Air Tickets Sales (ATS) System Requirements

Your company has been invited to develop an “IT system to **report** sales of air tickets” for AirVia Ltd, an airline with significant international exposure. AirVia want to sell tickets through the local Travel Agent companies, *especially in the countries where internet-based services are not widespread*. The software they have used for 20 years has reached the point where its **further maintenance is problematic** and they want a new software product to reflect the recent advances in user interfaces and more flexibility, which will eliminate the difficulties and limitations of the old software. AirVia Ltd want to evaluate the new software before they decide whether to make it mandatory for all travel agents selling their tickets. They may decide to offer your company a maintenance contract for the new software if you do a good job.

Your consultant has won the contract from AirVia head office to assess their requirements and produce implementation of *one system for one Travel Agent*. Your team has been tasked with doing the job. Your consultant has set up an appointment with Mr. Lancaster, the IT Manager at AirVia Ltd, and your team must attend the interview in the prescribed date / time slot. Mr Lancaster has agreed to outline the requirements of the new system, and the limitations of the current one – see below.

#### Initial Statement of Requirements

The AirTicket Sales (ATS) system will keep records of tickets sold by a Travel Agent company to customers, and produce the reports required by the Financial Department of AirVia Ltd. It will also allow a Travel Agent company to give discounts to their valued customers.

*TICKET STOCK*

The tickets consist of flight coupons (up to 4) and auditor's coupons, which are bundled together. The bundles are called *'blanks'* and can be of different types:

* 444 – used for international destinations (automatic ticketing with up to 4 flight coupons; each coupon is used for a particular leg of the journey),
* 440 – the same as 444 but for manual processing (the flying details are filled in manually by a travel advisor, e.g. if computer-based system is unavailable),
* 420 – as 444 but with only 2 flight coupons.

There are also blanks for domestic flights, which are filled in using computer (not manually):

* 201 – a blank with two coupons, and
* 101 – a blank with only 1 coupon.

Finally, there are MCO (Miscellaneous Charges Order) blanks used for excess luggage and for other miscellaneous services provided by the airline to their passengers. The codes used for MCO blanks are, respectively, 451 and 452.

All blanks are provided by the airline to the Travel Agents for producing tickets. Each blank has a number, which starts with the blank type (e.g., 444). This is followed by between 6 to 8 further digits to make a blank number consisting of up to 11 digits (e.g., 444 10023489). A blank becomes a valid ticket if the itinerary of the journey is placed on the flight coupons. Alternatively, a blank can be 'void' if the travel advisor makes a mistake.

The airline demand reports from the Travel Agents on their use of the blanks.

In case of a blank being lost or stolen the airline demand that this be immediately reported so that the blanks can be blacklisted through the global reservation system and cannot be used by malicious people. The reporting of theft/loss, however, is neither part of the existing AirTicket Sales nor required for the new software.

2 Checks will be made! For example, via automatic comparison of source code submissions, etc.

Once new blanks are received from the airline by a representative of the Travel Agent they are added to the existing stock of blanks (it ought to be possible to arrange them by blank type). Then Office Manager allocates blanks to each travel advisor before they can sell them to a customer. Unless a blank is assigned, it cannot be sold. Only the advisor who has been assigned a blank can sell it to a customer. This is required by the airline as a measure of improving accountability of advisors with respect to the blanks. A blank initially assigned to an advisor can be reassigned to a different advisor. In some cases ***unused*** blanks may be returned to the airline in which case a record about this can be kept in the Travel Agent’s log file (when and what has been returned to the airline), but records about the returned blanks are not kept in the Travel Agent’s database.

On a monthly basis, or on demand, reports are produced by the Travel Agent in which the turnover of the blanks is shown (see 9.1 Ticket Stock Turnover Report).

The ***system administrator*** is responsible for maintaining the stock of blanks and fixing problems with the database. Each travel advisor is responsible for the stock of blanks assigned to them.

*SALES*

Every ticket sold by an advisor must be registered in an Air Ticket Sales Report.

In the new system, *recording* of the following payment types is required: cash and credit card. The same holds for refunds.

There are two types of sales - *domestic* and *interlines* (i.e. international destinations). The payment for interline sales, in turn, can be made in *local currency* (using the currency codes specified by IATA – the International Air Traffic Association) or in *United States Dollars* (USD).

For interline sales in local currency the rate of US Dollars (USD) in local currency must be provided. The rate used is the one specified by the National Bank on the day of the sale.

The airline demand sales to be reported twice a month. With the current system up to 14 rates may be used within a report period. In the new system, the number of rates must be no less than in the current system. The rate format must be XXXXX.YYYY (as in the current system), i.e., the precision is 4 digits after the decimal point, and 1 USD may be no more than 99999 units in local currency.

For each sale the Travel Agent company is given a *commission* as a percentage of the ticket fare (the airport taxes/fees are excluded). The percentage of the commission depends on the type of the ticket and is agreed between the airline and the Travel Agent in a contract between them. The system must allow a commission rate to be added/deleted. When a sale is made, the appropriate commission amount should be recorded.

The sales reports must list all sales transactions together with the corresponding sub-totals and grand totals (see Section [9](#_bookmark3)). They are requested with various levels of detail as follows:

* *individual reports* as prepared by each advisor;
* summaries, i.e. *global reports*, which are arranged as:
  + reports per advisor. Each report contains one line per advisor;
  + reports per USD rate (tickets sold by all advisors for a given “USD/Local currency” rate). Each report contains one line per rate.

An example of reports for interline sales in local currency is shown in Section 9.2. Reports for domestic sales are shown in Section 9.3.

*REFUNDS*

Once a customer cancels a ticket, a record about this is made detailing the ticket returned and the amount refunded to the customer. It is sufficient that the details about refunds are recorded in a (set of) file(s). No refund reports are necessary.

The number of commission rates used for refunds as a rule is greater than the number of commission rates used for sales reports for the following reason. The Air Via Ltd occasionally changes the commission rates. Since the tickets may be returned up to 1 year after the sale, the system must, in addition to the rates currently used for sales, allow the use of commission rates, which were used up to 1 year in the past.

*MISCELLANEOUS*

The system is expected to provide functionality for maintaining the list of travel advisors and general maintenance of the system database by a system administrator: i) maintain contact details of the Travel Agent – name and address

– which will be used by the software in all reports, and ii) maintain a list of ticket types which will be used by the Travel Agent. In addition, the new system is expected to provide an **adequate level of security**. Also, a **backup/restore facility** for database is required which does not exist in the current system.

#### Problems with the current system

1. The user interface is old-fashioned. The first release of the existing system took place in the 90's of the last century. The technology at the time did not allow a GUI. This must change in the new system. Of highest priority for the new system is the graphical user interface. It must be clear, consistent and make the system easy to use.
2. The technology used in the existing system does not support different levels of security. Appropriate new technology must be used which provides adequate security mechanisms and allows users different levels of access to the system. For example, the administrator must have full access to the system stock, the advisors will have access to their own stock and respective sales reports only, the office manager will have access to the whole stock and to all individual reports. Office manager is also the only role who can generate all types of reports.
3. The existing system has severe *functional limitations* which make it difficult to use; new software must rectify these. Some examples are given below to illustrate this:
   1. Assume that a record about a sale is associated with a particular USD rate, which was found to be incorrect. With the current system, the only way to alter the record is to delete it first and then create it again with a correct rate.
   2. Commission rates are hard-coded in the current version of the source code. Every time they change, a minor release of software is required, which creates compatibility problems between the versions. Since the commission rates may vary between Travel Agents (different Agent companies may have different commission rates agreed with the airline), with the current version a multitude of different releases must be maintained – thus, this functionality becomes problematic. The new software must allow the use of an arbitrary number of commission rates. Introducing a new commission rate, however, should not require changes to the software source code.
   3. The current system does provide a rudimentary functionality to handle special kind of customers. The new system must provide an extensive functionality to allow the Travel Agents to improve their relationship with these kinds of customers. The list of features which are required is as follows:
      * *Regular customers* may have an account, which allows them to *pay later* – up to 30 days after the original purchase. Late payments must be discovered by the system and the Travel Agent (**automatically**) prompted after 30 days, via an alert.
      * *Valued customers*, in addition to the “late payment” option as for the *Regular customers*, can be given a discount as a percentage of the ticket fare. The discount plan is set/maintained by Office Manager and can be either *fixed* or *flexible* depending on the sales to the customer *within a calendar month*. The discount can be paid to the customer at the end of the month or deducted from the amount due for future sales. In either case, a record about this should be maintained in the system.
        + *fixed* discount – the same percentage of discount, e.g. 3%, is given to the customer for each ticket fare, irrespective of type and number of tickets sold.
        + *flexible* discount – the percentage of the discount depends on the value of the sales to the same customer accumulated within a calendar month.

Also, it is important that an appropriate Concurrency Control mechanism is used in the system so that database inconsistencies are avoided. For this, an appropriate isolation level between concurrent database transactions is needed. For example, concurrent interaction between the following: i) reporting of the sales by a single, or several, advisors; ii) use/assignment of the blanks by/to the advisor(s) and iii) stock update by the administrator, should produce consistent results and leave the database in a consistent state.