Towards International Electronic Government for Student Management of the Scholarship Section of the Dubai Police

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Abstract: - This report highlights the problems faced by the Scholarship Section of the Dubai Police to exchange the records and information of the delegated students with the host Universities via the UAE Cultural Attaché and proposes a solution that addresses these issues. It also proposes and describes in detail the working of a solution of i-eGov and the benefits provided to the Scholarship Section of the Dubai Police.

Key-words: - international electronic government, portal grid, cross-border e-transactions, student records, Dubai Police

1 Introduction
There is a rising need for more efficient and effective modes of information exchange inter-governamentally and internationally. Governments and universities have to tackle the challenges of inefficient information exchange systems daily when dealing with other countries and their universities.

This report describes the background and the need for the Scholarship Section of the Dubai Police to transform to an international electronic government (i-eGov). It highlights the problems such as time difference, language diversities etc. that are currently being faced by the Scholarship Section of the Dubai Police and the host universities in other countries to exchange student records and information by non-electronic means through the United Arab Emirates (UAE) Cultural Attaché.

The literature review researched focuses on the need for the governments of the world to have an integrated system to exchange information in order to solve global issues quickly and efficiently.

In general, the Scholarship Section of the Dubai Police is researching to find an efficient and trusted solution to facilitate the exchange of records of the delegated students and information from the Scholarship Section of the Dubai Police to the host universities through the UAE Cultural Attaché and vice versa. The proposed solution of i-eGov has been explained in detail.

2 Background
There are governments of different countries such as Belize and Dominican Republic that are more likely to work together to deal with regional and global problems in order to provide disaster relief, satisfy international agreements and enable trade and movement of people across borders [1]. Information technology (IT) plays a significant role in international synergy by connecting different countries worldwide electronically, especially when information technology resources are needed for every involved country to play a role in the electronic collaborative efforts. Thus, the governments worldwide including the Scholarship Section of the Dubai Police are recognizing the importance of transforming to an i-eGov. This kind of synergy can improve the efficiency in exchanging and sharing the records of the delegated students and information between the Scholarship Section of the Dubai Police and other host universities via the United Arab Emirates (UAE) Cultural Attaché.

The proposed solution will provide the Scholarship Section of the Dubai Police with a cross-border eTransaction technology model. Hence, in the future, the whole of Dubai Police can use the same pattern to electronically exchange their information with other countries world-wide instead of the current methods.
being used. It will increase their productivity and efficiency as well as facilitate and expedite the work and decision making process. In addition, it will assist the delegated students of the Dubai Police to communicate with the Scholarship Section of the Dubai Police and UAE Cultural Attaché and as a result enhance the services provided to them. Furthermore, it will also ensure rapid communication with the host universities to provide quick services to the students. This will ensure that the UAE Cultural Attaché, the host universities, and the Scholarship Section of the Dubai Police will have up to date information.

3 Problem Statement
Currently, the Scholarship Section of the Dubai Police is dependent on less sophisticated methods such as electronic fax, email etc. to exchange records of the delegated students between the Scholarship Section of the Dubai Police and the host universities via the UAE Cultural Attaché and vice versa. Due to the lack of information and heavy reliance on non-electronic means of exchange between the UAE Cultural attaché and the host universities, significant problems are being faced by the decisions-makers. The performance of the delegated students, both academically and non-academically which is monitored periodically are also affected.

One of the problems faced by the Scholarship Section of the Dubai Police is the time difference. For example, Australia is 6 hours ahead of the UAE. Due to this, the UAE and Australia are limited by the common working hours of only 2 hours a day considering the working hours in both countries. This short duration is not enough to exchange the records of the delegated students and information through the UAE Cultural Attaché which affects the speed of response from the host universities [2].

Weekly holidays in the UAE and Australia do not coincide sometimes. For instance, in the UAE the weekly holidays are on Friday and Saturday whereas in Australia it is on Saturday and Sunday. Accordingly, UAE and Australia share only 4 common working days with 2 working hours daily which has reduces the availability of communication time with the host universities [2].

Public holidays and occasions are also a vital problem. In Australia, during Christmas, the work performance reaches a low level due to the lack of staff. Thus, the Scholarship Section of the Dubai Police is unable to communicate with and contact the host universities through the UAE Cultural Attaché and as a result, the records of the delegated students would not be up to date, thus, delaying the decision making process significantly [2].

Obtaining updated information from the host universities has always been a problem. The Scholarship Section of the Dubai Police continues to request for updated information such as address, telephone number, university address, updated academic transcript and so on in order to avoid any discrepancies of information between the Scholarship Section of the Dubai Police, the UAE Cultural attaché and the databases of the host universities [2].

Thus, the research objectives are to assist the Scholarship Section of the Dubai Police to achieve its goal of enhancing the current methodology which is being used to exchange student records from the Scholarship Section of the Dubai Police with the host universities via the UAE Cultural Attaché. In addition, this research will help resolve the current problems being faced by the Scholarship Section of the Dubai Police. Hence, the Dubai Police will be the main research stakeholder in this research [2].

Furthermore, this research will improve the security concerns that exist in electronic transactions by using electronic signature, which has been given an official and legal standing, the same as handwritten documents [3], as well as to ensure that all information and electronic transactions will be exchanged securely between the Scholarship Section of the Dubai Police and the host universities by using secure web services. Finally, this research will explain why the Scholarship Section of the Dubai Police requires such a massive change pertaining to exchanging records of the delegated students between the Scholarship Section of the Dubai Police and the host universities in foreign countries.
4 Literature Review

This section gives an account of the need of an integrated system to exchange information between the governments of the world in order to solve global issues.

As per the study conducted by [4], Governments are increasingly using cross-boundary initiatives to face complex social problems. This study highlights the critical role that is played by the legislative and executive involvement in the formation of governance structures for cross-boundary information sharing initiatives. The importance of the three different types of knowledge which are of the environment, of participating organizations and of information needs is very relevant to the success of any project. As a result, understanding the environment and the governing bodies is necessary even for the Scholarship Section of the Dubai Police in order to overcome their cross-border problems.

The six major challenges that need to be overcome in order to enable government agencies to share information and work together across national boundaries are [5]:

- **Data Heterogeneity**: Data collected by different agencies in different countries have structural and semantic differences.
- **Language Heterogeneity**: Data in documents in unfamiliar languages cannot be used by agencies in different countries.
- **Heterogeneity in people and working environment**: Employees who have varying proficiencies and working environments will be different in different countries.
- **Heterogeneity in government policies, regulations, constraints and security and privacy rules**: Each country has its own regulations and policies that change with time according to the progress and development of the country.
- **Difficulties in inter-agency and inter-government communication and co-ordination**: Collaborating countries may find it difficult to keep each other updated on important events.
- **Heterogeneity in computing platforms**: Different government agencies use different operating systems, softwares and so on to perform their functions.

Thus, there is a need for an integrated transnational information system such as the distributed query processing which is currently a prototype system [5].

Governments globally face problems such as illegal migration, terrorism, natural disasters and so on. As a result, responding to these emergency situations needs organizational and inter-organizational processes and complex operating procedures between collaborating organisations. Thus, an organisation does not open up its entire database to the collaborating organisations. It is interested in obtaining or sharing that information that is pertaining to the occurrence of that particular event. As a result, an event-triggered knowledge sharing system facilitates event subscription, event notification, delivery of event data and processing and interoperation of applicable knowledge rules for data and knowledge sharing. As a result, the collaborating organisations can define events of interests and publish them in a global registry for browsing, event subscription, querying and notification. The mail features of this system are unified tools for each collaborating organisations, provision of usage instructions, data-type and error checking facilities and allowance of rules to be defined and viewed graphically [6].

A state level student tracking system was developed by the Policy research and Data Warehousing section of the State Council of Higher Education for Virginia (SCHEV) [7]. It highlights issues pertaining to data integrity, data elements, reports developments, potential users and implications for policy. This online tool presents aggregate reports of student success to inform policy makers at all levels. Since, the delegated students are located anywhere in the world, tracking them is an important aspect for the Scholarship section of the Dubai Police.

The European Union (EU) wanted to create a powerful economic group by saving transaction costs from removing the need to convert currencies in cross-border transactions within the EU [8], save search costs by acquiring information and search costs of acquiring information about prices normally quoted in
foreign currencies and eliminating the exchange rate uncertainty in cross-border trade and investment.

A four year effort to create a framework for a sustainable global community of practice among digital government researchers and research sponsors [9]. The project described the current status of the digital government research and a framework for several international working groups.

5 Proposed Solution
This section explains the working of the proposed solution of i-eGov, in order to solve the problems that are currently being faced by the Scholarship Section of the Dubai Police.

5.1 Delegated Students
Currently, the Scholarship Section of the Dubai police sends all applications applied by the staff of the Dubai Police to the host universities through the UAE Cultural Attaché. This step takes place after all the applicants have received their scholarships from the Scholarship Section of the Dubai police. After that, the delegated students travel abroad to their respective universities to pursue their academic degrees. As a result, the delegated students of the Dubai Police are located anywhere in the world.

5.2 The proposed solution of i-eGov
Figure-2 shows the proposed solution for i-eGov which is divided into three tiers such as a demilitarized zone, Local area network (middle-tier), and front-end tiers. It is assumed that the host universities accept the research policy (security and electronic communication issues) and make some changes to their existing policy in order to be connected to the i-eGov solution to exchange the delegated student records and information. All these tiers play an important role in serving the electronic environment within their domain. Front-end tier serves all system users, middle tier serves the organization local area network environment of the organisation such as database server, the exchange server (e-mails server), the intranet server, application server and the demilitarized zone serves the Internet environment and all connecting eGovernments locally and internationally.

With reference to the front-end tier, end-user can log in to the system from the grid portal by using their user name and password in order to be authenticated. Portal grid system has the capability to authenticate each end-user in order to acquire security credentials for grid tasks. Furthermore, the grid portal provides the end-users a customized view of the grid as well as it brings up end-users grid context which include all end-user references and notification log and more [10]. Once the end-user is authenticated and allowed to use the system, the systems can be dealt with according to the set privileges. In front-end tier, end-users can do several types of operations such as update, insert new data, and query the system for information regarding the delegated student regardless to the geographical location of the student. The system will send an enquiry to the targeted university by determining its system location from student record. Once such query is issued it will be manipulated in the middle tier environment.

In the middle tier environment, the application server sends the required query to the database server in order to obtain correct information about the student assuming that the databases of all participants are up-to-date. End-user portal grid displays the result if the database returns a true to application server. If the Dubai Police database returns a false result which is not very frequent due to the simultaneous updating of the databases by all participants systems, it
indicates that the required information is not available or needs to be updated from the system participants if the last updated process was done a long time ago such as 3 days. The application server forwards the same query after receiving it from the local database to the demilitarize zone. After it has been authenticated, it will pass through the firewall security located between Local Area Network (LAN) and demilitarized zone environments in order to obtain the information from international eGovernment database of the university where the selected student studies.

Demilitarized zone includes variety of services such as language eTranslator, grid services and UDDI services repository. The query is translated from Arabic language to other languages according to its destination, by language e-Translator model electronically. It will then send the query from the e-Translator model to the grid service, which is mainly web services with improved services and characteristics, in order to convert it to electronic business XML (ebXML) format to send it to the targeted university and also to avoid systems heterogeneity between international eGovernments. After that, the query will be sent from the grid services model to UDDI service - which provides an efficient and simple discovery of other business locations on the web – to find the exact route to the required country. Even though, the delegated students are located anywhere in the world, but they can be found by the system in just a second.

Jobs are scheduled in the demilitarized zone to run a certain operation internationally based on the time difference between the country and Dubai such as UAE and Australia. Now, the UAE Cultural Attaché server in the destination country receives the query in XML format and in the official language of the country, such that, XML files can be extracted in order to obtain the meaningful data from it and turn it to SQL query format in order to query their database. As a result, SQL query may return two values, true of false. True means the required record is available in the UAE Cultural Attaché database but still the system has not yet sent it to the Dubai Police database. False value indicates the required record does not exist in the database and the query must proceed to the university electronic system. When the query returns a false value the UAE Cultural Attaché server forwards the query to the selected university system. The query should pass through the 3 environments that were discussed earlier.

Finally, the UAE Cultural Attaché server will search the university server in order to obtain the required record from the main source of such information. When the university database returns the required information, it will send it back to the Scholarship Section of the Dubai Police system via UAE Cultural Attaché system after it is subjected to all processes that were applied when the query was first issued by the Dubai Police System.

Fig. 2- Proposed Solution of i-eGov

All student information exchanged by email between the Scholarship Section of the Dubai Police and the host universities via the UAE Cultural Attaché will be sent by email in order to notify them about certain matters pertaining to health conundrums, for example, if the delegated student admitted in a hospital. The host universities system will receive such information from their local hospital and then a copy of this email will be sent to the UAE
Cultural Attaché server. The required information will be extracted from the received email such as student-id, in order to integrate this email with student records. After that, UAE Cultural Attaché server will send a copy of the email to the Dubai Police server. The required information will be extracted from the received email for the same reason. Following sections describe the operation of the system in different scenarios in relation to Australian universities.

5.3 Scenario 1: Use of the system by the host universities
For example, as shown in Figure 2,
1. Once an employee of the Australian host university logs on, he/she will be authenticated by the server and will be granted limited system privileges according his/her job.
2. When student record is updated, the updated information will be converted to ebXML in order to exchange it with the UAE Cultural Attaché in Canberra.
3. It will be electronically send it to the UAE Cultural Attaché in Canberra.
4. The employee of the UAE Cultural Attaché will be notified about any updated information by the server.
5. If an employee is viewing a student record that is currently being updated by a host university in Australia, then the server will send an alert message to the employee, otherwise the updated information will be saved in the database server without any alert message.

5.4 Scenario 2: Exchange of information between the UAE Cultural Attaché and the Dubai Police
As shown in Figure 3,
1. When a student record is updated or electronically received by the UAE Cultural attaché from a host university in Australia, the updated information will be converted to ebXML in order to exchange it with the UAE.
2. When a query is initiated from the UAE Cultural Attaché server in order to send the updated information to the Dubai Police server, it will be translated from the original language back into Arabic language by using language e-Translator model in the UAE Cultural Attaché server.
3. The server will forward the updated information of the student record to the Scholarship Section of the Dubai Police server.
4. If an employee is viewing a student record that is currently being updated by a host university in Australia, then the server will send an alert message to the employee, otherwise the updated information will be saved in the database server without any alert message.

Fig. 3 – The exchange of student records

5.5 Scenario 3: Use of the system by the Scholarship Section of the Dubai Police
1. The employees of the Scholarship Section of the Dubai Police access the system using a portal grid system, after logging in and getting authenticated.
2. When the employees sends an SQL query to the database server regarding certain students, the SQL query will return the desired record.
3. At the same time the server will send the same SQL query, (after translating it to the home language of the host university and converting it to ebXML) to the UAE Cultural Attaché according to the geographic location of the host university system to retrieve any update that had been done but has not yet been exchanged.
4. After the SQL query passes through the UAE Cultural Attaché system and the host university system, if necessary, it will be translated to Arabic before sending it back to the Dubai Police student database.

5.6 Scenario 4: Use of the system by the delegated students
As shown in Figure 4

![Diagram showing the process of using the system by the delegated students]

Fig. 4 – Use of the system by the delegated students

1. The delegated students can be located anywhere in the world
2. When the delegated student logs onto the system, a customized portal grid will be retrieved according to the student preferences.
3. The system will detect the delegated student's geographic locations.
4. The geographical location of the student can be detected by either TCP/IP protocol of the country or by TCP/IP protocol of the Internet Service Provider (ISP).
5. Each country has its own IP address range as well as ISPs.
6. When the delegated student logs onto the Internet by using a certain ISP service, an IP address will be given to the user after the login process.
7. The IP address will be used by the system to detect the geographical location in order to forward the request to the website of the nearest UAE Cultural Attaché of the university’s home country.
8. They can thus search for information in the student records database according to their privileges.

As it can be seen by the foregoing discussion, the solution for these complicated global problems requires close communication, sharing of information, harmonization, teamwork, and collaboration among governments in different countries. However, such countries need to develop an international electronic synergy to share information and work with each other within the country, as well as to cross national boundaries.

6 Conclusion
This report has explained the need for the Scholarship Section of the Dubai police to transform to an i-eGov in order to eliminate the problems that are currently being faced to exchange the records and information of the delegated students. It highlighted some of these problems.

The working of the proposed solution of i-eGov was explained in detail to understand its impact on the Scholarship Section of the Dubai Police, delegated students, UAE Cultural Attaché and the host universities.

Hence, in order to solve global issues through cross-border exchange of information, i-eGov will need to be implemented by all collaborating organizations. However, there will be further technological and social challenges in order to achieve this objective.
References:


