Unified Web Based Electricity Consumers Services System

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Abstract: Protection of consumer’s interests is one of the roles of the Egyptian Electric Utility and Consumer Protection Regulatory Agency (EgyptEra). In order to investigate consumer’s complaints and ensure protection of their interests, EgyptEra start on his own initiative to study and design of an automated system to receive and record all complaints resolving steps and provide other services to the consumers through a system linked to the internet as a unified web based consumer’s services system (EgyptEra-CSS). This system developed to offer supreme services to all the electricity consumers to help them for contracting, meter reading registering, invoice check or payment, and to verify instantaneous reception of their complaints. The system set a predefined policy for escalation of delayed complaints. The system will record complete data of all the consumers supply elements, also it utilizes several reports defining some indicators which used in benchmarking the different departments/companies and help in data analysis and data mining needed for research. This paper will discuss the design concepts, specifications and the future of this EgyptEra-CSS system and the benefits can be gained either by EgyptEra or the electric distribution companies (EDCs).

I. INTRODUCTION

A. Background

EgyptEra was established as a legal entity affiliated to the Minister of Electricity and Energy (MOEE) upon the presidential decree number 326 for the year 1997 which followed by the decree number 339 for the year 2000 [1] to reorganize EgyptEra and define its facilities and Board of Directors.

EgyptEra objectives are to regulate, supervise and control all matters related to the electric power activities, whether in generation, transmission, distribution or consumption, in a way that ensures availability and continuity of supply so as to satisfy environmental protection considerations, interests of the electric power consumers as well as the interests of the producers, transmitters and distributors. Also it aims for preparing a lawful competition in the fields of electricity generation and distribution, and to avoid any monopolization within the Electric Utility. The Electric Utility comprises nine EDCs. The number of consumers in each EDC is illustrated in table I[2].

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Number of Consumers</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDC 1</td>
<td>4253916</td>
</tr>
<tr>
<td>EDC 2</td>
<td>3345288</td>
</tr>
<tr>
<td>EDC 3</td>
<td>1993352</td>
</tr>
<tr>
<td>EDC 4</td>
<td>2835146</td>
</tr>
<tr>
<td>EDC 5</td>
<td>2790669</td>
</tr>
<tr>
<td>EDC 6</td>
<td>3133764</td>
</tr>
<tr>
<td>EDC 7</td>
<td>1563537</td>
</tr>
<tr>
<td>EDC 8</td>
<td>279051</td>
</tr>
<tr>
<td>EDC 9</td>
<td>2075122</td>
</tr>
<tr>
<td>Total number of consumers</td>
<td>24693825</td>
</tr>
</tbody>
</table>

II. EGYPTERA-CSS

B. Consumers Issues

The presidential decree specified the functions of EgyptEra, one of these functions is the investigation of consumer's complaints to ensure protection of their interests and settlements of any disputes that may arise among the parties involved in the activity.

The consumers must complain first to the concerned company [3], and if they could not find a solution then EgyptEra shall start looking into the complaint according to the presidential decree number 339/2000 in cooperation with the responsible EDC to resolve the complaints in a constructive way that guarantee a stable relationship between EDCs and consumers.

C. Consumers Services System

In order to investigate consumer’s complaints to ensure protection of their interests and settlements of any disputes that may arise among the parties involved in the activity, a Unified Web Based Consumers Services System EgyptEra-CSS was designed totally by EgyptEra, developed and established to offer supreme services to all the electricity consumers connected to the electricity network. Complaints are the first module that already developed of this system to ensure complete recording of complaints details and instruction processes done till resolving. The system can be accessed either by consumers, utility operators or EgyptEra through internet.

A. EgyptEra-CSS Objectives:

To satisfy the consumer’s satisfaction and to meet EgyptEra supervision to all EDCs, the system objectives in its first phase are:

1. Ability to record complete data of all complaints received in all electricity companies through phone/internet or other paths: e-mail, mail, fax or by hand as in Fig.1.
2. Instantaneous direction of the complaint to the responsible technical or commercial department to solve.
3. Generate a non-repeatable complaint ID number expressing the company, department and date of
complaint, to be given to the consumer for future follow up.
4- Escalate the complaint to the higher level of responsibility after a certain defined time for each type if the complaint is not resolved.

5- Complete recording for all the complaint resolving processes and steps.
6- Estimate the complaint resolving time starts from receiving time, and define the responsibility level of solving.
7- Interact with consumer by e-mail or SMS to notify him of reception and resolving of his complaint and to ask him any data/document needed for resolution of his complaint.
8- Use the accumulated data in auditing and benchmarking EDCs by EgyptEra.

B. Egypt-Era-CSS General Specifications:
The general specifications of the system are:
1- Arabic language based and can deal with English.
2- Has unified short phone number 121.
3- Operators access the system through Internet by Leased or ADSL lines.
4- Operators can work off-line to receive calls during internet failure, and then data exchange will done with the system data base (DB) after restoring internet connection.
5- Ability to attach documents either by operators or complainer.
6- Auto recognition of the responsible department to solve.
7- Auto generated unique Case Number.
8- Sending email or SMS to consumers to notify them by:
   a. Reception of their complaint.
   b. Asking to send or complete data or documents.
   c. Solving their complaint.
9- Notify operators by audible alarm followed by visual popup to clarify the number of new non-opened cases received.
10- Ability to track the complaint either by the complainer or the operator using the case number.

11- Enable different levels of access: complainer, data entry, decision maker, monitoring.

C. Design concept:
To achieve the objectives mentioned before it was worthy to make use of the following:
1- The relation between the consumer’s addresses and the departments of EDCs and the regional PBX central of the national telephone company to rout the call to the right department of the EDC, Fig.2.

![Fig.2. Rout the call to the right department](image)

2- The relation between the consumer’s addresses and the supply elements of consumers to be built in the system, Fig.3.

![Fig.3. Consumer supply path](image)

D. Software and Data Bases used:
The system depends in its operation on some auxiliary predefined data bases:
1- Complaints types and classifications issued by EgyptEra.
2- Hierarchy of EDCs and its divisions and departments.
3- Hierarchy of governorates and its cities and districts.
4- The relation between the departments of the EDCs and governorates and its cities and districts.
5- The relation between the departments of the EDCs and the regional PBX centrals of the National Telephone Company.
The system developed and uses also the following software programs:
1- M.S CRM4
2- M.S SQL
3- M.S Exchange
4- M.S Windows Server

E. Reports:
The system will enable a lot of reports to give some information, statistics, comparisons and technical indicators, for example:
1. No. of complaints of each type sent to different departments in each company during certain period.
2. No. of complaints per 1000 consumers sent to different departments in each company during certain period.
3. Average resolving time of each type of complaints sent to different departments in each company during certain period.
4. No. of escalated complaints from different departments in each company during certain period.
5. System Average Interruptions Frequency Index SAIFI) = total number of customer interruptions/(total number of customers served).
6. System Average Interruptions Duration Index (SAIDI) = (Total Customer interruption durations)/(Total number of customers served)
7. Customer Average Interruptions Duration Index CAIDI = (Total Customer interruption durations)/(Total number of customer interruptions)
8. No. of complaints have interruptions of continuous duration classified as: (in blocks of X hours with total of Y hours) for specific department during specific period.
9. No. subscribers have interruptions of continuous duration classified as: (in blocks of X hours with total of Y hours) for specific department during specific period.
10. No. of Subscribers has interruptions of continuous duration equal or more than Y hours for specific department during specific period.
11. Detailed list of complaints have interruptions of continuous duration equal or more than Y hours for specific department during specific period.
12. No. subscribers have interruptions of cumulative duration classified as: (in blocks of X hours with total of Y hours) for specific department during specific period.
13. Subscribers have interruptions of cumulative duration equal or more than Y hours for specific department during specific period.
14. No. subscribers have interruption complaints of repetition classified as: (in blocks of X times with total of Y times) times per year for specific department during specific period.
15. Subscribers have interruption complaints of repetition equal to or more than Y times per year for specific department during specific period.

III. IMPLEMENTATION

A. Implementation policy:EDC1 was selected and a cooperation protocol was signed with it to be the pilot of implementation of the system based on that company has the largest number and diversity of consumers connected to it, and has a call center and good infrastructure ingredients.

Another cooperation protocol was signed with the Ministry of State for Administration Development (MSAD) to cooperate in this national project to make use of their previous experience and capabilities.
The EgyptEra-CSS system implemented as a pilot in all the technical departments of the selected EDC and will be rolled out in the commercial departments of this EDC and the rest of other EDCs and the Transmission Company. Also the system will be monitored in the MOEE and the Egyptian Electricity Holding Company (EEHC) as in Fig.4.

B. Status now: The complaints module of the EgyptEra-CSS system is implemented now in all technical departments of the selected EDC. The rest of the companies are well prepared, trained and ready to deploy the system. On the other hand, other enhancements will be done to this module including all the following:
1- Automatic registering of the phone number followed by automatic case creation.
2- Normalize all Arabic texts in all fields, and enable sensing of names and address during editing (add writing suggesting feature in the operator case entry page for the subscriber name and address).
3- Address field in the complaints page has to be separated into 3 required fields; the 1st field is "Area", the 2nd is "street" and the 3rd field is "building number" plus another field for flat no.
4- Add more than one address for this subscriber as Citizen may have more than one subscription, so once user opens a new case for this subscriber he can choose the right address from the subscriber addresses.
5- Convert text fields to lookup fields for any street or company employee mentioned in any page in the system.
6- Ensure solid relation between subscriber and its supply elements.
7- Create a new feature for automatic case grouping if the type of complain is interruption based on: complaint address, complaint type and complaint time.
8- Create a new relation between the Egypt-Era-CSS system and the events of supply cutoff by each company control center.
9- Create a new workflow for sending email or SMS to subscribers when they are applied under any programmed event for supply cutoff by each company control center.

Fig.4. Consumers services centers
10- Create a relationship between subscriber and supply elements, region and department. And enable drawing a tree graph representing the customer supply path.

11- Create for each subscriber a tree graph for supply elements from subscriber up to the M.V. transformer (a supply follow up graph to subscriber), another tree graph for transformer output boxes and their output boxes and cables.

C. A year of success:
The following are the most important data recorded during the fiscal year 2009/2010 starting of the date of its rollout to all the company's departments on 01/08/2009:
1. The total number of complaints is 127013 complaint.
2. The average ratio of the number of complaints received to the total number of subscribers is about 30 complaints per 1000 consumers.
3. An increase of the average time to resolve the complaint is noticed in the first quarter of fiscal year (Aug. & Nov. of 2009) up to 1887 minutes for the interruptions complaints and 1256 minutes for the rest of the complaints, this was a result of the poor experience of operators in recording the complaints resolution time, this time began to decline to become the border logical where it reached in the third quarter of fiscal year (Jan., Feb. & Mar. of 2010) to 102 minutes for the interruptions complaints and 203 minutes for the rest of the complaints as in Fig.5a and Fig.5b.

D. Benefits achieved:
The utilities use customer oriented indices to evaluate their service reliability with the most commonly used indices: System Average Interruption Frequency Index (SAIFI), System Average Interruption Duration Index (SAIDI), and Customer Average Interruption Duration Index (CAIDI). Deploying EgyptEra-CSS system assist the EDC to reduce the complaint average resolving time specially the interruption complaints. On the other hand the system assists Egyptera to monitor - online - the complaint status of the EDC, and benchmark its different departments regarding their percentage of complaints to total consumers and the average resolving time.

IV. FUTURE PLAN

Deep analysis is currently done to develop the second phase of this system which will include the following important services can be offered to consumers:
1- Enable customer to apply for enter his meter reading.
2- Enable customer to examine his bill.
3- Enable customer to pay his invoice electronically, and guarantee no duplication of payment by either the system or the company collector.
4- Enable customer to apply for new contract.
5- Enable customer to apply for upgrade meter/contract power,
6- Enable customer to apply for remove meter,
   Other features will be added to the system to enhance the benefits gained by EDCs such as:
1- Interact with smart meters in a future smart grid.
2- Plotting all the supply elements positions on an electronic earth map, and make the name and status of each element appear when the cursor point to it.

V. CONCLUSION

The benefit of using the information technology in the power sector [6] is very clear in this case. The application of the unified automated system EgyptEra-CSS helped speed handling consumer complaints and helped improve the efficiency of work in the electricity distribution company, which in turn helps to increase the amount of electricity sold by improving power failures and reduce the extended connection of power to citizens, will also help after the implementation of the next phases to improve the level of collecting the dues of all electricity companies (Production - transportation - distribution) in order to improve the efficiency of the electricity utility in general.

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