Reengineering of the current process of collecting data about business customers

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***Abstract*— In this paper, we are going to suggest how to change traditional data storage method within telecommunication company. Before reengineering, data was collected on excel spreadsheets, and also in various technical and sales applications. The key disadvantage of this type of data storage is inability to properly connect all the data. Our goal is to create the database that is going to gather and connect all data in one place. The relational model is created and it is filled up with real data about business customers. The first version of this database contains seven excel tables. Excel table's entities are properly connected with mutual connections. By performing queries on this database, the sales department can gather important information about business customers. We will change the process of collecting data by introducing a new database. Old excel tables are replaced with the relational model. In this way we save the employee's time because they have all necessary information in one place. Also, employees could perform queries on all data, and select only the specific data that meet the given criteria.**

I. INTRODUCTION

Sales department in any telecommunications company which works with enterprise customers, collects large amounts of data. As the telecommunication market grows rapidly, the same is happening with the amount of data collected. All these data should be stored in one place in order to simplify their further research and processing. While the smaller amounts of data are processed, it is acceptable to store them in excel tables. However, as the amounts of data grows, it becomes necessary to find a more suitable way for data storage. At the same time relations between data are becoming more and more complicated. Cooperation with the customer involves several different departments. When the key account manager wants to have all information about the customer, he has to gather information from several different departments.

Sales department, in one telecommunication company, is trying to overcome this problem by increasing the number of excel tables for data storage. These tables categorizes data according to the type. Contract numbers and names of the companies are stored in one table. The other table is used for collecting data about customers and their contacts. Over time, the number of those tables increases, and it is no longer possible to have all customer's data at one place.

Therefore, it would be more efficient to reengineer traditional forms of storing data so they can be used more effectively. Reengineering of data collection will lead to the creation of the new modern storage system. All necessary data would be available at one place and all performed operations would have the central influence. All created tables are properly connected within SQL Server Management Studio. Certain relational tables are also created which have the function to join different tables. Reeingeering of the process of collecting data will save the time, which is necessary for getting desired information. It will have an indirect influence on the sales department's performance as well.

One of the first definitions of the reengineering discuss about the fact that reengineering is visible through the new way in which the business process functions in a company [1]. Radical changes of the process should increase the quality of performance in the form of faster execution and improvement of the service itself [2].

Reengineering of the process will provide a lot of benefits. One of the key benefits is described in this paper. It enables the creation of consistent and high-quality end-to-end process flows with opportunities for performance improvement, and for re-use of existing processes and systems.

It is necessary to come up with business strategy which enables the rise of company's profits on one side and customer satisfaction on the other. The tools used for this purpose can be very complex. The simple example described in this paper shows how we can achieve significant improvements in process flow with low investments. The attention is directed to the end user all the time because it is considered that meeting specific requirements and user's needs are leading us to success nowadays [3].

The paper describes an innovative relational model for data collection. Comparing with traditional methods of collecting and storing data this new model should bring improvements. The goal of the creation of the database is to gather and connect all the data in one place. The purpose of that is to help sales department to achieve better results.

II. TRADITIONAL METHODS FOR COLLECTING DATA ABOUT BUSSINES CUSTOMERS

A. The structure of data collected

In the beginning there weren't a lot of information to be stored. In time the amount of data collected has been increased significantly. More complex technical solutions which were implemented for key customers, additionally increased the amount of data for storing.

Currently all data about business customer are kept in one excel table. As the data amount is increasing, this

way of data storage isn't enough any more. The data are categorized into technical data, financial data and sales data. These data categories are distributed in several different excel tables. Different excel tables are used by different departments (technical, sales, finance and marketing) in order to communicate with customers properly. The bigger number of excel tables makes data access more difficult. Data processing is also becoming more complicated. If one piece of data changes, it is necessary to make that change in every single table where that piece of data exists. As more departments are involved, mistakes are often made, and a lot of time needed for data reconciliation.

TABLE I.
DATA STORAGE BEFORE REENGINEERING PROCESS

Type of the data	Usual data storage location
VAT nummber, company name	MPLS database used by technical support department, the sales department and finance department that issue invoices to the customers
Data requirement – inability to access them easily	
If there is a change in the name of the company, the key account managers must provide this information to the financial sector immediately and also to the department for technical support. So the same information must be forwarded to two different sides at the same time. If there is compensation deal with the customer, then it is necessary that the marketing department gets this information too.	
Type of the data	Usual data storage location
Bandwidth and the type of service	MPLS database used by technical support department, finance department sales department
Data requirement – inability to access them easily	
Management often requires reports which include these information, but it is usually in very different forms: connected to all other contracts which customer has connected to all other services in a particular location, etc.	
Type of the data	Usual data storage location
Price	finance department sales department
Data requirement – inability to access them easily	
Management often makes various reports containing a list of customers with information about bandwidth and prices for the services.	
Type of the data	Usual data storage location
Technical contact person	MPLS database sales department
Data requirement – inability to access them easily	
Management sometimes wants a list of all technical contacts for all customers.	
Type of the data	Usual data storage location
Contract signing date and contract expiration date	finance department sales department, where every key account manager keeps record about their own customers
Data requirement – inability to access them easily	
Every month management wants to know which contracts are about to expire. That way they can maintain income by offering additional services. These information could also help targeting the specific customers for different actions	

In the mentioned telecommunications company the following customer's data are collected: name of the company, VAT number, address, contact person for administrative and technical requests. It is also important to define all services which customer uses according to the type of the infrastructure. After that, it is necessary to define bandwidth and prices which clients pay for each individual service. All contracts signed with customers should also be listed. The purpose of collecting all these data is further processing. Sometimes it will be necessary to list all administrative contacts in order to inform them about changes in the billing system. The other thing, which is also necessary is the list of all contact persons for technical issues, in order to send them the announcement for further maintenance activities. The important information is contract expiration's date because the key account managers are obligated to initiate negotiations about the contract renewal with the customer, a few months before the expiration date. All these information are not available on one place, and each time a new list with necessary data has been made from the beginning.

The management demands reports in different forms, which is becoming more difficult task for all employees. These reports usually collect data from different departments and different excel tables. Table 1 shows several examples of hindered data access.

B. Neccesity to change traditional methods for collecting data about bussines customers

Data managing and analysis have always been the challenge for every company. In the past, there was a system which collected only important data and discarded the rest. That kind of system existed because there were not any possibilities to store big amounts of data. That is the reason the data which was considered unnecessary at that moment, were discarded as useless. Despite the fact that technology advanced and the new media for storing unlimited amounts of data were developed, the old business system continued to exist. The data which didn't provide useful information at the moment were discarded, even though the new technological capabilities were introduced. The data storage itself wasn't the problem. The real problem was the data analysis, which continued to become more and more difficult with the increase of data [4].

In order to overcome these problems, the relational model is created. Now it is possible to store all data about business customers, even the unstructured ones. It is possible to perform different queries in order to select data according to the various criteria.

Reengineering of the process of collecting data and the creation of the unique database would have multiple benefits for all employees in business to business sales department. After the contract has been signed all data about that particular customer would be entered into this database. Later, each key account manager would make changes for his customers. In such way all current data about business customers would be at one place.

In order to demonstrate the usefullness of this database, it is filled with real data about business customers. These

data are owned by operator's sales department. Further, the purpose of queries that are created upon this database is to gather current information about business customers. These information should help key account managers and the sector managers to get accurate information regarding existing customers and services they use.

Beside the fact that the purpose of the test database is to make data access easier, it should also enable the data categorization. All this is done to improve customer's satisfaction about services they use. It saves time and contributes to more comfortable business activities.

In order to have a better view of all advantages of this new database, a particular query will be made and the results of such query will be presented.

III. THE NEW METHOD OF DATA COLLECTION

We are going to describe the experimental relational database which is merging all the tables in a unique database. The idea is to enter data only once and to make it accessible to all employees in desired format. The output data can be presented in different ways. It depends on the current demands of database users. Data integration saves employees' time. Also, new database significantly increases accuracy of the data that are coming as the results of the different queries. All these improve efficiency of the process of collecting data, and reduce the possibility of error to a minimum. Simulation includes some key data related to the business customers. Key tables included in this simulation are joined in the SQL Server Management Studio. Type of relationships between the tables are 1: N or N: M, depending on the relations between entities.

The first step of the process of collecting data about the new customer is to enter all necessary data in the table named Customers. This table contains data: identification number, customer name, tax identification number, company address and identification number of the type of client. Tax identification number is the unique identification of the customer. One customer with his tax number may sign several different contracts. For that reason it is necessary to introduce an artificial primary key that is different for each customer and that is the customer's identification number. This table contains the addresses of the company headquarters. Customer may have several different addresses on which he has delivered different services.

External Key for table named Customer is at the same time identification number for type of the customer and represents the primary key for the table named Type of the customer. These two tables are connected with the connection type 1: N, which means that one customer can only be categorized as one type (private sector, foreign representative offices, embassies, etc.). While one customer's type can have multiple associated customers. Table named Type of the customer contains data: the identification number for type of the customer, which is also primary key, type of company, size of the company, company description and the existence of partnerships.

For table Customers, through its primary key - Customer ID number, associated is table named Contact person for which this number represents an external key. Connection of these two tables is of type 1: N. One customer can have several contact persons, but one contact person is representing only one company. Table Contact person defines a primary key as the identification number of a contact person and represents internally defined number that is unique for each contact person.

Table named Contact person contains data: ID of a contact person, name and surname, contact address, e-mail, fixed and mobile phone. With similar logic, other tables are defined and connected.

Using relationships between these tables various queries could be set. These queries will be applied to all data contained in the database. The results include all data from the database that meet the required criteria.

Fig. 1 presents one simple request that combines these tables and gets unique output. The output is in the form of a table that contains the desired data.

This example shows all contact persons from the companies which contain word "private" in their description. An additional requirement select only outputs where field "Compensation" is empty, which means that there is no compensation deal with that particular customer. This list of all contact persons from the private sector companies can make the data search easier. In addition to that, refined search can be done, and within the private sector only insurance companies can be selected. The table which comes as the result contains the following columns: type of the company, description, name and surname and mobile phone number. Beside these columns, we can add more columns such as contract numbers and service specifications. This possibility would make further operator's actions easier.

```
SELECT TC.[Type of the company], TC.description,
CP.[name and Surname], CP.Mobile_phone AS 'Mobile
phone'
FROM Customers C, [Type of the customer] TC,
Contact_person CP
WHERE
C.ID_Type_of_the_customer=TC.ID_Type_of_the_Customer
AND C.ID_customer=CP.ID_customer
AND TC.Compensation IS NULL
AND TC.[Type of the company] LIKE 'private%'
```

Type of the company	Description	Name and Surname	Mobile phone
Private sector	Recycling	Đorđe Uskoković	060/817 10 11
Private sector	protective gear	Vladimir Tustić	062/800 98 58
Private sector	production	Dragan Ilić	065-927-3018

Figure 1. Request „Private sector"

Suggested database can be used in different situations. For example, we can list all insurance companies with their contact person. Sometimes we need that information quickly in order to reach the customer before the competition company. If we become aware of a new regulatory policy about insurance companies we want to use this databse to quickly get contact persons from all copanies that meet desired criteria.

One specific case discuss the situation when there was requested that all insurance companies need to have disaster recovery location. The features of this database were very important in this situation. In a matter of minutes all customers could be listed, as well as their contracts, services and even the prices they pay. Contact persons with their phone numbers could also be added. The unique list would be created, and it would be given to key account managers, so they can call their customers and offer them disaster recovery location in operator's data center.

There are various possibilities for the application of this database. For example, we could list all business customers whose contracts expire in March or April or May. Furthermore, using those search results, the sales department can make plan about communication with customers in order to renew contracts. In that way, the detailed search for customer's information and their services, can always be up-to-date. The best solutions can be offered when it is necessary to review the whole situation on the specific location, or when it is observed the particular type of customer or the particular service. Based on all reliable information strategic plans about how to adjust the technical solutions for customers could be made. If we go further, we can see the tendencies of price decrease and the increase of demand for the links with greater bandwidth.

The purpose of reengineering the data storage is the better usage of the same data. The fact is that in different queries all the data can be included and that couldn't be done before. The situation in which the technical service data are kept in technical department and are available only on request, means that previous analysis couldn't reach all information about the services.

This database could be changed and we can create additional tables and columns if it is necessary for the activities of the department which uses it as a tool. Knowing the fact that the telecommunication market is rapidly growing and changing, the flexibility of the suggested database presents its main advantage. Development and adjustment of the database to the needs of the market can be the subject of further analyses.

IV. THE ADVANTAGES OF THE NEW SOULTUON

Preliminary data have been collected and entered into several tracking systems to make it accessible to everyone. Any modification of data means a change in all places where such data is kept. Data entry errors and the discord between the data wasted a lot of employees' time. The unique database that is suggested is easy to use because it keeps all the information in one place. Changes that are entered automatically are displayed on all the following outputs. Implementation of a centralized database will minimize the possibility of mistakes.

Through the new database, employees will always be able to obtain the required information about business customers. It will also save time and improve business processes. Reports prepared for management are now easy to manage and have a variety of features.

Expectations regarding the further development of the telecommunications market are relatively consistent. It is expected expansion in demand for Internet services. It is, also, expected increase in investment in development of telecommunications services within the company [5]. This expectation leads to big confusion among operators who are not flexible and which are not ready for quick changes.

Therefore, it is necessary to prepare the operators for changes. Detailed analysis of all data, will give the information about tendencies of further development.

The tendencies of price decrease of Internet services [6], will also point out the need to be proactive in the way of providing the telecommunication services to the end users. When the customer is satisfied with the service and the way that is treated, never breaks cooperation with the operator.

V. CONCLUSION

The rapid growth of telecommunication market is very stressful, but it is also a big challenge for telecommunication operators. It is necessary to keep up with changes, which are fast and permanent. Every customer's demand should be considered with expertise and the understanding of the big picture.

Once again, the emphasis is on containing all related data in one place. However, personal satisfaction as well as competency to fulfill the requirement should not be ignored. The existence of the analysis which points out to market's tendencies will contribute to strategic planning and anticipation of customer's needs in the future.

Filtering data from a single database can be easily and can quickly get the desired results. The usage of these results will influence directly on the sales activities of the sales department for business customers. It will shorten the time required for obtaining information about users. Also, improvement of the customer satisfaction due to a proactive approach is expected. Analysis of existing data allow the prediction of future technical solutions for the various projects. Also, gives us a more clear insight into the current situation of services used by business customers. Expected is future development of this database in accordance with the needs of the sales department. Customizing the user's preferences and the employees need is a key priority for the further development of the database.

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