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ICT usage in Annual registration with stock balancing as a way for Compliance of standards with the businesses in EU

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Abstract

All companies have an obligation to do regular annual registration and stock balancing and a need to do the same periodically as a way for improvement of their own business. This is especially important for Companies with e large number of various items that are present at the same moment as well as also a very large number of items that are active periodically.

This is a very voluminous task even in small Companies. It becomes more complicated for larger Companies with higher number of departments and with miscellaneous items.

 With larger trading Companies it is always harder, because they usually have tenth of thousands of active items and also tenth of thousands of periodically active items. In addition to this, even articles that are not active momentarily occupy room physically and in the databases both because of physical stock and historical importance of the circulation.

Since the number of items that needs to be registered is considerably large, the process of physical counting takes a very long time, thus the Company is forced to pause its business for a number of days. It is also imposed to use a mathematical method of consolidation of the retrieved data, as well using modern technology, such as mixed networks, Wireless Handheld Computers together with desktops. As a result the actual registration takes place, in two ways, first with a pause on stock movement and also without any interruption while the Companies continue with

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business as usual.
Once the registration is finished, the data is consolidated between the starting stock at the beginning of the registration, sale and the registration itself to a balance, which it can then be projected at a date of our convenience.

Keywords: Registration, balance, stock, Wireless, databases, heterogeneous networks

Introduction

The challenge that we are dealing with is that we have to organize various groups who are supposed to do the physical registration of the items. The groups of the registering staff have to be chosen on the basis of their knowledge of the divisions of items, their responsibility towards the item groups (divisions) and of course on their ability to use modern technology devices. In no case can we do a successful registration with staff that are not well trained ore who do not know recognize the articles that they register.
The hierarchical organization is crucial for the success. We have to identify the person in charge,   registration manager, group leaders, and responsible persons. Each one of the team members is responsible to identify himself and his work to his leader. By the end of the work we are going to have the information on Who, When, How and Counted for each counting of every individual article, and the summarized totals of each article. Every change and eventual mistake is going to have an author and the time when it happened so it can be improved immediately.

Preparation steps for the Registration start

The duties that we should perform in different phases of registration are as follows:

- Preparation of the IT infrastructure
During the preparation for physical registering the following steps need to be taken Covering of the entire area with quality network, since the network would be combined for various devices it should be at least
   ❑   WIFI
   ❑   Wired
- Preparation and control of the devices for actual work and control of the network connection
   ❑   Control of the Date/Time and regional settings in all devices

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- ❑ Date/Time is important for later identifying the time the article was actually counted
- ❑ Regional Settings affect the actual data in form and also in accuracy
- ❑ Ensure that the documents created by various devices shall be uniquely identified

- Preparation of the items physical placement

- ❑ Trying to group the identical items near each other, since some of the same items are distributed all over the registering area
- ❑ We perform depending on the fact that we continue circulation of the articles or not
- ❑ Surrounding - the momentarily registration area with a tape in a manner of "police tape"

Once the physical registering is finished, WE continue performing the following tasks:
- ❑ The union of the data from both databases

Consolidation of these documents, preserving the identification of the main information such as:
- ❑ Author
- ❑ Date-Time
- ❑ The amount of Counted Quantity and
- ❑ Number of the Counting for the same item
- ❑ Unifying the counted items by their codes (barcode)
- ❑ Comparison of the amount of Counted Quantity with the accounting quantities
- ❑ Consolidation of the difference between the Quantities counted with the accounting quantities
- ❑ Creating accounting documents on item quantities
- ❑ Imbalance
- ❑ Overbalanced
- ❑ Underbalanced and
- ❑ Balanced

Finally accommodating the acquired documents by the accounting system and having the system change the data for further processing and reporting.

We will also provide a Case Study which has taken part in one of the branches of a very big Company. Therefore, we will try to support every issue that we state with physical backup of the registering and annual balance that we did within this Unit.

The registration with desktop has been done for 41215 items, with Handheld

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Computers 8015,
 while the total articles that have been active in the period until the registration day
is 93101, so we have a total of 41871 inactive articles. Before the start of the
registration we save the information on Accounting Stock Quantities, in this case it
is 07-Jan.

Table 1 - Registration Dates

| Company		Start	Physical reg.	End	Stock
ETC	PRIZEREN	8/1/2013	08/1/2013	10/1/2013	07.01

Physical registration

The areas that are being used for registration are being covered by two means of
network:
Cable Local Area Network, which is distributed from the Local Data Server to the
desktop machines where Registrars are processing directly into database
documents. This can also be done using notebook computers.
The second group is the one that registers the item directly in the Local Server
Database by scanning them with specialized handheld computers equipped with
built in scanners. This is the WIFI group hence they are connected to the network
through the combined switch that has input from the LAN and distributes the
network between Computers (Wire) and Handhelds (Wireless).

On Figure 1 we have illustrated how the network scheme in an IPV4 protocol layout would look
like.

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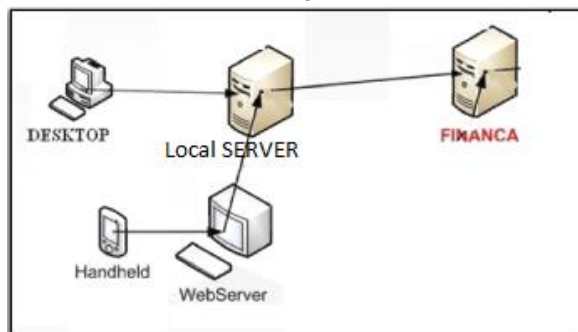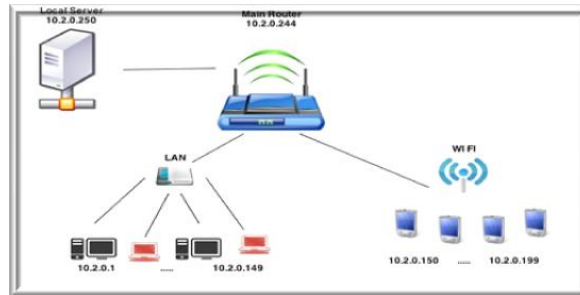

Figure 1 Network scheme in an IPV4 protocol layout

We are only considering the addresses that are needed for the conclusion of our task.

Since we are dealing with diverse devices, this leads as well to the diversity of the databases used by these devices. The databases are chosen to be SQL based, but the PC-machines work with SQL SERVER database, and the Handhelds work with compact version of SQL databases especially designed to occupy as little memory as possible, even though this memory is compacting in space and increasing in size. It is essential for the devices to discharge every finished document, freeing the memory for the next documents.

For achieving the communication between handheld devices databases and the local server, we use web services. This communication is bidirectional.

Every registration document shall be given a unique document number, user ID and device ID.

During the scanning of the items within a document, we will obtain: item code, quantity counted, quantity on account, date-time registered.

Because we are registering mainly retail stores, we are assuming that the quantity counted and quantity on account, in many cases shall not be the same. In our experience, the same thing happens with the wholesale stores who have a very fast circulation. It is of great importance that a document can be registered only once. This is achieved by giving each document its unique ID. In this case, if the network fails during the transportation of the document, but the document itself has reached its destination in the target database, the document cannot be doubled in that database after the network connection has bee restored.

Meantime while the registration is continuing, we have two cases. First case is when the business has paused, so no changes are happening while we are registering. The second case is when the sale and supply of the same articles is also taking place, so we could say that the company is not at any kind of discontinuation, but it is doing business as usual, with some small restrictions. The area where the registration is taking place should be temporarily surrounded,

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usually by a tape, so the same item does not take part at registration and sale at the very same time.

In the most unwanted case, it can happen that the item that is being registered is taken by a customer and is at the customer basket, and it has not yet arrived to the Cash Register. As we can see, the item isn't counted in the registration of the items with the same code and it is not sold since it is still in the Customer basket. Practically this is the only restriction that we are forced to do. But this can also be eliminated using proper mathematical processing.

Unification and primary consolidation of the gathered data

Until this step, we have some documents entered from handheld devices and some entered by the SQL DBMS directly. Our first duty is to bring these documents together in one table of the database, where we can continue processing them as unique documents.

First we create the table in the database that meets the requirements for reporting all the possible on goings happened by any of the sources of the document creators. This table can be prepared earlier in the database, because we are intending to save a detailed history off all the balancing registration that we have taken. This is going to be important for later documentation on all that has happened during the registration itself. To do this we use a key that is unique for this Registration.

18	24	1/8/2013	Regjistrimi 2013 - J D	N	991	0	992	0	D	<NULL>
19	24	1/9/2013	KONSOLIDIM Regji D	D	991	3052	992	1158	N	1/7/2013
20	24	4/23/2013	Regjistrim i Gjithmb D	N	991	0	992	0	N	4/22/2013
21	24	4/25/2013	konsolidim - Regjist D	D	991	4089	992	1613	N	4/22/2013

Figure 2 – Registration and Consolidation

The data from the other source is being imported into our database in a table and then combined with the data that are entered directly in the database using scripts as follows:

```
/* THE SCRIPT FOR INSERTING DATA
insert into lregist
( Idregist, numr, sifrA_art, regist, cdatumtime, Counted,
  calculated, pershlista )
select 16, n.numr_HH_ + 10000, s.sifrA_art, s.Sasi, n.datum_FUT, Realiz_Sasi,
      Sasiodzal, N.Identif_Br
from HH_docs N
inner join StaHH_ac S
        on N.HH_Id = S.HH_Id
where datum_HH_ >= '2013-01-08 00:00:00' and datum_HH_ <= '2013-01-10
00:00:00'
  and sifra_art <> 9999999
```

order by n.numr_HH_ desc
*/ End of script

We can immediately create a report on the data that are processed by the devices and the consolidation needed for to accomplish balancing.

i	Njpun	PIS	Fillimi data	Fundi data	-	stanara	nga HH	Konsoli	stokut me	stoqet	perputhur	erputh	templl -	mi 1	te	mi 2	ME SASI
3he	2|ETC	PRIZEREN	24	18	8/1/2013	10/1/2013	41215	8015	7987	49202	7/1/2013	93101	49230		28105	28105	1267	29372	

Figure 3 – Number of items being physically registered

Every row of the document that is added to the table shall also have a Source Id, so we can refer to the device and the user who originally entered the data.

Our registration has started on a certain day, it lasts e few days and it shall be consolidated by giving it the date of the first day of the physical registration.

I..	ID_Lregist	Document_Nr	Sifra_Art	Consolidation	Counted	Stock_moment_Scan	Stock_on_date	Date_time	Device_user
16	342940	100	5497302	1.000000	37.000000	36.000000	36.000000	1/8/2013 7:04:43 AM	1c6 minirja-
16	342941	100	5132456	-5.000000	45.000000	50.000000	50.000000	1/8/2013 7:05:06 AM	1c6 minirja-
16	342942	100	5132467	28.000000	60.000000	32.000000	32.000000	1/8/2013 7:05:22 AM	1c6 minirja-
16	342943	100	5132468	.000000	42.000000	42.000000	42.000000	1/8/2013 7:05:28 AM	1c6 minirja-

Figure 4 - Balancing form 1

This is imposed by the fact that we have cases as listed below:
The same item resides in more than one place
The device has had an error (communication error or similar) and
Human error (device accidents)
Until now we managed to get the necessary data to start the primary consolidation.
The Variables are:
Stock_on_Date (Sd)
Counted (Co)
Consolidation (Cn)
Based on this we can use a very simple formula to Calculate the balancing Consolidation:

$$(Co - Sd) = Cn$$

Now if we apply this formula by using actual data, we can see instantly that we will have all three cases that we mentioned before. These calculation are described below:

In the first line of the table	37 – 36 = 1	Conclusion	Overstock
In the second line of the table	45 – 50 = -5	Conclusion	Under stock
In the fourth line of the table	42 – 42 = 0	Conclusion	Balanced

Secondary Consolidation

As we already mentioned, some items are accommodated on more than one place

(shelf). In this case the information acquired during physical registration by the interaction of our devices with the Local Server database will not be useable immediately. It has to be further mathematically processed so we can achieve accurate data.

The article that we are going to treat is listed below:

ID...	ID_Lregist	Document_Nr	Sifra_Art	Consolidation	Counted	Stock_moment_Scan	Stock_on_date	Date_time
16	319988	1507	1141003	-682.000000	365.000000	1047.000000	1055.000000	1/10/2013 1:02:03 PM
16	320906	1506	1141003	-1046.000000	1.000000	1047.000000	1055.000000	1/10/2013 12:19:30 PM
16	347250	18719	1141003	-1035.000000	12.000000	1047.000000	1055.000000	Jan 10 2013 2:09PM
16	349162	18704	1141003	-488.000000	559.000000	1047.000000	1055.000000	Jan 10 2013 10:28AM
16	361887	18579	1141003	-917.000000	138.000000	1055.000000	1055.000000	Jan 8 2013 10:31AM

Figure 5 - Registering same item on multiple shelves

As we can see it has been registered a total of 5 times, of which once with 1055 stock on moment scan and 4 other times with 1047 stock on moment scan. On the other side the Stock on the beginning of the Physical registration is 1055, so it is identical with the "stock on moment scan" on the first scan of the item. Because of the number of Physical counting's we have an unusual momentarily Consolidation for each line based on the formula used before $(Co - Sd) = Cn$ it gives us respective Balance Consolidations of 682, 1046 and so on.

Our duty is to reconsolidate this to the expected balance and then to subtract the sale to the gained result.

We have to group individual item by the fact that it was being sold meantime that it was being registered, and that it was not being sold. The item 1141003 has 2 groups, 1 row with one stock_moment_scan and 4 rows with another stock_moment_scan.

The data to be consolidated is grouped by the item_code then by the stock_moment_scan.

Sifra_Art	Consolidation	Stock_on_date	Stock_moment_Scan	NrSCan	Total_counted
1141003	-3251.000000	1055.000000	1047.000000	4	937.000000
1141003	-917.000000	1055.000000	1055.000000	1	138.000000

Figure 6 – Item grouping by Stock_moment_scan

Therefore, now we have a formula that gives us the summary data on the item required:

For the group of 4 rows

SUM(Counted)　　　　　 =　　 937
Sum(Consolidation)　　　　 =　　 -3251
Stock_moment_scan　　　 =　　 1047
Starting_stock(Stock_on_date) =　　 1055
Num_scan (Number of scans)　 =　　 4

= 278 =

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For the group of 1 rows

SUM(Counted) 　　　　　=　　138
Sum(Consolidation) 　　　=　　-917
Stock_moment_scan 　　　=　　1055
Starting_stock(Stock_on_date) = 　1055
Num_scan (Number of scans) 　=　　1

Sale can be obtained in many ways, one of them is as a difference between the starting stock and the stock at the moment of scan, so :

Sale = sum{groups[Starting_stock - Stock_moment_scan]} = (1055 – 1055) + (1055 – 1047) = 8

So we can finally calculate

TOT_Stock = sum{groups[Num_scan x Stock_moment_scan]} = 4 x 1047 + 1 x 1055 = 5243

TOT_Consolidation = sum{groups[Consolidation]} = - (3251 + 917) = -4168

TOT_Counted = sum{groups[Counted]}= 937 + 138 = 1075

Thus, our temporary registration is:

Registration_temp = TOT_Stock - TOT_Consolidation = 5243 – 4168 = 1075

Since we had a sale of totally 8 pieces during the physical registration and we are going to convey our balance to the beginning date of the start of physical registration, we shall of course add the sold quantity to the balance

Registration = Registration_temp + Sale = 1075 + 8 = 1083

Now we can say that we have finished registering the item. The balance acquired will be

Balance = Registration - Starting_stock(Stock_on_date) = 1083 – 1055 = 28

This is our final Balance for this specific Item. We can see that it has overstock (overbalance). This is going to be reflected on a balancing document.

We have done the same for all of the items that are part of our registration, some belonging to the first – simple group, with one shelf and no sale, and the others belonging to the second – more complicated group, being one number on shelves and being sold while we are performing the physical registration.

Creating the final balancing documents

We usually create a separate document for every group of items

Overstock document

Under stock document

Balanced stock document

Since the documents are going to reflect the balance of each item at the moment

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of the completion of the registration, it is only normal that it can be conveyed at an earlier Date – time, to meet our needs. This can be done because a balance of a quantity of +-XX will not change the item Card if it is carried few days ahead. Only the row of its residing is going to move.

Datum dok.	Shifra	Emri	Dokument	Sasi hyrje	Stok	Cm.fat.hy	TVS	Rab	Cmimi de	Sasia dalj
				9.875,00	1.064,00		Po			8.811,00
2012-12-31			64-100/8362		1.051,00		Po		0,380	13,00
2012-12-31	000050	REXHISTRIM	64-992/1576 TEPRICE		1.079,00		Po		0,380	-28,00
2013-01-02			64-100/500001		1.078,00		Po	2,00	0,380	1,00
2013-01-02			64-100/500001		1.068,00		Po		0,380	10,00

Figure 7 – Item card after Consolidation (Final)

Conclusion

With this paper we have tried to show that the registration and stock balancing can be performed without interrupting of business. Modern devices and methods are required for this to be possible.

The case study has had a number of 49230 items, of which 8015 are registered with handheld Computers and 41215 are registered with Laptops and desktop Computers. 93101 total articles that have been active in the period until the registration day, so we have a total of 41871 inactive articles.

The Sale – Unit has been chosen to be of middle size, some 7000m2 and with a medium number of unique items. The method can be easily applied on a greater number of items with the same score.

If we assume that a company has a big circulation, the 3 – 10 days saved on physical registration and stock balancing means a value of about 1% to 3% save in money. So it is always worth taking it into consideration.

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