asia, the US and Latin America to offer shares in many markets around the world.

A.7.5.1.2 Systems and Products

System	Entries	Products
QUOTESHEET	TD trades & ccs	Convertibles, Warrants, GDRs
TRUK (Taps)	TD trades & TD ccs	Convertibles, Warrants, GDRs, Covered warrants
TWUL	TD trades & ccs	Convertibles

Convertibles, Warrants & GDRs products can be booked to any office from any location for example from London to Tokyo and Frankfurt, and to London from New York.

A.7.5.1.3 ISMA Transaction Reporting Requirements

A.7.5.1.3.1 XSSA

XSSA, which is listed in the register of members of the council of reporting dealers, is required to report to ISMA every transaction in International Securities, e.g. most Corporate Bonds and some Government Bonds, entered into with another member of the council or another TRAX subscriber.

A.7.5.1.3.2 XXBANK

XXBANK as an ISMA Member in the United Kingdom is required to report to ISMA every transaction in International Securities whether or not entered into with a member of ISMA. XXBANK may also report to ISMA other transactions in securities that are not International Securities where XXBANK is not subject to obligations to report transactions in such securities to any other recognised or designated exchange, for example, the London Stock Exchange. These obligations are described in more detail in the sections below.

International Securities for the purposes of this rule means the securities in ISMA's list of reportable securities, published from time to time by the board. ISMA produces a listing of all domestic or international securities (the preface of the listing is attached). The listing of securities and their status is also obtainable from the TRAX system. *Covered Warrants will normally be reported in the same way that we are reporting the underlying stock that in most cases will be via TRAX. In some instances where no cusip has been allocated, we need to report direct to the SFA using the DRS system.*

A.7.5.1.3.3 Timing for ISMA Reporting

Generally transaction reports made under ISMA's rules must be filed with ISMA no later than thirty minutes from the time the terms of the transaction are agreed between the counter-parties (i.e. within 30 minutes of the time of execution).

A transaction in International Securities is subject to transaction reporting under ISMA's rules which occurs (i.e. executed) between 5:00 pm and 10:00 am local time in the country where the transaction is to be booked, or which is entered into in one country but booked in a country with a different time zone, and occurring between 5:00 pm and 10:00 am local time in the country where the transaction is to be booked (the after-hours period), shall for the purposes of this section be an after-hours transaction.

Transaction reports concerning after-hours transactions must be filed with ISMA no later than 10:30 am local time in the country where the transaction is to be booked on the next business day following the after-hours period (i.e. 10:30 am London time in the case of trades on XXBANK's books and 10:30 am Paris time in the case of trades on XSSA's books) and shall show the time and date (adjusted to show the corresponding time in the country in which the transaction is to be booked) when the transaction was entered into originally (i.e. the time of execution of a transaction executed overseas should be adjusted to show the equivalent London/Paris time depending on whether the trade is booked to XXBANK or XSSA).

"Business day" shall refer to the period from 10:00 am to 5:00 pm on each day.

A.7.5.1.3.4 Other Matters

Where a TRAX subscriber is unable to make transaction reports within the time provided because of software, hardware or communications failure it shall immediately notify ISMA. As soon as the failure has been overcome the TRAX subscriber shall notify ISMA and shall file all outstanding transaction reports as soon as possible thereafter.

TRAX subscribers must regularly during a business day access ISMA's TRAX system in the prescribed manner for the purpose of determining matched, unmatched, advisory and other transactions in respect of them.

Where a TRAX subscriber has been notified of an advisory transaction by a counter-party, the subscriber shall immediately effect a transaction entry to match or deny the advisory transaction.

TRAX subscribers must access ISMA's TRAX system in a secure manner approved by ISMA.

A.7.5.1.4 SFA Transaction Reporting via TRAX

SFA requires that XXBANK report all transactions in Investments, which it effects through an approved reporting mechanism unless the Investment or transaction is exempted. In the case of secondary convertibles, warrants and GDRs there are no product exemptions

In addition no reporting is required to be made to SFA where a firm has reported the transaction to an appropriate Qualifying Exchange (attached). This is not applicable in the case of cash convertibles, warrants and GDRs as XXBANK is not currently a member of any other Qualifying Exchange (for the purpose of trading these products).

As mentioned in A.5.5.1.3.2 XXBANK reports its transactions in International Securities through TRAX. XXBANK has decided to use the TRAX system, which has been designated as an Approved Reporting Mechanism (attached), to report transactions to SFA in other convertibles, warrants and GDRs).

A.7.5.1.4.1 Timing of Transaction Reports for SFA reporting

Reports of transactions to SFA must be made no later than close of business on trade date + 1.

A.7.5.1.5 Contents of Transaction Reports via TRAX

Under SFA rules the following fields are mandatory:

- the firm's identifying code, i.e., the SFA firm code,
- the investment's identifying code of an approved security type (attached) or a full description,
- the date and time of the transaction,
- the transaction size, price and currency,
- whether the transaction is a purchase or sale,
- whether the firm dealt as principal or agent,
- the settlement date,
- the transaction's reference number,
- any other mandatory fields required by the reporting system,
- whether the transaction is a cancellation, and
- in the case of a derivative transaction, the appropriate expiry date, strike price and whether a put or call.

With effect from May 6th 1997 a counter-party identifier will also have to be reported for investment firms, credit institutions and group companies. With effect from October 1997 counter-party identifiers for other counter-parties will be reportable.

In addition, transaction reports to ISMA must contain all details regarding the transaction that are required ISMA's TRAX system rules from time to time in force for transaction matching in the format required by those rules (see attached listing of required fields). On TRAX the special condition code of "A" should be added for all transactions where XXBANK/XSSA act as agent (if this code does not appear ISMA will assume that the member firm acted as principal). If stock lending/borrowing transactions are reported a matchable condition code of "W" should be entered.

A.7.5.2 FID - Bonds**A.7.5.2.1 Product Definition**

Bonds are interest bearing or discounted government or corporate securities that oblige the issuer to pay the bond holder a specified sum of money, usually at specific intervals, and to repay the principal amount of the loan at maturity. Bondholders have an IOU from the issuer but no corporate ownership privileges as stockholders do.

Secured bonds are backed by collateral, which may be sold by the bondholder to satisfy a claim if the bond's issuer fails to pay interest and principal when they are due.

Mortgage Backed Securities is a security where investors receive payments out of the interest and principal on the underlying mortgages.

A.7.5.2.2 Systems and Products

System	Entries	Products
BSS	TD trades & TD ccs	All
TWUL	TD trades & TD ccs	All
TRUJ	TD+1 ccs	
GTUA	TD+1 ccs	US Govt bonds
SZUA	All	
TRUJ (Taps)	TD+1 ccs	all except IBS
GHY	All	High yield products
MBUC	All	Mortgage backed securities

A.7.5.2.3 ISMA Transaction Reporting Requirements**A.7.5.2.3.1 XSSA**

XSSA, which is listed in the register of members of the council of reporting dealers, is required to report to ISMA every transaction in International Securities, e.g. most Corporate Bonds and some Government Bonds, entered into with another member of the council or another TRAX subscriber.

A.7.5.2.3.2 XXBANK

XXBANK as an ISMA Member in the United Kingdom is required to report to ISMA every transaction in International Securities whether or not entered into with a member of ISMA. XXBANK may also report to ISMA other transactions in securities that are not International Securities where XXBANK is not subject to obligations to report transactions in such securities to any other recognised or designated exchange, for example, the London Stock Exchange. These obligations are described in more detail in the subclauses below.

International Securities for the purposes of this rule means the securities in ISMA's list of reportable securities, published from time to time by the board. ISMA produces a listing of all domestic or international securities (the preface of the listing is attached). The listing of securities and their status is also obtainable from the TRAX system.

A.7.5.2.3.3 Timing for ISMA Reporting

Generally transaction reports made under ISMA's rules must be filed with ISMA no later than thirty minutes from the time the terms of the transaction are agreed between the counter-parties (i.e. within 30 minutes of the time of execution).

A transaction in International Securities subject to transaction reporting under ISMA's rules which occurs (i.e. executed) between 5:00 pm and 10:00 am local time in the country where the transaction is to be booked, or which is entered into in one country but booked in a country with a different time zone, and occurring between 5:00 pm and 10:00 am local time in the country where the transaction is to be booked (the after-hours period), shall for the purposes of this section be an after-hours transaction.

Transaction reports concerning after-hours transactions must be filed with ISMA no later than 10:30 am local time in the country where the transaction is to be booked on the next business day following the after-hours period (i.e. 10:30 am London time in the case of trades on XXBANK's books and 10:30 am Paris time in the case of trades on XSSA's books) and shall show the time and date (adjusted to show the corresponding time in the country in which the transaction is to be booked) when the transaction was entered into originally (i.e. the time of execution of a transaction executed overseas should be adjusted to show the equivalent London/Paris time depending on whether the trade is booked to XXBANK or XSSA).

"Business day" shall refer to the period from 10:00 am to 5:00 pm on each day.

A.7.5.2.3.4 Other Matters

Where a TRAX subscriber is unable to make transaction reports within the time provided because of software, hardware or communications failure it shall immediately notify ISMA. As soon as the failure has been overcome the TRAX subscriber shall notify ISMA and shall file all outstanding transaction reports as soon as possible thereafter.

TRAX subscribers must regularly during a business day access ISMA's TRAX system in the prescribed manner for the purpose of determining matched, unmatched, advisory and other transactions in respect of them.

Where a TRAX subscriber has been notified of an advisory transaction by a counter-party, the subscriber shall immediately effect a transaction entry to match or deny the advisory transaction.

TRAX subscribers must access ISMA's TRAX system in a secure manner approved by ISMA.

A.7.5.2.4 ASE Transaction Reporting (TRAX)

XXBANK is a Special Corporate Member of the ASE. The ASE requires that trades in ASE listed bonds (i.e. both corporate and government) be reported by ISMA members through TRAX and be identified by a specific condition code to reflect the type of entity with whom the trade was executed (see 2.2.6).

A.7.5.2.4.1 Timing for ASE Reporting

The transactions which are ASE reportable are also ISMA reportable and therefore are covered by the timing requirements described above for ISMA reporting.

A.7.5.2.5 SFA Transaction Reporting via TRAX

SFA requires that XXBANK report all transactions in Investments, which it effects through an approved reporting mechanism unless the Investment or transaction is exempted. In the case of secondary market cash bond transactions the only exempt Investments are wholesale money market instruments referred to in paragraph 2(2) of Schedule 5 to the Financial Services Act (see attached) other than those dealt in on a regulated market. Due to the difficulty in identifying these products it has been decided to report all bonds.

In addition no reporting is required to be made to SFA where a firm has reported the transaction to an appropriate Qualifying Exchange (attached). This is not applicable in the case of cash FID products as XXBANK is not currently a member of any other Qualifying Exchange (for the purpose of trading FID products) except for the Amsterdam Stock Exchange where reporting is arranged through ISMA's TRAX system.

As mentioned in A.5.5.2.3.2 XXBANK reports its transactions in International Securities through TRAX. XXBANK has decided to use the TRAX system, which has been designated as an Approved Reporting Mechanism (attached), to report transactions to SFA in other fixed income products (for example, USTs, JGBs).

A.7.5.2.5.1 Timing of Transaction Reports for SFA reporting

Reports of transactions to SFA must be made no later than close of business on trade date + 1.

A.7.5.2.6 Contents of Transaction Reports via TRAX**A.7.5.2.6.1 General**

Under SFA rules the following fields are mandatory:

- the firm's identifying code, i.e., the SFA firm code,
- the investment's identifying code of an approved security type (attached) or a full description,
- the date and time of the transaction,

- the transaction size, price and currency,
- whether the transaction is a purchase or sale,
- whether the firm dealt as principal or agent,
- the settlement date,
- the transaction's reference number,
- any other mandatory fields required by the reporting system,
- whether the transaction is a cancellation, and
- in the case of a derivative transaction, the appropriate expiry date, strike price and whether a put or call.

With effect from May 6th 1997 a counter-party identifier will also have to be reported for investment firms, credit institutions and group companies. With effect from October 1997 counter-party identifiers for other counter-parties will be reportable.

In addition, transaction reports to ISMA must contain all details regarding the transaction that are required ISMA's TRAX system rules from time to time in force for transaction matching in the format required by those rules (see attached listing of required fields). On TRAX the special condition code of "A" should be added for all transactions where XXBANK/XSSA act as agent (if this code does not appear ISMA will assume that the member firm acted as principal). If stock lending/borrowing transactions are reported a matchable condition code of "W" should be entered.

A.7.5.2.6.2 Specific

1) LIFFE Basis Trades

In the case of the cash leg of a basis trade undertaken using LIFFE's basis trading facility a special condition code of 'T' must be entered.

2) ASE Trades

In addition to ISMA requirements the ASE/ISMA require that the special condition field on TRAX be populated with the following codes to identify the type of ASE reportable transaction:

"D" - if the transaction is a direct dealing transaction between members of the ASE,

"U" - if the transaction is between an ASE member and a non-Dutch broker, and

"I" - if the transaction is between an ASE member and an institutional investor.

A.7.5.2.7 Booking where customer identified at trade entry

Trading acct 74 range	Customer accts 42 range
DEBIT -100@6	CREDIT +100@6
30 mins Trade report for ISMA matching members + Transaction report	

A.7.5.2.8 Booking where Single customer identified post trade entry

Trading acct 74 range	XXX	Customer accts 42 range
DEBIT -100@6	CREDIT +100@6	
DEBIT -100@6	CXL/CORR	CREDIT +100@6
30 mins Trade report for ISMA		CXL/Correct to customer not currently reported to ISMA, will require reporting after SFA BN272 after May 6th'97

A.7.5.2.9 Booking for Sub account reallocation

Trading acct 74 range	XXX	Breakdown Wash a/c	Customer accts 42 range
DEBIT -100@6	CREDIT +100@6		
DEBIT -100@6	CXL/CORR	CREDIT +100@6	
		DEBIT -40@6	CREDIT +40@6
		DEBIT -60@6	CREDIT +60@6
30 mins Trade report for ISMA		CXL/correct to wash account not currently reported to ISMA , CXL will require reporting after SFA BN272 after May 6th '97	Customer trade not currently reported to ISMA, will require reporting after SFA BN272 after May 6th '97

A.7.5.3 REPOS**A.7.5.3.1 Systems and Products**

System	Entries	Products
WFUA	All	

A.7.5.3.2 ISMA transaction reporting

ISMA require that Repos/Reverse Repos in International Securities be reported in accordance with their transaction reporting requirements.

International Securities for the purposes of this rule means the securities in ISMA's list of reportable securities, published from time to time by the board. ISMA produces a listing of all domestic or international securities (the preface of the listing is attached). The listing of securities and their status is also obtainable from the TRAX system.

A.7.5.3.2.1 Repo Transactions Reporting Rules

Equity repos are not reportable

Tri-party repos are not reportable

Any repos in 'free' rights and warrants, attached to bonds which have already been reported are not reportable,

There is no need to report a change in margin or a re-pricing. A substitution during the course of a repo is also not reportable. If however a repo is partially repaid then this should be reported.

A.7.5.3.2.2 Timing for ISMA Reporting

Trades executed by 1600 London time are to be reported by 1700 the same business day. Trades executed after 1600 are to be reported by 1000 the following business day. 'Business day' shall refer to the period from 1000 to 1700 on each day.

A.7.5.3.2.3 Contents of Transaction Reports

Transaction reports to ISMA must contain all details regarding the transaction that are required ISMA's TRAX system rules from time to time in force for transaction matching in the format required by those rules (see attached listing of required fields).

The following special conditions are required on repo transactions reported to TRAX:

- Repo 'Q',
- Repo is 'callable' 'E',
- Pensions Liveree 'Z'

On TRAX the special condition code of "A" should be added for all transactions where XXBANK/XSSA act as agent (if this code does not appear ISMA will assume that the member firm acted as principal). If stock lending/borrowing transactions are reported a matchable condition code of "W" should be entered.

A.7.5.3.2.4 Other Matters

Where a TRAX subscriber is unable to make transaction reports within the time provided because of software, hardware or communications failure it shall immediately notify ISMA. As soon as the failure has been overcome the TRAX subscriber shall notify ISMA and shall file all outstanding transaction reports as soon as possible thereafter.

TRAX subscribers must regularly during a business day access ISMA's TRAX system in the prescribed manner for the purpose of determining matched, unmatched, advisory and other transactions in respect of them.

Where a TRAX subscriber has been notified of an advisory transaction by a counter-party, the subscriber shall immediately effect a transaction entry to match or deny the advisory transaction.

TRAX subscribers must access ISMA's TRAX system in a secure manner approved by ISMA.

A.7.5.3.3 ASE transaction reporting

ASE do not require the reporting of repo transactions. There is no indication that this will change in the immediate future.

A.7.5.3.4 SFA transaction reporting

Repos are not currently transaction reportable to the SFA, although they are due to become reportable towards the end of 1997. The requirements for repo reporting to the SFA are not yet published and will therefore be considered in a later phase of the Phoenix project.

A.7.5.3.5 Bank of England reporting

The Bank of England launched a gilt repo market on 1 January 1996. XXBank & Co. International Limited, as a participant in the market, reports its transaction in gilt repo to the Bank of England using the TRAX system. The information to be reported follows that for repos in International Securities (see above). In addition ISMA have provided the following codes for Delivery by Value dummy securities:

A083525 Delivery by Value - Gilts only

A083426 Delivery by Value - Gilts and other CGO acceptable instruments

Any reporting of re-pricing and margin deliveries in Gilts should contain a matchable special condition code of "Y" to ensure that the BoE does not include such trades in its calculations.

A.7.5.4 Buy-Sell Backs

A.7.5.4.1 Systems and Products

System	Entries	Products
WFUA	All	

A.7.5.4.2 ISMA transaction reporting

Buy-sell back transactions in International Securities are viewed by ISMA as two separate transactions by ISMA and are transaction reportable to ISMA as FID Cash (Non-Repo) transactions. SFA and ASE also view buy-sell back transactions as separate transactions for transaction reporting purposes. For ease of reference the transaction reporting rules are reproduced below.

A.7.5.4.2.1 XSSA

XSSA, which is listed in the register of members of the council of reporting dealers, is required to report to ISMA every transaction in International Securities, e.g. most Corporate Bonds and some Government Bonds, entered into with another member of the council or another TRAX subscriber.

A.7.5.4.2.2 XXBANK

XXBANK as an ISMA Member in the United Kingdom is required to report to ISMA every transaction in International Securities whether or not entered into with a member of ISMA. XXBANK may also report to ISMA other transactions in securities that are not International Securities where XXBANK is not subject to obligations to report transactions in such securities to any other recognised or designated exchange, for example, the London Stock Exchange. These obligations are described in more detail in the sections below.

International Securities for the purposes of this rule means the securities in ISMA's list of reportable securities, published from time to time by the board. ISMA produces a listing of all domestic or international securities (the preface of the listing is attached). The listing of securities and their status is also obtainable from the TRAX system.

A.7.5.4.2.3 Timing for ISMA Reporting

Trades executed by 1600 London time are to be reported by 1700 the same business day. Trades executed after 1600 are to be reported by 1000 the following business day. 'Business day' shall refer to the period from 1000 to 1700 on each day.

A.7.5.4.2.4 Other Matters

Where a TRAX subscriber is unable to make transaction reports within the time provided because of software, hardware or communications failure it shall immediately notify ISMA. As soon as the failure has been overcome the TRAX subscriber shall notify ISMA and shall file all outstanding transaction reports as soon as possible thereafter.

TRAX subscribers must regularly during a business day access ISMA's TRAX system in the prescribed manner for the purpose of determining matched, unmatched, advisory and other transactions in respect of them.

Where a TRAX subscriber has been notified of an advisory transaction by a counter-party, the subscriber shall immediately effect a transaction entry to match or deny the advisory transaction.

TRAX subscribers must access ISMA's TRAX system in a secure manner approved by ISMA.

A.7.5.4.3 ASE transaction reporting (TRAX)

XXBANK is a Special Corporate Member of the ASE. The ASE requires that trades in ASE listed bonds (i.e. both corporate and government) be reported by ISMA members through TRAX and be identified by a specific condition code to reflect the type of entity with whom the trade was executed (see A.5.5.2.6).

A.7.5.4.3.1 Timing for ASE Reporting

The transactions which are ASE reportable are also ISMA reportable and therefore are covered by the timing requirements described above for ISMA reporting.

A.7.5.4.4 SFA transaction reporting via TRAX

SFA requires that XXBANK report all transactions in Investments, which it effects through an approved reporting mechanism unless the Investment or transaction is exempted. In the case of secondary market cash bond transactions the only exempt Investments are wholesale money market instruments referred to in paragraph 2(2) of Schedule 5 to the Financial Services Act (see attached) other than those dealt in on a regulated market. Due to the difficulty in identifying these products it has been decided to report all bonds.

In addition no reporting is required to be made to SFA where a firm has reported the transaction to an appropriate Qualifying Exchange (attached). This is not applicable in the case of cash FID products as XXBANK is not currently a member of any other Qualifying Exchange (for the purpose of trading FID products) except for the Amsterdam Stock Exchange where reporting is arranged through ISMA's TRAX system.

As mentioned in A.5.5.4.3.2 XXBANK reports its transactions in International Securities through TRAX. XXBANK has decided to use the TRAX system, which has been designated as an Approved Reporting Mechanism (attached), to report transactions to SFA in other fixed income products (for example, USTs, JGBs).

A.7.5.4.4.1 Timing of Transaction Reports for SFA reporting

Reports of transactions to SFA must be made no later than close of business on trade date + 1.

A.7.5.4.5 Contents of Transaction Reports via TRAX

A.7.5.4.5.1 General

Under SFA rules the following fields are mandatory:

- the firm's identifying code, i.e., the SFA firm code,
- the investment's identifying code of an approved security type (attached) or a full description,
- the date and time of the transaction,
- the transaction size, price and currency,
- whether the transaction is a purchase or sale,
- whether the firm dealt as principal or agent,
- the settlement date,
- the transaction's reference number,

- any other mandatory fields required by the reporting system,
- whether the transaction is a cancellation, and
- in the case of a derivative transaction, the appropriate expiry date, strike price and whether a put or call.

With effect from May 6th 1997 a counter-party identifier will also have to be reported for investment firms, credit institutions and group companies. With effect from October 1997 counter-party identifiers for other counter-parties will be reportable.

In addition, transaction reports to ISMA must contain all details regarding the transaction that are required ISMA's TRAX system rules from time to time in force for transaction matching in the format required by those rules (see attached listing of required fields). In the case of a buy/sell back transaction a special condition code of 'R' must be entered on both legs of the transaction. If a buy/sell back is 'callable' a special condition code of 'E' should be added. Undocumented buy/sell back transactions will have a matchable condition code of 'V'. On TRAX the special condition code of "A" should be added for all transactions where XXBANK/XSSA act as agent (if this code does not appear ISMA will assume that the member firm acted as principal). If stock lending/borrowing transactions are reported a matchable condition code of "W" should be entered.

A.7.5.4.5.2 Specific

1) ASE Trades

In addition to ISMA requirements the ASE/ISMA require that the special condition field on TRAX be populated with the following codes to identify the type of ASE reportable transaction:

"D" - if the transaction is a direct dealing transaction between members of the ASE,

"U" - if the transaction is between an ASE member and a non-Dutch broker, and

"I" - if the transaction is between an ASE member and an institutional investor.

A.7.5.5 New Issues

A.7.5.5.1 Product Definition

A stock or bond being offered for the first time. These may be initial public offerings by previously private companies or additional stock or bond issues by companies already public and often listed on exchanges.

New issues can take the form of private placements, which involve the sale of stocks, bonds or other investments directly to an institutional investor like an insurance company.

A.7.5.5.2 Systems and Products

System	Entries	Products
SUUL	All	XXBANK
TRUB	All ??	MS & Co
TRUK	TD trades & ccs	XXBANK
TRUJ	TD+1 ccs	XXBANK
SUUA	All	MS & Co
TWUL		
GTUA		DTC & other domestic US products

A.7.5.5.3 Regulatory Requirements Summary

ISMA's transaction reporting requirements do not differentiate between primary and secondary market transactions. However, under SFA rules issuing market allotments and syndications are not reportable to SFA unless they are dealt in/on a regulated market (from discussions with SFA this means that if a new issue is fungible with an existing

issue then reporting is required, if not no reporting is necessary). Given the difficulty in identifying these transactions it has been decided to report all new issue transactions. For ease of reference ISMA, SFA and ASE rules are detailed below.

A.7.5.5.3.1 XSSA

XSSA, which is listed in the register of members of the council of reporting dealers, is required to report to ISMA every transaction in International Securities, e.g. most Corporate Bonds and some Government Bonds, entered into with another member of the council or another TRAX subscriber.

A.7.5.5.3.2 XXBANK

XXBANK as an ISMA Member in the United Kingdom is required to report to ISMA every transaction in International Securities whether or not entered into with a member of ISMA. XXBANK may also report to ISMA other transactions in securities that are not International Securities where XXBANK is not subject to obligations to report transactions in such securities to any other recognised or designated exchange, for example, the London Stock Exchange. These obligations are described in more detail in the sections below.

International Securities for the purposes of this rule means the securities in ISMA's list of reportable securities, published from time to time by the board. ISMA produces a listing of all domestic or international securities (the preface of the listing is attached). The listing of securities and their status is also obtainable from the TRAX system.

A.7.5.5.3.3 Timing for ISMA Reporting

Generally transaction reports made under ISMA's rules must be filed with ISMA no later than thirty minutes from the time the terms of the transaction are agreed between the counter-parties (i.e. within 30 minutes of the time of execution).

A transaction in International Securities subject to transaction reporting under ISMA's rules which occurs (i.e. executed) between 5:00 pm and 10:00 am local time in the country where the transaction is to be booked, or which is entered into in one country but booked in a country with a different time zone, and occurring between 5:00 pm and 10:00 am local time in the country where the transaction is to be booked (the after-hours period), shall for the purposes of this section be an after-hours transaction.

Transaction reports concerning after-hours transactions must be filed with ISMA no later than 10:30 am local time in the country where the transaction is to be booked on the next business day following the after-hours period (i.e. 10:30 am London time in the case of trades on XXBANK's books and 10:30 am Paris time in the case of trades on XSSA's books) and shall show the time and date (adjusted to show the corresponding time in the country in which the transaction is to be booked) when the transaction was entered into originally (i.e. the time of execution of a transaction executed overseas should be adjusted to show the equivalent London/Paris time depending on whether the trade is booked to XXBANK or XSSA).

"Business day" shall refer to the period from 10:00 am to 5:00 pm on each day.

A.7.5.5.3.4 Other Matters

Where a TRAX subscriber is unable to make transaction reports within the time provided because of software, hardware or communications failure it shall immediately notify ISMA. As soon as the failure has been overcome the TRAX subscriber shall notify ISMA and shall file all outstanding transaction reports as soon as possible thereafter.

TRAX subscribers must regularly during a business day access ISMA's TRAX system in the prescribed manner for the purpose of determining matched, unmatched, advisory and other transactions in respect of them.

Where a TRAX subscriber has been notified of an advisory transaction by a counter-party, the subscriber shall immediately effect a transaction entry to match or deny the advisory transaction.

TRAX subscribers must access ISMA's TRAX system in a secure manner approved by ISMA.

A.7.5.5.4 ASE Transaction Reporting (TRAX)

XXBANK is a Special Corporate Member of the ASE. The ASE requires that trades in ASE listed bonds (i.e. both corporate and government) be reported by ISMA members through TRAX and be identified by a specific condition code to reflect the type of entity with whom the trade was executed (see A.5.5.2.6).

A.7.5.5.4.1 Timing for ASE Reporting

The transactions which are ASE reportable are also ISMA reportable and therefore are covered by the timing requirements described above for ISMA reporting.

A.7.5.5.5 SFA Transaction Reporting via TRAX

SFA requires that XXBANK report all transactions in Investments that it effects through an approved reporting mechanism unless the Investment or transaction is exempted. In the case of secondary market cash bond transactions the only exempt Investments are wholesale money market instruments referred to in paragraph 2(2) of Schedule 5 to the Financial Services Act (see attached) other than those dealt in on a regulated market. Due to the difficulty in identifying these products it has been decided to report all bonds.

In addition no reporting is required to be made to SFA where a firm has reported the transaction to an appropriate Qualifying Exchange (attached). This is not applicable in the case of cash FID products as XXBANK is not currently a member of any other Qualifying Exchange (for the purpose of trading FID products) except for the Amsterdam Stock Exchange where reporting is arranged through ISMA's TRAX system.

As mentioned in A.5.5.2.3.2 XXBANK reports its transactions in International Securities through TRAX. XXBANK has decided to use the TRAX system, which has been designated as an Approved Reporting Mechanism (attached), to report transactions to SFA in other fixed income products (for example, USTs, JGBs).

A.7.5.5.5.1 Timing of Transaction Reports for SFA reporting

Reports of transactions to SFA must be made no later than close of business on trade date + 1.

A.7.5.5.6 Contents of Transaction Reports via TRAX

A.7.5.5.6.1 General

Under SFA rules the following fields are mandatory:

- the firm's identifying code, i.e., the SFA firm code,
- the investment's identifying code of an approved security type (attached) or a full description,
- the date and time of the transaction,
- the transaction size, price and currency,
- whether the transaction is a purchase or sale,
- whether the firm dealt as principal or agent,
- the settlement date,
- the transaction's reference number,
- any other mandatory fields required by the reporting system,
- whether the transaction is a cancellation, and
- in the case of a derivative transaction, the appropriate expiry date, strike price and whether a put or call.

With effect from May 6th 1997 a counter-party identifier will also have to be reported for investment firms, credit institutions and group companies. With effect from October 1997 counter-party identifiers for other counter-parties will be reportable.

In addition, transaction reports to ISMA must contain all details regarding the transaction that are required ISMA's TRAX system rules from time to time in force for transaction matching in the format required by those rules (see attached listing of required fields). In the case of a buy/sell back transaction a special condition code of 'R' must be entered on both legs of the transaction. If a buy/sell back is 'callable' a special condition code of 'E' should be added. Undocumented buy/sell back transactions will have a matchable condition code of 'V'. On TRAX the special condition code of "A" should be added for all transactions where XXBANK/XSSA act as agent (if this code does not appear ISMA will assume that the member firm acted as principal). If stock lending/borrowing transactions are reported a matchable condition code of "W" should be entered.

A.7.5.5.6.2 Specific

1) LIFFE Basis Trades

In the case of the cash leg of a basis trade undertaken using LIFFE's basis trading facility a special condition code of 'T' must be entered.

2) ASE Trades

In addition to ISMA requirements the ASE/ISMA require that the special condition field on TRAX be populated with the following codes to identify the type of ASE reportable transaction:

"D" - if the transaction is a direct dealing transaction between members of the ASE,

"U" - if the transaction is between an ASE member and a non-Dutch broker, and

"I" - if the transaction is between an ASE member and an institutional investor.

A.7.5.6 Trade Booking - Public Issues - FID

Issuer Holding Account (045-05031)	Trading Account (074-00106)	Co-Manager Account MSIL(042-00025) or External (045 range)	MSIL Primary TradingAccount (074-00145)	IED Client or PCS IED(045 range) PCS(074-0013A)
DEBIT -1,000@6	CREDIT +1,000@6 DEBIT -600@6 DEBIT -400@6	CREDIT +600@6 DEBIT -600@6 CREDIT +400@6	CREDIT +600@6 DEBIT -200@6 -200@6 -200@6	CREDIT +200@6 +200@6 +200@6
Trade not reported	Trade not reported	Trade not reported	Trade not reported	Trade not reported

A.7.5.7 Trade Booking - Private Placements - FID MTN Drawdowns

Issuer Holding Account (042-NEWOS)	Trading Account (074-00137)	Customer Acct (045 range)
DEBIT -1,000@6	CREDIT +1,000@6 DEBIT -1,000@6	CREDIT +600@6 +400@6
Reported	Reported	Reported

A.7.5.8 Trade Booking - Private Placements - FID Structured Products (DPG)

Issuer Holding Account (042-08125)	Trading Account (074-00AB2)	Customer Acct (045 range)
DEBIT -1,000@6	CREDIT +1,000@6 DEBIT -1,000@6	CREDIT +600@6 +400@6 -
Reported	Reported	Reported

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A.8RUR A8: Requirements Paris Bourse Netting

A.8.1 Summary

A.8.1.1 Problem definition

The clearing fees for the settlement of equity trades on the French Domestic market are costly, they have been calculated as approximately USD 996, 880 per annum. This is due to the fact that we do not hold any positions on our Paris books (XXSA) and therefore a large proportion of our trades are between XXBank International London (XXBANK) and XXBank Societe Anonyme (XXSA).

XXBANK and XXSA settle separately and the inter-company instructions are a significant proportion of our settlement fees.

Netting the Omni trades on trade date for a specific settlement date and Cusip into a single instruction will result in an approximate total yearly saving of FRF 4,139,600 (USD 827,920).

Paris clearing has some special characteristics:

- The XXSA trades are cleared through the XXSA account at Sicovam (507), which is administered by YY.
- YY have developed special settlement systems that receive the daily Order and Execution details from the Bourse system (COCA), they administer clearing for a number of Bourse members.
- The XXBANK trades are cleared through XX Guaranty's Sicovam account (048), where XX Guaranty acts as a normal clearing agent.

A.8.1.1.1 Detailed Inter-company Trade Scenario

XXBANK want to sell FRF equity through the Paris Bourse, the following trades are booked:

1. XXBANK sells to XXSA omni: XXBANK instructs XX Guaranty (XGPE) to deliver securities to XXSA's account at Sicovam (Sicovam id 507).
2. XXSA buys from XXBANK omni: YY administer XXSA's account at Sicovam and instruct to receive from XX Guaranty (Sicovam id 408).
3. XXSA sells to the Paris Bourse: the Bourse trades automatically settle at Sicovam with a delivery from XXSA's account to the Bourse.

The clearing fees we pay for transfer of the position from XXBANK to XXSA (points 1&2 in the above example) are excessive, due to the fact that we currently do this for each order against the Bourse. This results in multiple transfers for the same product and settlement date, which we are charged for individually.

A.8.1.2 Summary of Requirements

The omnibus netting algorithm that we implement must be consistent with the netting algorithm that YY uses; this is to ensure that the netted instructions match.

We must be able to easily reconcile any discrepancies with YY.

The Paris Month-end settlement must not be adversely affected by the omnibus netting.

A.8.1.3 Recommended Solution

Implement netting of the Paris Omni instructions on a daily basis, netting the instructions by product, settlement date and trade date.

A.8.2 Requirements Statements**A.8.2.1 Functional Requirements****A.8.2.1.1 Instruction Netting**

1. YY the administrator of our settlement with Sicovam (507) will process the orders and executions file they receive at the end of the day from Servisen and net the omnibus movement for agent MSB1 0347 and account 03919506 by product, trade date and settlement date into a single instruction. Unless the quantity nets to zero, then two offsetting instructions, a buy and a sell will be created.
2. XXBank will net the omnibus instructions for agent MSB1 0347, account 039 19506 and agent MGPE, account 045 14116 in the Agent Bank system in exactly the same way as YY.
3. Netting will run when the Trade Entry system has been disabled at end of day. No omnibus instructions will be sent to XX Guaranty until the netting has completed.

A.8.2.1.2 Settlement/ Reconciliation

1. The current trade date reconciliation reports will need to include details of the netted omnibus instructions and the bulked underlying instructions for both YY and XXBank. These reports will be used to investigate the details of any unmatched netted instructions between YY and XXBank.
2. XXBank will keep the XSB1 0347 (XXSA) netted instruction in a held status and reconcile them with YY's settlement results on settlement date. The matched instructions status will be changed to finalised and any breaks will be reported on and investigated.
3. The XGPE 0302 (XXBANK) netted instructions are forwarded via SWIFT to XX Guaranty, our firm agent for French equities on the London books, who instruct the Relit settlement system on our behalf.
4. On settlement date we get a download of settlement results (D4 - SDENOU.TXT) from YY, we match the YY settlement results with our settlement instructions in Agent Bank that are in a held status. The matched (settled) Agent Bank instructions status is changed to finalised. Reports are printed detailing the settled instructions and any instructions with no match (unsettled).
5. XX Guaranty will also report back when the bulked instructions settle. On receipt of these settlement messages the bulking process updates all the underlying instructions for the bulk to a finalised ('FI') status such that they are picked up by the Agent Bank open item cleanup process and all open items related to the underlying trades are closed out with a cleanup code of LAD to ensure that no journals are cut for the underlying instructions. The bulk instruction is set up to cut journals.
6. Post Trade date cancel/corrects and cancels (from Trade Entry) will be rejected and will NOT undo netting. The trades between XXSA and XXBANK are generated automatically from Bourse executions; therefore there should be very few post Trade Date cancels or cancel/corrections. The amendments may well be incorrect, but they will be reported to Operations and if required the amendments should be instructed manually via Agent Bank.

A.8.2.2 Operational Requirements

A.8.2.2.1 Data Security

- Standard Agent Bank Data Security

A.8.2.2.2 Application Security

- Standard Agent Bank Application Security

A.8.2.2.3 Backup/Recovery

- In the event of any systems problems the Omni netting process will be designed to be rerun from the beginning and therefore be able to restart in the middle of the netting process, ignoring instructions that have already been netted.

A.8.2.2.4 Reliability/Availability/Serviceability

- Month end issues for cleanup of netted items

A.8.2.2.5 Performance

- Batch; needs to run before end of day

A.8.2.2.6 Archiving

- Standard Agent Bank archiving

A.8.2.2.7 Holiday Processing

- netting should run every day (if there is nothing traded there will be nothing to net)
- settlement of netted items should run every day we get a feed from YY or SWIFT statements from XX Guaranty

A.8.3 Recommended Solution

A.8.3.1 Recommendation

As Paris Bourse has monthly settlement, there are two options:

1. Net all omni trades by cusip and value date.
2. Net all omni trades by cusip, value date and trade date on a daily basis.

We recommend option 2, as option 1 has the following problems:

- Having only a few extremely large trades between XXBANK and XXSA, which could cause problems if there were short positions.
- Dividend payments within netted trades. Netting trades over several trade dates could give rise to the problem of part of an instruction being cum dividend and part of it ex-dividend. Netting per day means that all dividend payments are made automatically in the Relit system, according to trade date.

A.8.3.2 Cost and Benefit

A.8.3.2.1 Costs

- Analysis 21 Days (Incurred)

- Design 14 Days
- Code/Test 21 Days
- Implement/Train 00 Days
- Total 56 Days \$USD 112,000.

A.8.3.2.2 Benefit

1. XXBank's annual cost savings based on the current fee schedule charged by YY, through the netting of Omni's would be as follows (based on volumes for the months of May, June, and July 1995):
 - Current Fees for trades between XXBANK and XXSA:
 - trades per quarter at FF 100 per trade = FRF 4,984,400 per year (USD 996,880 - rate 1 USD = 5 FRF)
 - Hypothetical Fees with Omni's netted :
 - trades per quarter at FF 100 per trade = FRF 844,800 per year, (USD 168,960)
 - Total Savings per year = FRF 4,139,600, or USD 827,920
2. The Omni reconciliation will be easier due to the reduced inter company trade volumes.
3. XXBank is also charged for each order XXBANK enters regardless of the net result. E.g. In the same trading day XXBANK might buy 1000 Accor and sell 1000 Accor against the market. The net effect for this movement on XXSA is zero, but as YY sends delivery instructions to Sicovam on our behalf for each order, we are charged for both.

A.8.3.3 Scope and Size

This is a standard small project.

A.8.3.4 Schedule

This is a standard small project that will be implemented by the small projects group following the defined schedule. The various stages in the project will be control by the project coordinator who will allocate the people responsive.

1. Requirements and Functional Specifications Report
2. Technical Specification Definition
3. Coding
4. Unit Testing
5. System Testing
6. Run in Parallel
7. Go-live

A.8.3.5 Critical Success Factors/Assumptions/Issues

A.8.3.5.1 Critical Success Factors

1. The netted Omni delivery instructions created for XXBANK and XXSA should match exactly with the netted instruction that YY use to instruct Sicovam on our behalf.
2. The Omni Netting process must not adversely affect the month end settlement and reconciliation process; the month end settlement and reconciliation process should require minimal Paris and London operations manual intervention.
3. Due to the fact that the majority of the XXSA, XXBANK trades will be created by completed orders and executions entered by the trades into the Servisen system there should be very few (less than 5) post Trade date cancels and cancel/ corrections per day. These amendments will be processed manually by operations.
4. The current Trade Date + 1 and Month end reconciliation processes will include detailed reports of the netted instructions and underlying instructions, highlighting any discrepancies between YY and XXBank. These reports will be used by operations to investigate and remedy any discrepancies.

A.8.3.5.2 Assumptions

1. We require YY to implement the Omni netting as agreed on the same trade date, they must also be able to provide us with the netting details that will feed into our reconciliation match merge process in a timely fashion.
2. There should be very few cancel/corrects and cancels, since the orders and executions that create the Agent Bank instructions and are used by YY to instruct Sicovam, come directly from the trader's Servisen terminals.

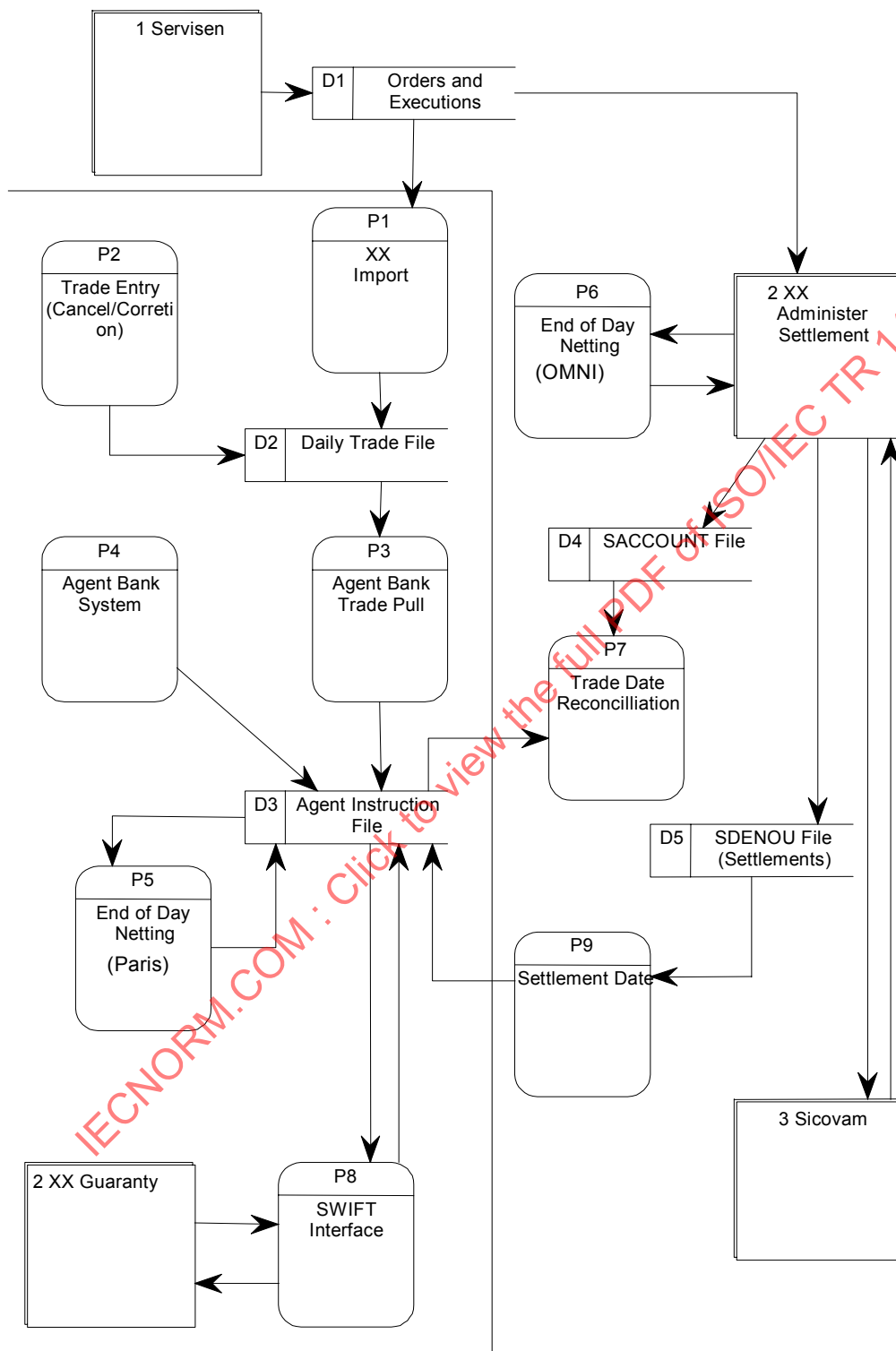
A.8.3.5.3 Issues

1. Netting - We require detailed information about YY's Netting process, to ensure that we can net in exactly the same manner.
2. Reconciliation - We will require detailed information about the download files from YY that will be used to Reconcile the netted instructions and their underlying instructions on Trade Date + 1 and Settlement date, this information will be vital in ensuring timely and accurate settlement.
3. Communication - There is Potential for miscommunication as there are many groups involved. London IT, London Operations, Paris Operations, Paris IT, YY, XX Guaranty.

A.8.4 Functional Specifications

A.8.4.1 Proposed Process Details

A.8.4.1.1 Detailed Data Flow Diagrams



A.8.4.1.2 Detailed Process Descriptions

A.8.4.1.2.1 Servisen

There will be no changes to the current Servisen processing.

1. The XXBANK trader enters an Order in Servisen System against the Paris Bourse
2. The Executions are carried out on the Paris Stock Exchange (Societe de Bourse).

P1 - XXBank Import

1. The completed order and its execution information **(D1)** is downloaded from the Servisen system and loaded into the TAPS system. The same information is downloaded at the end of the day to YY in Paris who administer our settlement at Sicovam (507).

P2 - Trade Entry System

1. Manual trades between XXBANK and XXSA are entered, these include French client, IBS, convertible bonds, warrants and rights trades, YY is instructed by fax.
2. Trade date Cancels and Cancel/Corrections are entered via TRUK and will be pulled by the Agent Bank pull-load and processed in the Agent Bank creating new settlement delivery instructions.
3. Post trade date Cancels and Cancel/Corrections are entered via TRUK, they will also be pulled by the Agent Bank pull-load, but will be rejected by the Paris Omni processing. A report will be printed for action by operations.
4. Post Trade Date Trades entered manually between XXBANK and XXSA.

P3 - Agent Bank Trade Pull

The Agent Bank system pulls the trades from the daily trade file (D2) on a real time basis these trades are processed in Agent Bank. The Omni netting processing will identify the XXSA and XXBANK omnibus trades using table (AI73) and place them in a unique held status to be selected by Omni netting processing at the end of the day.

P4 - Agent Bank System

Delivery Instructions can be entered, cancelled or cancel/corrected manually using the Agent Bank system.

P5 - Agent Bank Paris Omni Netting (End of Day)

At the end of the Trading day when trade entry has been brought down the Omni Netting process will run. The Paris omnibus trades will be selected and netted together in the same manner as YY, by product, settlement date and trade date.

The netted instructions for our London agent XX Guaranty (XGPE 0302) are sent via SWIFT and the netted instructions for XXSA (XSB1 0347) are kept in a held status for settlement date be reconciled with the YY.

A.8.4.1.2.2 YY Administer Settlements

On the Paris (XXSA) side there is a file transfer at the end of the day between Servisen and YY, which sends details of all completed orders and their executions that have been processed against the Bourse.

P6 - YY Omni Netting (End of Day)

YY will process the omnibus trades and net them together by product, settlement date and trade date to create single settlement instructions and send the instructions to the Relit settlement system for settlement against our account at Sicovam (507).

P7 - Trade Date +1 Reconciliation

We currently reconcile the executions and orders between XXBank and YY at the end of the day and create reports showing any exceptions between XXBank and YY. The exception reports are investigated by operations on Trade date + 1.

The current reports will highlight the unmatched omni orders and executions, but will not show the details of the underlying instructions; this will make it difficult to investigate the discrepancy.

Depending on whether YY can supply us with the details of the underlying instructions bulked together per netted instruction, the reconciliation process will be improved to match the netted instructions and their underlying instructions and report on any discrepancies for investigation by operations.

A.8.4.1.2.3 XX Guaranty**P8 - SWIFT Interface**

XX Guaranty (XGPE 0302) the firm agent for French equities on the London books will receive the netted instructions detailing the movement between their account at Sicovam (048) and XXSA's account at Sicovam (507) via a SWIFT message.

P9 - Settlement Date

On settlement date this process uploads the file of Settlement results (D4 SDENOU.TXT File) transmitted from YY and matches the YY's settlement instructions against the instructions on Agent Bank. The only difference will be that we will now have a single omnibus instruction per product, trade date and settlement date. Reports are produced detailing all the settled orders and any that have not settled.

The settled instructions for XXSA (XSB1 0347) will be cleaned up, the netted instructions status will be changed to finalised and will cut journals, the underlying instructions will be finalised with a cleanup code of LAD to prevent journals being cut.

XX Guaranty will also report back when the netted instructions settle. On receipt of the settlement messages, the bulking process updates the netted instruction to a finalised ('FI') status and all the underlying instructions to a finalised ('FI') status with a cleanup code of LAD to prevent journals being cut.

The Agent Bank cleanup process will clean up all the open items, and cut journals for the netted instruction.

We also reconcile the positions between YY and our Bank Reconciliation's System (RBUA). We get a daily position feed from YY (SBALTITR.TXT), that is compared with the positions in system RBUA. Reports are printed detailing any position breaks.

Annex B (normative)

Real Time / Control RUR

B.1 RUR B1 : Basic Subtraction

The user states the requirement to be able to subtract two fields (FieldA and FieldB) from each other and receive the result in a third field (FieldC). $\text{FieldC} = \text{FieldA} - \text{FieldB}$. The result should be available within 0.01 seconds.

Signed integer numbers (range –99999999 to +99999999) can be subtracted. Any other value in FieldA or FieldB will result in an error message. FieldC will display the difference between FieldA and FieldB.

B.2 RUR B2: Significantly larger function

The user states the requirement to be able to subtract two fields (FieldA and FieldB) from each other and receive the result in a third field (FieldC). $\text{FieldC} = \text{FieldA} - \text{FieldB}$. The result should be available within 0.01 seconds.

The data format of FieldA or FieldB can be:

1. signed integer (range –99999999 to +99999999),
2. date (format DDMMYYYY, range 01011800 to 31129999), or
3. time (format HHH.MM).

FieldA and FieldB have to be in the same data format. Mixed data formats or any other data formats will result in an error message. FieldC will always be in signed integer data format denoting:

1. the difference of signed integers, example: FieldA: +9567, FieldB: +568, FieldC: +8999,
2. the number of days between two dates, example: FieldA: 30081996, FieldB: 20071996, FieldC: +41, and
3. the number of minutes between two times, example: FieldA: 102.25, FieldB: 094.55, FieldC: +450.

B.3 RUR B3: Slightly larger function

The user states the requirement to be able to subtract two fields (FieldA and FieldB) from each other and receive the result in a third field (FieldC). $\text{FieldC} = \text{FieldA} - \text{FieldB}$. The result should be available within 0.01 seconds.

As in RUR B2 the data formats of FieldA and FieldB can be:

1. signed integer,
2. date, or
3. time.

The data formats of FieldA and FieldB can be mixed but, when mixed, FieldB must be a signed integer. Incorrect data format combinations or other data formats will result in an error message, which specifies the error type.

When the data format in FieldA and FieldB are the same, the resulting FieldC, as in RUR B2, will be in signed integer format denoting the difference between:

1. two integers,
2. two dates in number of days, and
3. two times in number of minutes.

FieldC will be in the data format of FieldA when the data format in FieldA and FieldB is mixed, denoting:

1. the date preceding the date in FieldA by the number of days specified in FieldB: example: FieldA: 30081996, FieldB: +41, FieldC: 20071996, and
2. the time preceding the time in FieldA by the number of minutes specified in FieldB: example: FieldA: 102.25, FieldB: +450, FieldC: 94.55.

B.4RUR B4: User requirement of a single display field

Consider RUR B1 with the following user defined implementation requirement:

A primitive input device with only one data entry/display field is used. The common entry/display field together with an <ENTER> key provides all user communication. The user enters FieldA, then the <ENTER> key and then FieldB followed by the <ENTER> key. The system will display FieldC or an error message.

B.5RUR B5: User requirement for error messages

Consider RUR B1 with the following user defined implementation requirement:

The error messages are stored together with the program logic.

B.6RUR B6: User requirement of user maintained error messages

Consider RUR B1 with the following user defined implementation requirement:

The error messages are stored in a data file which external users may modify.

B.7RUR B7: User requirement of an internal function

Consider RUR B1 with the following user defined implementation requirement:

The subtract-function is part of a general-purpose function requested by the user to assist in the automation of the business operation. Communication with the subtract-function is only made by a number of different computer programs, which then will include the subtract-function.

B.8RUR B8: Automatic line switching

B.8.1 General description

Two lines - a working line and a backup line - are provided for a communication channel. If the working line degrades or fails the backup line is used instead. The decision to switch from one line to another is made by the receiving side. The switch to the backup line will remain in effect even after the working line becomes fully operational.

A standard redundancy method is used to continuously check the accuracy of the transmissions. Error correction, however, is not part of the application and is carried out externally. The error rate of a line signal will determine if the quality of a line is normal, degraded, or has failed. Since the lines are monitored continuously a complete loss of signal will initially be detected as a degraded quality. The expected response to a degraded or failed signal on the working line is to automatically switch to the backup line, if that line is in better condition.

B.8.2 External Commands

Technicians are provided with a set of commands to change the configuration of the channel.

- remove line: the line is taken out of service,
- restore line: the line is placed in service,
- forced switch: the line is selected for communication as long as it is in service, and
- conditional switch: the line is selected for communication, as long as it is in service and at least at the same quality as the line currently selected.

B.8.3 Properties

- a) The quality of a line has four levels:
 1. "normal" ($<10^{-9}$ error rate),
 2. "degraded" (10^{-5} to 10^{-9} error rate),
 3. "failed" ($>10^{-5}$ error rate, or no signal), and
 4. "out of service".
- b) One and only one of the two lines is selected for communication at any given time.
- c) When a "remove work line" event occurs:
 - if the work line is not out of service,
 - then it goes out of service,
 - otherwise the work line remains out of service.

(The behaviour on a "remove backup line" event is analogous).
- d) When a "restore work line" event occurs:
 - if the work line is out of service,
 - then it becomes normal,
 - otherwise the level of the work line does not change.

(The behaviour on a "restore backup line" event is analogous.)
- e) When a "forced switch to work line" event occurs:
 - if the working line is not out of service,
 - then it becomes the selected line,
 - otherwise the selection of the lines remains unchanged.

(The behaviour on a "forced switch to backup line" event is analogous.)

- f) When a “conditional switch to work line” event occurs:
- if the work line is not out of service and is not of poorer quality than the backup line,
then the work line becomes the selected line,
otherwise, the selection of the lines remains unchanged.
- (The behaviour on a “conditional switch to backup line” event is analogous.)
- g) When a “work line degraded” event occurs:
- if the quality of the working line is “normal”,
then it will change to “degraded”,
otherwise, the quality of the work line remains unchanged.
- (The behaviour on a “backup line degraded” event is analogous.)
- h) When a “work line failed” event occurs:
- if the quality of the work line is “degraded”,
then it will change to “failed”,
otherwise, the quality of the work line remains unchanged.
- (The behaviour on a “backup line failed” event is analogous.)
- i) When a “work line cleared” event occurs:
- if the quality of the work line is “degraded” or “failed”,
then it is set to “normal”,
otherwise, the quality of the work line remains unchanged.
- (The behaviour on a “backup line cleared” event is analogous.)
- j) If a
- “remove line”,
 - “restore line”,
 - “line degraded”,
 - “line failed”, or
 - “line cleared” event occurs,
- and the currently unselected line becomes of a higher quality than the selected line,
then the selection will be switched.
- k) Removing, restoring, deterioration, or clearing of a line does not affect the quality of the other line.
- l) Switching the selected line does not affect the quality of either line.
- m) It is forbidden to switch to a line that is out of service, except when both lines are out of service.
- n) The selected line will only change as a result of one of the following:
1. the selection is changed with a switch command,
 2. the currently selected line deteriorates to a quality inferior to the other line,
 3. the currently selected line goes out of service, or
 4. the currently unselected line clears (or is restored) to a quality better than the selected line.

B.9RUR B9: Valve Control System

B.9.1 CONTEXT

The functional requirements below describe the behaviour of the solenoid control valve on a hydraulic circuit valve controlling a mechanical device for changing gear on an automatic transmission installed in a land vehicle. The valve can be open or closed, it is open by default and closed to engage the gear change mechanism. The process controls the amount of time the valve is close during an operating cycle of several thousand microseconds. A clock supplying the operating cycle reference triggers the process.

B.9.1.1 INPUT

The process uses as input:

- A sensor signal (Gc) indicating gear change is in progress (value 1) or not (value 0),
- A sensor signal (Su) indicating, during gear change, if shifting to upper gear (value 1) or lower gear (value 0),
- A sensor signal (Idl) indicating whether the transmission is under stress (value 0) or idling (value 1),
- A binary flag "A" which value is stored in the processor ROM memory or
- A binary flag "B" which value is stored in the processor ROM memory,

Binary flags "A" and "B" describe some general configuration characteristics of the automatic transmission.

B.9.1.2 OUTPUT

The process produces as output:

Time (T), during one operating cycle, during which the control valve must be closed.

B.9.2 REQUIREMENTS

B.9.2.1 PART A – Determine general operating condition

Determine whether operating slowly or quickly from the closed state of the hydraulic valve.

```
IF (    Gc = 1
      AND Idl = 1
      AND A  = 0
      AND B  = 0 )
```

THEN, operating under normal condition, perform PART B

```
IF (    Gc = 1
      AND Idl = 0
      AND Su = 1
      AND A  = 0
      AND B  = 0 )
```

THEN, operating during gear change, perform PART C

B.9.2.2 PART B – Control to open hydraulic valve slowly from its closed state

Reset T to the smaller value of either INIT or the value of T during the last process cycle, where INIT is a constant stored in the computer ROM memory,

Compute the new value of T: $T = T - (Cst_X * ET)$

where Cst_X is a constant stored in the processor ROM memory and ET is the elapsed time since an action that opens the hydraulic valve slowly from its closed state has been activated.

Condition for completion:

if the following conditions are met then valve control is passed to another process:

T is smaller or equal to LT

OR

Slp is greater or equal to Uslp

Where LT is a lower threshold of time and Uslp is an upper threshold of amount of slip stored in the processor ROM memory. Slp is the current amount of slip, which denotes the difference of number of revolution between the engine output shaft and the power train shaft. The value is computed and updated according to the following formula and stored in the processor RAM memory.

$$Slp = |E_{rev} - PS_{rev}|$$

Where E_{rev} is the engine's output shaft revolution and PS_{rev} is the power train shaft revolution. Both variable's value are supplied by concurrent processes using input from separate sensors and placing calculated result in the processor RAM memory.

B.9.2.3 PART C – Control to open the hydraulic valve quickly from its closed state

- Reset T to the smaller value of either INITS(Vs) or the value of T during the last processing cycle, where INITS is a table of initial value stored in the processor ROM memory and Vs is the vehicle speed which is computed and updated by another process and stored in the computer RAM memory.
- Compute the new value of T: $T = T - (INCR(Vs) * ET)$ where INCR is a table of increments which depend on the speed of the vehicle stored in the processor ROM memory and ET is the elapse time since an action to close the hydraulic valve quickly from its closed state has been activated,
- Condition for completion: if the following conditions are met then valve control is passed to another process:

T is smaller or equal to LT

Where LT is a lower time threshold stored in the processor ROM memory.

NOTE From a functional size measurement perspective, the data attributes and data structures preserved in the processor ROM and RAM memory are considered to reside within the software boundary.

B.10 RUR B10: Gateway System

B.10.1 INTRODUCTION

B.10.1.1 Purpose

The purpose of this study is to specify the functional requirements for the *SAVAT Gateway (SAGA)* for the *Mail-Order* supplier *SAVAT Corporation*.

This functional specification:

- sets out all the software requirements of the system as approved by the user.
- describes the inputs, outputs, functional processes, and the environmental requirements.
- will provide the technical basis for the Systems Design Document.
- will be the document which will be used to validate the delivered system.
- describes the functional requirements of the *Gateway* that is required to support the transition of the *SAVAT Corporation's* videotext *Mail-Order* system from the *Presentation/9* system to the *AUS-ONLINE* multimedia platform.

B.10.1.2 Audience

The audience of this document includes:

- Development Team
- AUS-ONLINE Multimedia project sponsor
- Project board
- Quality Reviewer

B.10.1.3 Definitions, Acronyms and Abbreviations

SAGA	SAVAT Gateway Application
MOIS	MAIL-ORDER Interface Specifications
EC	External Computer located at SAVAT
X.25	CCIT Recommendation for packet switched networks
TCP	Transmission Control Protocol
P/9	Presentation/9
MAIL-ORDER	SAVAT's Electronic Mail Home Mail-Order Service

B.10.2 Current Situation

B.10.2.1 Overview

SAVAT provides a public access mail-ordering system through a videotext interface system. The SAVAT *Mail-Order* system allows users using their videotext terminal to be able to login online and:

- order SAVAT products directly
- receive current account balance
- obtain monthly statement
- order a new product catalogue.

The AUS-ONLINE organisation provides the interface between the user's videotext terminal and the SAVAT Corporation's mail order application. The AUS-ONLINE interface system is called *Presentation/9* videotext system.

AUS-ONLINE plan to decommission the *Presentation/9* videotext system and replace it with a multi-media system which will allow the user to use a variety of different types of terminals. When AUS-ONLINE implement their new presentation software they will need to provide an alternative means of public access to the current *Presentation/9* Service Providers, such as SAVAT.

B.10.2.2 Existing Hardware and Software

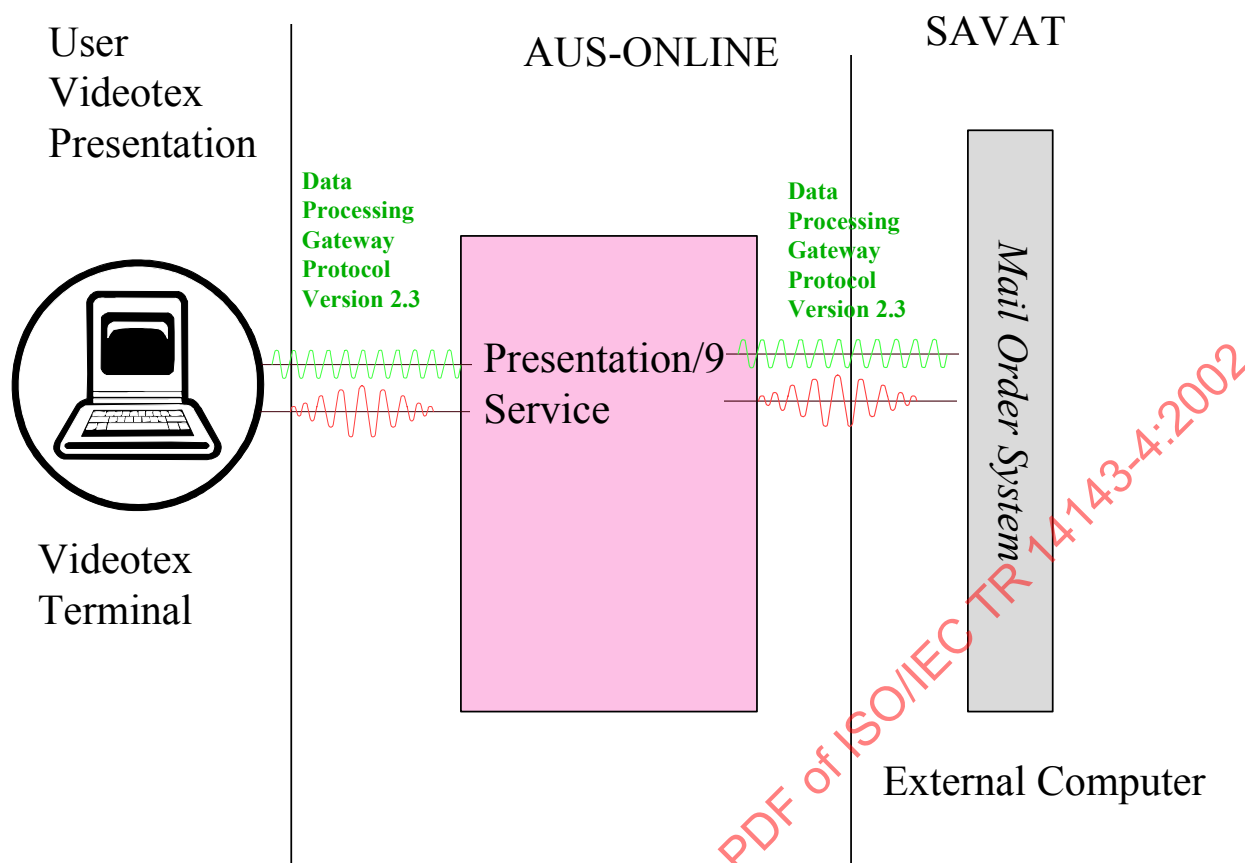
The current interface to the SAVAT *Mail-Order* system is via videotext terminals connected to the AUS-ONLINE *Presentation/9* (P/9) service.

The AUS-ONLINE P/9 service:

- drives the user interaction between the videotext presentation interface and the SAVAT *Mail-Order* system which is implemented on an External Computer (EC)
- uses a communications protocol which:
 - passes data between the videotext system and the SAVAT External Computer
 - is the AUS-ONLINE Media Gateway Protocol Version 2.3
 - provides the facilities to describe P/9 user actions to SAVAT's External Computer and receive 'page retrieval', data collection or other videotext responses from the External Computer.

The *Mail-Order* service facility provides the following online ordering and account keeping services to authorised users:

- Account Balance Details
- Ordering of Products
- Ordering of Product Catalogues
- Other related maintenance functions.



B.10.3 Objectives and Scope

B.10.3.1 Business Objectives

The SAGA application (SAVAT Gateway System) will provide the alternative means of providing public access to the service provider SAVAT.

The main business objective is to move the access to the SAVAT *MAIL-ORDER* system from the current Presentation/9 system to the AUS-ONLINE multimedia platform with no impact on the existing SAVAT *Mail-Order System*.

The SAVAT Gateway will act as an intermediate system between the AUS-ONLINE multi-media application and the SAVAT *Mail-Order Application* to enable the transition to the new platform to be transparent to the existing SAVAT Application.

B.10.3.2 Scope

This study encompasses all the functional requirements for the project to provide a gateway into the SAVAT Corporation's *Mail-Order* software. The SAVAT Gateway will:

- use the *Mail-Order* Interfacing Specification's supplied requests,
- mimic the V2.3 protocol to the SAVAT External Computer
- collect all the required details from the SAVAT External Computer.

The SAVAT Gateway will perform the following functions:

- establish a session for each User which logs onto the AUS-ONLINE system requesting SAVAT access.

- collect data from the SAVAT External Computer's *Mail-Order* System based on the *Mail-Order* Interfacing Specifications requests
- return information error responses. For example if there is a communication link breakdown disconnect the session.

The SAVAT Gateway will be able to cater for the following SAVAT *Mail-Order* functions:

1. Display Account Statements
2. Provide Account Balance
3. Accept Purchase Orders for Goods
4. (*Modify Purchase Orders*)¹
5. Order Account Statement
6. Accept Catalogue Order
7. Maintenance of Administrative Services Menu

The 'Maintenance of Administrative Services Menu will include:

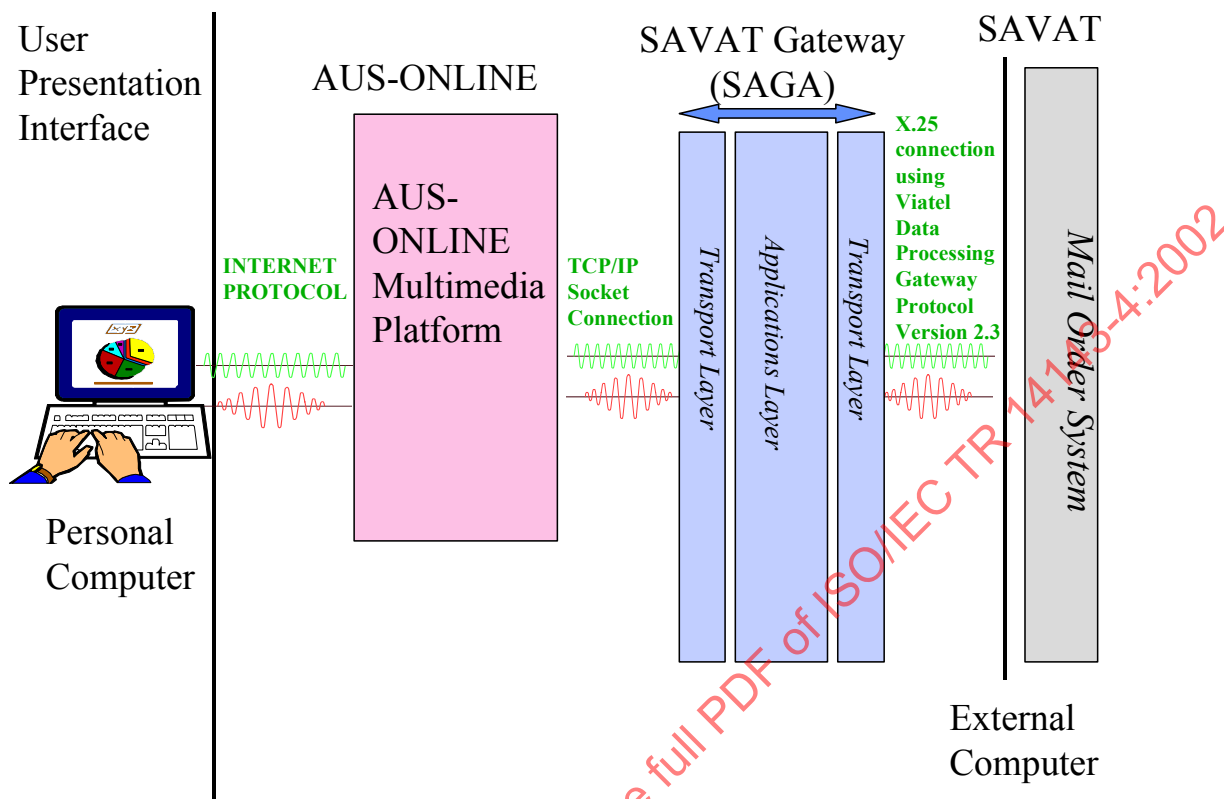
- 7.1. Change Password
- 7.2. Freeze Logon ID Number
- 7.3. Enquire on last 'n' Order Transactions
- 7.4. (*Cancel Purchase Orders*)²
- 7.5. Product Category Maintenance Menu
 - 7.5.1. Register New Product Category
 - 7.5.2. Delete Product Category
 - 7.5.3. (*Amend Product Category Details*)³
 - 7.5.4. Product Category Directory

¹ Not yet implemented on SAVAT

² Not yet implemented on SAVAT

³ Not yet implemented on SAVAT

B.10.3.3 System Architecture



B.10.3.4 System Objectives

The *SAVAT Gateway Application* is to be installed on an Alpha VMS platform. The application uses both TCP/IP sockets and X.25 communications interfaces to connect to the other parties of the system. The AUS-ONLINE Multi-Media platform is on a Tandem Computer. The Tandem will establish a TCP/IP connection to the Gateway for each session that is activated by the user requiring access to the SAVAT system. It uses the transactions to request and action *Mail-Order* functions on the SAVAT system.

The Gateway will carry out the following functions:

1. Establish a separate session with SAVAT for each active user connection from the AUS-ONLINE Multi-media application (Note: this connection will use the Media Data Processing Gateway Protocol V2.3 to communicate with the SAVAT application over the X.25 Network.)
2. Use a state transition table to control the processing steps i.e. to map the single AUS-ONLINE transactions to the multiple step transactions of the SAVAT applications.
3. Outputs an application's trace log for debugging purposes. The level of trace required will depend on the volume of data.
4. Control the configuration of the various parts of the application by the use of configuration files, which define the communications and application variable components that will vary with the implementation mode. The configuration parameters will include communications addresses, network definitions, home page addresses and level of trace. The Gateway application **will not** provide functions, which can update these files.

B.10.4 System Environment

B.10.4.1 Hardware Environment

The SAVAT Gateway will be implemented on a DEC Alpha 3000/600. It has access to the AUS-ONLINE Tandem via TCP/IP socket interface. It also has access to the SAVAT External Computer via the X.25 network.

B.10.4.2 Software Environment

The DEC Alpha runs the open VMS version 6.1 for AXP operating system. The TCP/IP services are provided by the software TCP/IP Services for open 3.2 (UCX). The X.25 services are provided by X.25 client version 1.1.

B.10.4.3 Communications and Network Environment

The following diagram shows the various layers of data communications as it applies to the Gateway application, both at the AUS-ONLINE end and the SAVAT end.

Gateway Robot Application		
Gateway - AUS ONLINE application interface	Application Layer	Gateway Robot - SAVAT application interface (V2.3 Data Processing Gateway Protocol)
TCP Protocol	Transport Layer	
Internet Protocol	Network Layer	X.25 Network Protocol
Ethernet	Physical Layer	X.25 Network

B.10.5 Functional Description

The user logon request from AUS-ONLINE application is received by the SAVAT Gateway and it tries to establish a connection with the SAVAT application. Once the connection is established the Gateway session gets into conversation mode. It then issues further requests and collects data from the SAVAT application. Once all the required data is collected, it sends a response back to the user. When all the transactions are complete the Gateway application disconnects the session. The various requests from the AUS-ONLINE application and the transaction flow, which follows, are discussed in the following sections.

The Gateway Application will mimic the user's screen commands/menu selections by sending requests to the SAVAT application. The SAVAT application will send the appropriate 'frames' back to the Gateway Application containing the requested 'screen' information to be displayed. The Gateway sends this transaction data to the AUS-ONLINE application, which presents it to the user as displayed screen information.

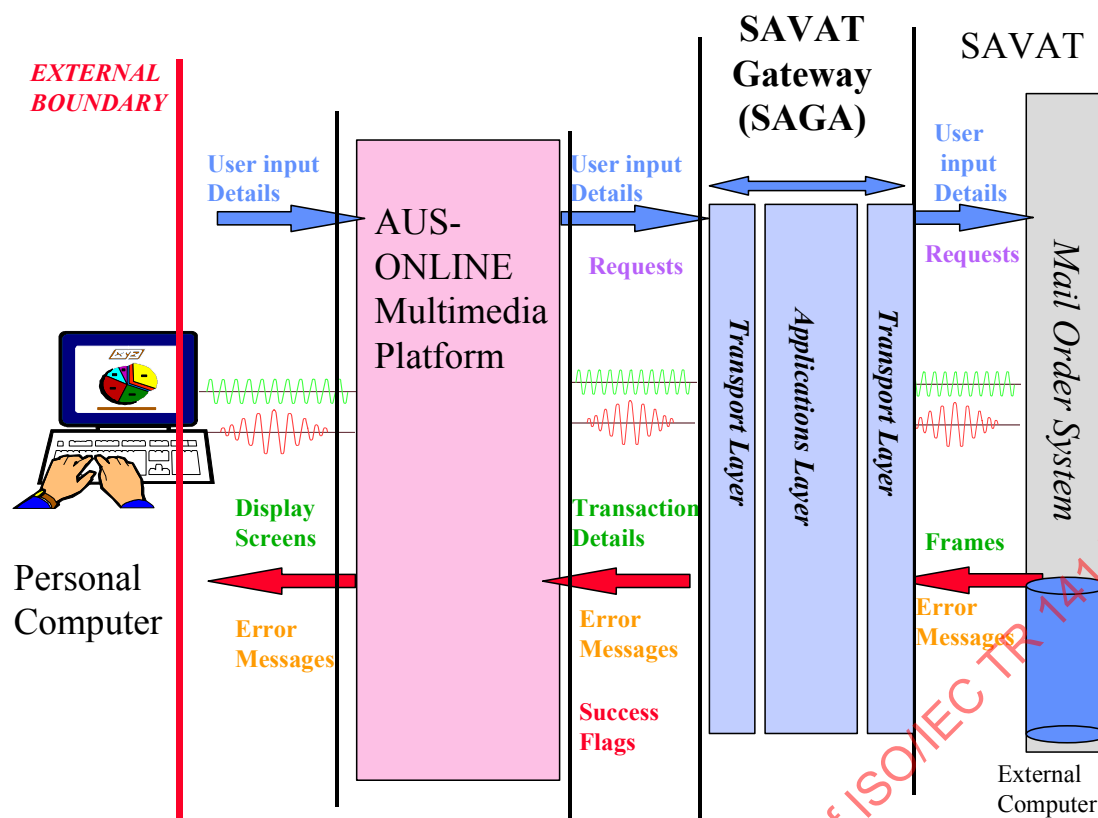
To simplify the functional description, the handling of Technical Problem frame 6058 is covered under Error Handling, and is not mentioned in the individual descriptions.

B.10.5.1 Data Inputs

The data input to the Gateway Application are requests from AUS-ONLINE application and the responses from the SAVAT application. The format of the request messages from the AUS-ONLINE application are available in the Related Documents and References [#3] and description of the blocks received from the SAVAT application are available in references [#1] and [#4].

B.10.5.2 Data Outputs

The data output from the Gateway are responses to the AUS-ONLINE application and requests to the SAVAT application. The format of the response messages to AUS-ONLINE are available in Related Documents and Reference [#3] and description of the blocks sent to the SAVAT application are available in Related Documents and References [#1] and [#4].



B.10.5.3 Logon to the SAVAT System - Logon Transaction

B.10.5.3.1 Function Overview

The LOGON request from the AUS-ONLINE application initiates the *Gateway application* to establish a session with the SAVAT system.

If the session is successfully established then it will return a success flag of:

‘Y’ (connection was a success) and the Users account balance displays on his screen.

Else (an error occurred) then it will return a success flag of:

‘N’ connection was refused

‘C’ password needs to be changed

‘L’ incorrect user ID or password

Also sends an appropriate message in the response header.

B.10.5.3.2 Function Description

The logon transaction actions are as follows:

1. A socket read is issued to receive the input request
2. On receiving a LOGON request an X.25 connection is established to the SAVAT External Computer.
3. On connection failure a reply is sent to the AUS-ONLINE application with a success flag of ‘N’ and an appropriate network error message.

4. If a connection:

- is established successfully:
 - receives a "Main menu frame" (0028) from SAVAT
 - a conversation request is sent to SAVAT.
 - Calls function *Get Account Balance* (Refer supporting functions 6.1) Note Account Balance details are stored in internal data structures.
 - Selects option 9 to return to Main Menu frame (0028)
 - Send a 'Y' reply to the AUS-ONLINE application (logon ID account details and account balance is displayed on the user's screen)
- is not successfully established, an 'connect error' frame(5008) is received:
 - If the Login ID and Password are invalid and a success flag of 'L' is sent to the AUS-ONLINE application and the error message frame is displayed.
 - If the connection is refused then depending on the reason six different frames (8258, 1258, 4058, 9158, 4358, 5008) will be received from SAVAT. The *Msg_Txt* field will contain the frame number and error code and a one line error message. A success flag of 'N' will be sent to the AUS-ONLINE application.
 - If the connection is successful and the Login and Password are valid but the password needs to be changed then a 'Password Change Frame' (9008) is received from SAVAT. The *Gateway* sends a success flag of 'C' and the *Gateway* session will be in the change password frame when the transaction ends. The TCP client (AUS-ONLINE) can only send a change password request.

B.10.5.4 Change Password**B.10.5.4.1 Function Overview**

The handling of the Change Password transaction is split between Normal Password Change and Forced Password Change.

When the Gateway application receives a request to change the password it checks to determine if it was a forced password change state. (If it is a 'forced password changed state' then the only transactions that are accepted are 'Change Password' and 'Logoff').

If the Gateway application was expecting a forced request, processing is handled by the 'Forced Password Change' processing; otherwise it is handled by the 'Normal Password Change' Processing.

B.10.5.4.2 Function description

1. Receives the request to 'Change Password'
2. Tests if the *Gateway* application is in the 'Forced Password Change State' and goes to 'Forced Password Transaction'
3. If not a Forced Password Change, it goes to the 'Normal Password Change'.

B.10.5.5 Normal Password Change**B.10.5.5.1 Function Overview**

This request is issued by the AUS-ONLINE application whenever the user requests to change a password.

If the password change is successful the *Gateway* application returns a success flag of 'Y' otherwise a success flag of 'N' with the appropriate message.

B.10.5.5.2 Function Description

1. The *Gateway* application is in 'Main menu frame' (0028) when it receives the change password request. The 'Maintenance Services Menu' frame (1028) is chosen by selecting option 7. The Password change option is chosen by selecting option 1. The 'Password Change Frame' (9008) is sent to the SAVAT application.
2. The Request Message from the AUS-ONLINE application includes the - Login ID and Password and is passed to the SAVAT application.
3. The SAVAT application validates the Login Id and password:
 - and if invalid it returns the frame (9008) with an error message. The cancel sequence is issued to return to the Maintenance Menu frame and a reply message flag 'L' is sent to the AUS-ONLINE application.
 - If the Login ID and Password are valid then the new password is sent to the SAVAT application and validated by the SAVAT application.
4. If the new password is:
 - invalid then SAVAT returns frame (9090) with an error message. A cancel sequence is sent to the SAVAT application to return to Main Menu and a success flag of 'N' is returned to the AUS-ONLINE application.
 - valid then the new password is accepted by the SAVAT application then the 'successful password change frame' (9908) is received and option 9 is selected to return to Main menu. A reply with a success flag of 'Y' and the Customer's Current Account Balance is sent to the AUS-ONLINE application. (Customer's Current Account Balance Details are stored within the *Gateway*'s internal structures.)

B.10.5.6 Forced Password Change

B.10.5.6.1 Function Overview

This request is issued by the AUS-ONLINE application whenever the user requests for a password change.

If the password change is successful the *Gateway* application returns a success flag of 'Y' otherwise a success flag of 'N' with the appropriate message in the response header.

B.10.5.6.2 Function Description

1. The *Gateway* session is in the frame 'Forced Password Change at Logon' (9000).
2. The Change Password request message from the AUS-ONLINE application includes the - Login ID and Password is passed to the SAVAT application.
3. The SAVAT application validates the Login Id and Password:
 - if invalid it returns an 'invalid' frame (9008) and an error message. The cancel sequence is issued to return to the Maintenance Menu frame and a reply message flag 'L' is sent to the AUS-ONLINE application.
 - valid then the new password is passed onto the SAVAT application and validated by the SAVAT application.
4. If the new password is:
 - invalid then SAVAT returns an 'invalid password' frame (9090) with an error message. A cancel sequence is sent to the SAVAT application to return to Main Menu and a success flag of 'N' is returned to the AUS-ONLINE application.
 - valid then the new password is accepted by the SAVAT application then frame (9098) is returned and option 9 is selected to return to Main menu. A reply with a success flag of 'Y' and the Account Balance is sent to the AUS-ONLINE application. (Customer's Current Account Balance Details are stored within the *Gateway*'s internal structures.)

B.10.5.7 Logoff from SAVAT System - Logoff Transaction

B.10.5.7.1 Function Overview

The LOGOFF request occurs when:

- the user wants to log off from the SAVAT application and the request is issued by AUS-ONLINE
- a socket connection is lost with AUS-ONLINE and is called by the *Gateway Robot*.

The request message consists only of a header with the transaction type LOGOFF.

The *Gateway application* does not send any reply message to the AUS-ONLINE application. It just does the 'call clear' on the X.25 connection to the SAVAT application and closes the socket connection to the AUS-ONLINE application for this session.

B.10.5.7.2 Function Description

The logoff transaction actions are as follows:

1. The *Gateway* session receives the Logoff request.
2. It sends a disconnect to the SAVAT application
3. It sends a call clear to disconnect the X.25 connection for this session.
4. It deletes the records in the internal data structures associated with this session.
5. Closes the socket connection for this session.

B.10.5.8 Order Goods

B.10.5.8.1 Function Overview

This request is issued by the AUS-ONLINE application when the user requests to purchase goods from SAVAT. The request message contains the Account Number, the Product ID and Item Quantity.

If the order for the goods is successful then it will return a success flag of:

'Y' (order was a success) It also returns the Customer's Account Balance and a message informing the customer of the Purchase Order Number and the Delivery Date.

Else (an error occurred)

'N' incorrect account number product id or item quantity

'S' full screen error

Also sends an appropriate message in the response header.

B.10.5.8.2 Function Description

The Accept Purchase Order transaction actions are as follows:

1. The *Gateway* session issues a socket read to receive the Purchase Order Request,
2. The Purchase Order option is selected from the Main Menu by selecting option 3,
3. Tests for an unexpected frame (6058 8258 9158 4358) or full screen error frame (6058, 8258) and

4. If full screen error:

- returns an error message. The cancel sequence is issued to the SAVAT application to return to the Maintenance Menu frame (0028) and a reply message with a success flag of 'S' is sent to the AUS-ONLINE application

Else OK:

- Frame (0108) is received from SAVAT. The request including the Account Number, Product Id and Item quantity are sent to the SAVAT application.

5. The SAVAT application checks the Account Number, Product Id and Item quantity to see if they are correct.

- if incorrect an invalid frame (1008) is received with an error message. The cancel sequence is sent to the SAVAT application to return to the Main Menu and a reply message flag of 'N' is sent to the AUS-ONLINE application.
- if correct and the confirm frame (8108) has been received from SAVAT then the order is confirmed by selecting option 1.

6. If the Order placement within the SAVAT application is:

- unsuccessful an error is detected then the SAVAT application returns the frame (1108) with an error message. A cancel sequence is sent to the SAVAT application to return to the main menu and a reply with a success flag of 'N' is sent to the AUS-ONLINE application.
- successful then a successful order frame (0108) is received which includes the Purchase Order Number. The Gateway application selects option 9 to return to Main menu. A reply with a success flag of 'Y' is sent to the AUS-ONLINE application and the *Get Account Balance* function is called to collect the customers Account Balance.

B.10.5.9 List Orders for Account

B.10.5.9.1 Function Overview

This request is issued by the AUS-ONLINE application when the user requests a list of the previous '20' order transactions for his account number. A customer may have more than one account with the Mail Order house. They may select the account index (e.g. 1 for primary account, 2 for secondary account) which will be translated into the actual account serial number using the account information table. The request message contains the account index in the account information table as the input. A flag is set in the response message to indicate if more transactions exist than requested.

The Gateway application returns a success flag of:

- 'Y' when the transaction completes successfully and returns a list of the last '20' transactions.
- 'N' along with an error message in the response header when there:
 - are no accounts
 - are no transactions for the account
 - is a serious error

B.10.5.9.2 Function Description

The *List Orders for Account* transaction actions are as follows:

1. The Gateway session receives the *Get the Last 20 Order Transactions* request and checks if this is a continuation of a previous request.
2. The statement display option is selected from the Main Menu by selecting option 1.

3. The SAVAT application returns frame 4308 if more than one account exists. This frame contains a list of accounts. If
 - only one account exists then the account information for that account is returned by the SAVAT application in frame 1308.
 - no account exists then a reply with select flag of N and an error message is sent to the AUS-ONLINE application.
4. The account serial number for the users desired account number is obtained by calling the function *Get Account Serial Number*.
5. If the function returns the account serial number:
 - successfully then the serial number for the account is passed to the SAVAT application. The SAVAT application returns the account information for the Logon ID in frame (1308) and option 8 is selected to display the transactions for the account.
 - unsuccessfully then a success flag of 'N' is returned to the AUS-ONLINE application.
6. If there are transactions for an account then transaction's frame (2308) is received and the '*Get the Last 20 Order Transactions*' function is called to collect the latest '20' transactions
7. If there is an error (i.e. frame (1308) is received with an error message) from the SAVAT application with an error message then:
 - option 9 is selected to return to the Main Menu and a reply with a success flag of 'N' is sent to the AUS-ONLINE application.
8. If the latest 20 transactions are:
 - returned successfully then the success flag is set to 'Y' and the system checks if for a 'more flag =:
 - 'Y' and leaves the *Gateway* in the transactions frame (2308)
 - 'N' option 9 is selected to return to the Main Menu
 - not returned successfully then the success flag is set to 'N' to indicate an error and returns to the main menu.

B.10.5.10 Order Account Statement

B.10.5.10.1 Function Overview

The request is issued by the AUS-ONLINE application when the user requests to order a statement for his account. The request message contains the account index in the account information table as input.

The *Gateway* application returns a success flag of:

- 'Y' when the transaction completes successfully.
- 'N' along with an error message in the response header when:
 - the account index is invalid
 - there is another serious error.

B.10.5.10.2 Function Description

The Order Account Statement transaction actions are as follows:

1. The *Gateway* application receives the request to *Order an Account statement*.
2. The Statement Order Option is selected from the Main Menu by selecting option 5.
3. The frame (5408) is received and the *Gateway* application gets the account number from the transaction request and passes it to the SAVAT application.
4. The SAVAT application checks to see if the account number is valid:
 - if it is not valid then a 'not valid' frame (5408) is received with an error message and a cancel sequence is sent to the SAVAT application. A reply message with a success flag of 'N' is sent to the AUS-ONLINE application
 - if it is valid then the 'statement order' successful frame (9408) is returned. Option 9 is selected to return to the main menu and a success flag of 'Y' is sent to the AUS-ONLINE application.

B.10.5.11 Display Statement Summary

B.10.5.11.1 Function Overview

This transaction returns the statement summary for the indicated account number. Details returned are displayed on frame 1038. These include Mail Order House Branch Name, Current Balance, Opening and Closing Balance as at date together with any overdue account fees.

The *Gateway* application returns a success flag of:

- 'Y' when the transaction completes successfully.
- 'N' along with an error message in the response header when:
 - the account index is invalid
 - there is another serious error.

B.10.5.11.2 Function Description

The Order Account Statement transaction actions are as follows:

1. The *Gateway* application receives the request for the *Account Summary*.
2. The *Statement Summary* Option is selected from the Main Menu by selecting option 1.
3. The frame
 - 5408 is received if more than one account exists. This frame contains a list of accounts.
 - 1308 is received if only one account exists. A check is made to ensure that the details displayed are for the requested account.
4. If account is incorrect processing then go to step 10.
5. If account is correct processing then go to step 8.
6. Call Get Account Serial Number.
7. Test returned status.

8. Request details.
9. The statement details are recorded by the *Gateway Robot*. The SAVAT system is left on frame 1308 in case a transaction arrives.
10. A reply with success flag of Y is sent to the AUS-ONLINE application.
11. Account serial number is not available then option 9 is chosen to return to the Main Menu.
12. A reply with a Success Flag of N is returned to the AUS-ONLINE application.

B.10.5.12 Ad hoc Catalogue Order

B.10.5.12.1 Function Overview

This function enables the user to order a replacement set of catalogues. The user may pre-select categories using the *Register Mail Order Product Category* transaction. Whenever a new Catalogue is released for a preselected category it is automatically sent to the User, however the user may use this transaction to order a replacement set of his pre-selected categories.

This request is issued by the AUS-ONLINE application when the user places an order for a replacement set of *Mail-Order* catalogues. The request message contains the account number as input.

The *Gateway* application returns a success flag of:

- 'Y' when the transaction completes successfully.
- 'N' along with an error message in the response header when:
 - the Product Category number is invalid
 - there is another serious error.

B.10.5.12.2 Function Description

The Order new Catalogue transaction actions are as follows:

1. The *Gateway* session receives the Order New Catalogue request.
2. The Order New Catalogue menu frame (2028) is selected by selecting option 6.
3. The SAVAT application checks if the account number is valid:
 - if it is not valid then a not valid frame (8040) is received with an error message and a cancel sequence is sent to the SAVAT application. A reply message with a success flag of 'N' is sent to the AUS-ONLINE application
 - if it is valid then frame (4408) is received and a success flag of 'Y' is sent to the AUS-ONLINE application.

B.10.5.13 Freeze Logon ID Request

B.10.5.13.1 Function Overview

This request is issued by the AUS-ONLINE application when the user requests for his Logon ID to be frozen from using the Mail Order facilities. The request message contains a transaction number.

The *Gateway* application returns a success flag of:

- 'Y' when the transaction completes successfully.
- 'N' along with an error message in the response header when the transaction fails.

B.10.5.13.2 Function Description

The Freeze Login transaction actions are as follows:

1. The *Gateway* session receives the *Freeze Logon Id* request.
2. The Maintenance Services Menu frame (1028) is selected from the main menu by selecting option 7.
3. The Freeze Logon Frame (0508) is selected by choosing option 2.
4. The session is disconnected and a success flag of 'Y' is sent to the AUS-ONLINE application.
5. The socket connection for this session with the AUS-ONLINE application is closed.

B.10.5.14 Register Product Category Selection

B.10.5.14.1 Function Overview

The SAVAT Mail Order Corporation has over twenty categories of products which customers may purchase. Each category type has its own Catalogue, which is released monthly and distributed to users on its mailing list. In order for a user to receive a Catalogue from a particular category they need to register their selection with SAVAT. They are charged an annual fee based on the number of different types of Catalogues they receive. The user may select to register themselves for a new catalogue category at any time using this function or select to re-order their catalogues using the *Adhoc Catalogue Order* transaction.

This request is issued by the AUS-ONLINE application when the user wants to add a new Product Category to the existing list of Product Categories for which he already receives catalogues. The request message contains the Product Category number as input. The Product Category List transaction will run periodically in the background in order to maintain the list of valid Product Category numbers for use here.

The *Gateway* application returns a success flag of:

- 'Y' when the transaction completes successfully.
- 'N' along with an error message in the response header when:
 - the Product Category number is incorrect
 - there is a serious error

It also returns an error message in the response header and the list of Product Categories in the response message.

B.10.5.14.2 Function Description

The Register Product Category Selection functions are as follows:

1. The *Gateway* session receives the Register Product Categories request.
2. The Maintenance Services Menu frame (1028) is selected from the Main Menu by choosing option 7.
3. The Product Category Maintenance Menu frame (2028) is chosen by selecting option 5. The Register Product Category Selection frame (0608) is selected by choosing option 1.
4. The Product Category number in the ADDCAT request is passed to the SAVAT application where it is validated:
 - if it is not valid then a not valid frame (0608) with an error message and a cancel sequence is sent to the SAVAT application to return to the Product Category Maintenance Services Menu. Then option 9 is chosen to return to the main menu. A reply message with a success flag of 'N' is sent to the AUS-ONLINE application.

- if it is valid then frame (1608) is received and the users account number is passed to the SAVAT application.
5. The SAVAT application checks if the other input details are valid:
- if any field is not valid then a not valid frame (2608) is received with an error message and a cancel sequence is sent to the SAVAT application to return to the Product Category Maintenance Services Menu. Then option 9 is chosen to return to the main menu. A reply message with a success flag of 'N' is sent to the AUS-ONLINE application.
 - if it is valid then:
 - the 'select product category' successful frame (8608) is returned
 - the select product category is confirmed by selecting option 1.
6. A check is done to see if there are any errors on confirmation.
- if there are any errors then error frame (2608) is returned with an error message. A cancel sequence is sent to SAVAT to return to the Product Category Maintenance Services Menu.
 - The option 9 is chosen to return to the main menu.
 - a reply message of N is sent to AUS-ONLINE.
 - if the Product Category selection is registered successfully then frame (9608) is received.
 - option 9 is selected on the main menu,
 - success flag of 'Y' is sent to the AUS-ONLINE application.

B.10.5.15 Delete Product Category from Selection

B.10.5.15.1 Function Overview

This request is issued by the AUS-ONLINE application when the user wants to delete a Product Category from the list of Product Categories for which he already receives catalogues. The request message contains the index of the Product Category in the Product Category table as input. The application will need to perform *Get Users Product Category List* transaction just prior to this on in order to have an up to date list of the user's pre-selected Product Categories. The Product Category List transaction will run periodically in the background in order to maintain the list of valid Product Category numbers for use here.

The Gateway application returns a success flag of:

- 'Y' when the transaction completes successfully.
- 'N' along with an error message in the response header when the Product Category number is incorrect or when there is a serious error. It also returns an error message in the response header and the list of Product Categories in the response message.

B.10.5.15.2 Function Description

The Delete Product Category Selection functions are as follows:

1. The Gateway session receives the delete product categories request.
2. The Maintenance Services Menu frame is selected from the Main Menu by choosing option 7.
3. The Product Category Maintenance Menu frame is chosen by selecting option 5 followed by option 2 to delete product category.

4. A check is done to determine if there are any Product Categories selected.
 - if no product categories are already selected then a not valid frame (2028) is received with an error message. Option 9 is chosen to return to the main menu. A reply message with a success flag of 'N' is sent to the AUS-ONLINE application.
 - if product categories have been previously selected then the Product Categories frame (3808) is received which contains a list of all Product Categories for that user. The function *Get Product Category Serial Number* is called to get the serial number corresponding to the Product Category Number selected. The serial number is passed to the SAVAT application to get the Product Category Details.
5. The Product Category number is passed to the SAVAT application where it is validated:
 - if it is not valid then a not valid frame (3808) is received with an error message. Option 9 is chosen to return to the Maintenance Services Menu. Then option 6 is chosen to return to the main menu. A reply message with a success flag of 'N' is sent to the AUS-ONLINE application.
 - if it is valid then the valid frame (8808) is received and the deletion of the selected product category is confirmed by choosing option 1.
6. If the deletion
 - is Not successful then:
 - the 'error frame (3808) is returned
 - option 9 is selected on the main menu
 - reply message with a success flag of 'N' is sent to AUS-ONLINE,
 - is successful then:
 - the 'delete product category' successful frame (9808) is returned
 - option 9 is selected on the main menu,
 - success flag of 'Y' is sent to the AUS-ONLINE application.

B.10.5.16 Product Category List

B.10.5.16.1 Function Overview

This transaction returns a list of all the Product Categories for which mail-orders can be made.

The transaction is only intended for periodic use during off peak periods to enable AUS-ONLINE computers to retrieve the Product Category List and record it so the users can browse the list without having to exchange data with SAVAT.

The transaction request includes an alphanumeric field allowing the list to be returned from a starting point.

B.10.5.16.2 Function Description

The Product Category list functions are as follows:

1. The *Gateway* session receives the List product categories request.
2. The Maintenance Services Menu frame is selected from the Main Menu by choosing option 7.
3. The Product Category Maintenance Menu frame is chosen by selecting option 5 followed by option 5 to list the product categories and a the product categories frame (0018) is returned

4. The keyword supplied in the request is passed to SAVAT
5. The frame (1018) listing all product categories is returned.
6. If the all the listed categories have not yet been reported then the details are recorded by the *Gateway Application* and the next page is selected.
7. When the complete list of product categories is received then:
 - option 7 is chosen to return to the Maintenance Services Menu
 - option 9 is selected on the main menu,
 - success flag of 'Y' is sent to the AUS-ONLINE application.

B.10.5.17 Users Product Category List

B.10.5.17.1 Function Overview

This transaction returns a list of all the Product Categories currently selected for this User.

The transaction needs to be performed by the Application just prior to any calls to Register or Delete a Product Category in order to have an up to date Product Category list.

B.10.5.17.2 Function Description

The Users Product Category list functions are as follows:

1. The *Gateway* session receives the User product categories list request.
2. The Maintenance Services Menu frame is selected from the Main Menu by choosing option 7.
3. The Product Category Maintenance Menu frame is chosen by selecting option 5 followed by option 3 to list the product categories for a user and the user's product categories page is returned.
4. The frame (3708) listing all product categories for the User is returned.
 - If not successful then the frame is returned with an error field is placed in Msg_Txt field. A reply with success flag 'N' is sent to AUS-ONLINE
 - If successful then the frame with the Users Product Categories are listed.
5. If the all the user categories have not yet been reported then the details are recorded by the *Gateway Application* and the next page is selected.
6. When the complete list of product categories is received then:
 - option 7 is chosen to return to the Maintenance Services Menu,
 - option 9 is selected on the main menu,
 - success flag of 'Y' is sent to the AUS-ONLINE application.

B.10.6 Supporting Functions

B.10.6.1 Get Account Balance

B.10.6.1.1 Function Overview

This transaction returns the user's current account balance for a particular account. (A single user may have more than one account with the Mail Order house.)

B.10.6.1.2 Function Description

The Users Account Balance functions are as follows:

1. If not in Main Menu select option 9 to return to main menu.
2. Check:
 - if nine or less accounts exist then frame 5508 is received. The account number balance and credit /debit details for the account numbers on the frame are collected and stored on the internal data structures. Option 9 is selected to return to the Main Menu. Status of SUCCESS is returned and go to step 5
 - if more than nine accounts exist then frame 5508 is received. The account number, balance, credit/debit details for the account numbers on the frame are collected and stored in the internal data structures. Option 8 is selected to get the next frame of account numbers. A check is done to see if the last page is reached by checking for the keyword 'Grand Total'. If the last page is not reached processing continues from step 5 again.
3. Select option 9 to return to main menu. Status SUCCESS is returned.
4. Option 1 is selected for statement display.
5. Check:
 - if only one account exists then frame 1308 will be displayed. Account details are recorded. Go to step 13.
 - if more than one account exists page 4308 will be returned with a list of account numbers and types. These will be recorded against the corresponding account details obtained above. Check if more account details exist. If more account details exist then option 8 will be selected for the next page and this step is repeated, else issue a cancel sequence and return to main menu.
6. Collect 'Grand Total' Account Type set to 'd', Grand Total value in Acct-Balance, Acct-Num set to 0, Acct-CR-DR and Credit -CR-DR set to spaces.
7. A cancel sequence is issued to return to the main menu.

B.10.6.2 Get Account Serial Number

B.10.6.2.1 Function Overview

Users may have more than one account from which to select. This is an internal function translates the selected account number on the menu into the serial number for that particular account. This transaction returns the serial number for the selected account.

B.10.6.2.2 Function Description

The Account Serial Number functions are as follows:

1. The request message contains the users account number. The account number is used to obtain the SAVAT Account Serial number relevant to the Account in the current frame (4308).

2. A check is done to see if a match exists:

- if matched then the account serial number associated with the account is returned with a status of SUCCESS.
- if not matched then a check is done to see if more accounts exist. If no more accounts exist then a status of FAILURE is returned. If more accounts exist then option 8 is chosen to get the next page. Step is repeated until the account serial number is obtained or no more accounts exist.

B.10.6.3 Get Last 'n' transactions for the User's Account

B.10.6.3.1 Function Overview

This function is called by LISTTX transaction.

B.10.6.3.2 Function Description

The Get Last 'n' transactions for the User's Accounts functions are as follows:

1. The transactions on the current frame (2308) are collected. The SAVAT application sends transactions in blocks of 11 to the Gateway application. The last transaction (one at the bottom of the page) is the same as the one at the top of the page that will be retrieved when the previous command is sent to the SAVAT application. The Gateway application should collect the first 10 transactions off the screen.
2. A check is done to see if it is the last page of transactions by checking the error message:
 - If last page then:
 - select option 6 to return SAVAT to last page screen (4308),
 - set success flag to 'Y' and more flag to 'N' and return transactions and flags to calling routine.
 - Else not last page:
 - check to see if transaction count is greater or equal to the 'n' selected.
 - if 'n' have been collected then set success flag to 'Y' and more flag to 'N' and return transactions and flags to calling routine.
 - else continue until 'n' have been collected.

B.10.6.4 Get Serial Number for Product Category

B.10.6.4.1 Function Overview

This function is called by Register Product Category and Delete Product Category Transactions to get the serial number of the Product Category required.

B.10.6.4.2 Function Description

The Get Serial Number for Product Category functions are as follows:

1. The request message contains the Product Category Index for the desired Product Category. The Product Category Number for the Index is fetched from the Product Category Information Table in the internal data structures.
2. The list of Product Categories on the current frame (3808) is checked to see if a match is found for the Product Category given:

- If a Match is found then the serial number for the Product Category is obtained. A status of 'success' is returned.
- If a Match is not found then a check is done to see if more Product Categories exist and if no more are found then a status of 'failure' is returned, otherwise option 8 is chosen to get to the next page. This is continued until no more Product Categories exist.

B.10.6.5 Error Handling

The Gateway Application will initiate a forced logoff under the following circumstances:

- a disconnect request is received from the SAVAT application
- after 3 consecutive unsuccessful attempts to change password
- communications failure

B.10.6.5.1 Full Screen Errors

The SAVAT application returns error frames whenever there is a serious error and also disconnects the session. In such cases, the gateway sends a success flag of 'N' the AUS-ONLINE application and also closes the socket connection for that session.

Whenever a technical problem frame is detected the current transaction a reply is sent to the AUS-ONLINE application with a success flag of 'S'. The frame number and Error code will be sent in the MSG_TXT field, separated by a space. The X.25 session to SAVAT will be disconnected, internal data structures will be released, and the socket connection will be closed.

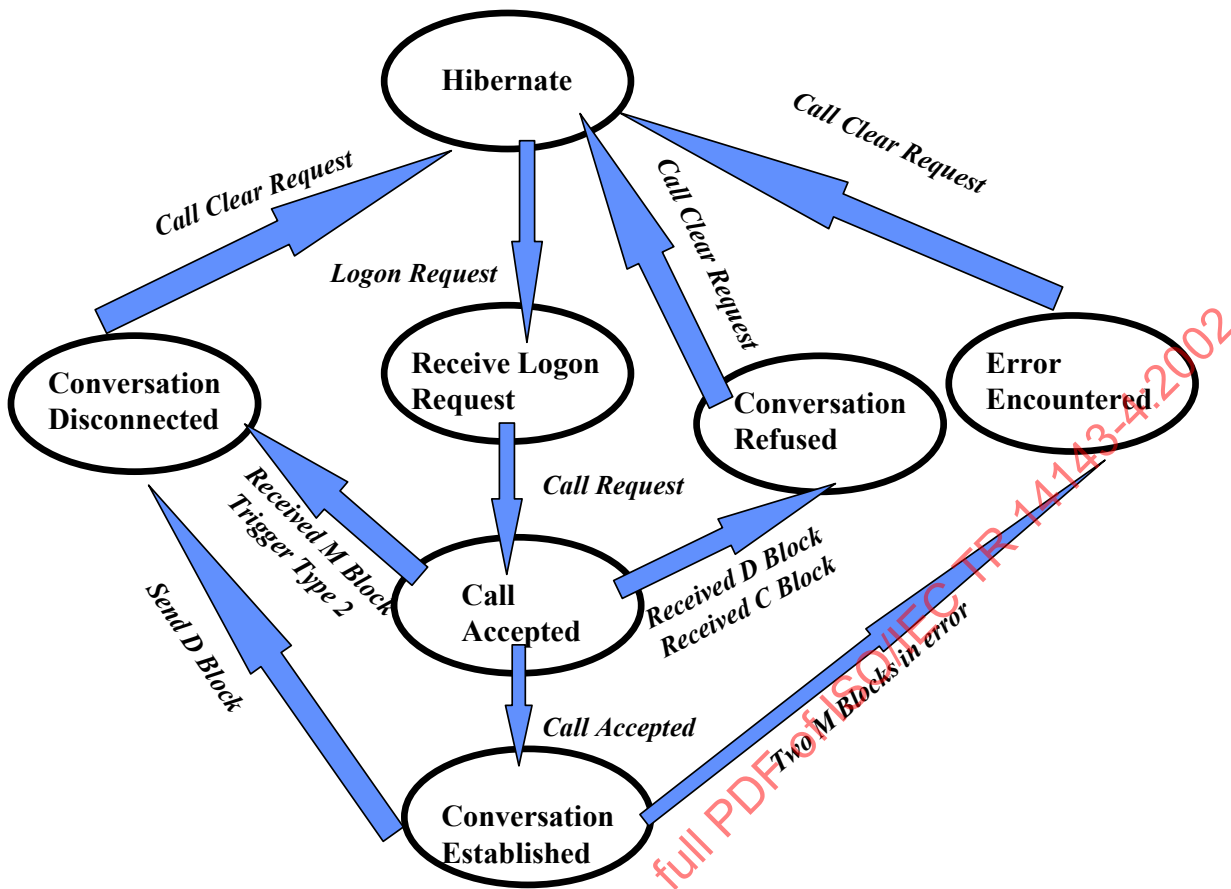
B.10.6.5.2 On Screen Errors

When on screen error messages are detected, the last field on the page (error message) will be inserted in the MSG_TXT field of the response and a success flag of 'N' will be returned.

B.10.7 System Overview

The Gateway Application uses the TCP/IP socket interface to connect to the AUS-ONLINE application; it uses the X.25 connection to connect to SAVAT. It sets up a session for each user trying to access the SAVAT application. The Gateway application is normally in 'Hibernation State'. It makes use of asynchronous system traps to trap events and process them. It wakes up on SYS\$QIO event and processes the event and goes into hibernation state again. Whenever a SYS\$QIO event occurs an AST routine is called to process the request. Once the request is processed and the reply sent it returns into hibernation state until it is disturbed by another SYS\$QIO event.

B.10.7.1 Transition State Diagram



B.10.7.2 Transition States

The state transition diagram describes the possible states and allowable transitions, which may take, place depending upon the events that occur. This state transition diagram represents how the *Gateway* application should interpret and act upon the protocol blocks from the SAVAT application.

The state transition diagram does not deal with the various transactions but deals with the various states and transitions in general. The individual transactions are dealt in detail elsewhere in the document. The states can be one of two types:

- LISTEN mode: - the *Gateway* is waiting for response from the SAVAT application
- ACTION mode: - the *Gateway* is processing a received block or preparing a response.

Hibernate

Gateway application is in the hibernation state. It will be in this state until an event occurs. When an event occurs the *Gateway Application* wakes up and performs the necessary actions and returns to this state.

Receive Logon Request

Gateway application is in this state when it gets a logon request from the AUS-ONLINE application. It then makes a call request to the SAVAT application to establish an X.25 connection and waits for a response.

Call Accepted

Gateway application enters this state when a call is accepted from the SAVAT application. It then makes a conversation request to the SAVAT application by sending an A block.

Conversation Established	Gateway application enters this state when it receives an M block with trigger type other than 2 from the SAVAT application. The Gateway Application has successfully logged onto the SAVAT application and is ready to carry out transactions.
Conversation Disconnected	Gateway application enters this state when it receives an M block with trigger type 2 (goodbye frame) from the SAVAT application. It sends an E block as a disconnection acknowledgement of the SAVAT application. It then sends a call clear to the SAVAT application.
Conversation Refused	Gateway application enters this state when it receives any one of the following from the SAVAT application: - C block - connection refusal from the SAVAT application - D block - disconnect request from the SAVAT application It sends a call clear to the SAVAT application
Error Encountered	Gateway application enters this state when it receives an M block with an error. It responds with a Q block with an appropriate error code> When it receives an M block with an error for the second time it responds with a disconnection request D block. It then waits for acknowledgement.
Hibernate	Gateway Application enters this state when it receives a call clear or when a call request is refused.

B.10.8 Gateway Application Functions

The functions of the Gateway application can be grouped as follows:

1. Gateway Application - AUS-ONLINE interface functions
2. Gateway Application - SAVAT interface functions
3. Socket interface functions
4. Gateway v2.3 interface functions
5. X.25 interface functions
6. Miscellaneous functions

B.10.8.1 AUS-ONLINE Mail Order Interface Functions

login	create gateway connection, if forced password change signal caller else return SAVAT details plus Account Details and Product Category Details
change password	detects type of change and passes control accordingly
normal password change	change password and return simple reply

forced password change	complete forced password change logon and return SAVAT details
logoff	close session
order goods	purchase goods from SAVAT request
list order for account	collect last n order transactions for account
order account statement	Order statement for account request
display statement summary	Statement summary for this account request
ad hoc catalogue order	catalogue order for this account request
freeze logon ID	disable mail ordering from SAVAT for this user id
register product category selection	insert new product category to user product category list
delete product category selection	remove user product category from user product category list
error message return	return converted error message on error detection
interface configuration	configuration data

B.10.8.2 SAVAT Mail-Order Interface Functions

logon	user logon for videotext. Collect Account details and Product Category details. Monitor forced logon change.
change password	change password in video text application; if forced password change then collect Account details and product category details.
logoff	logoff from videotext application
order goods	purchase goods using account number used offset in saved account list
list orders for account	collect transaction details across details listing, use offset in saved account list.
ad hoc catalogue order	catalogue order for selected account
statement order	Statement order for selected account
statement summary	Statement summary for selected account
freeze logon ID	disable mail ordering for this user id
register product category	insert new product category to user product category list
delete product category	remover user product category from user product category list
retrieve product category list	collect current product category details
get users product category list	Get list of product categories that match a pattern from the product category list