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E-Governance to E-Commerce: A Smart Transition

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Abstract—

The advancement of communication technologies have helped us to interact in an efficient and faster manner. To utilize the benefits of advanced communication technologies for the Citizen, we have already proposed a Citizen centric multivariate electronic smart card based E-Governance mechanism. So far we have concentrated only on the secured transmission of classified information through Internet using our proposed E-Governance mechanism. In this paper we will explore the multivariate aspect of our proposed E-Governance mechanism during E-Commerce transactions to provide smart services to the Citizen.

Keywords— E-Governance, E-Commerce, Citizen, Smart Service, Multivariate aspect.

I. INTRODUCTION

The advancement of communication technologies have helped us to interact in an efficient and faster manner. In the present days of global economic meltdown, Government of the developing countries can use it to deliver smart governance to the Citizen in cost effective manner. On the other hand, Citizen can instantly access the governmental services at their door steps. Thus, to apply the benefits of Information and Communication Technology (ICT) for the betterment of society, we have already proposed a Citizen centric multivariate electronic smart card based E-Governance mechanism. So far we have concentrated only over the secured transmission of classified information through Internet using our proposed E-Governance mechanism. In this paper we will discuss the multivariate aspect of our proposed E-Governance mechanism during of E-Commerce transactions, so that it can explore interdisciplinary research works in this field.

For better understanding of our objective, we have stated the origin of our research work in section – 2. As we have already conducted several literature survey **[6, 10]** works, in section – 3 we directly introduce our proposed Citizen centric multivariate electronic smart card based E-Governance mechanism. As per our earlier declaration, in section – 4 we have discussed the multivariate aspect of our proposed mechanism in terms of E-Commerce transactions. The conclusion drawn from the entire discussion are mentioned in section – 5. Finally, the references are listed at the last part of this paper.

II. ORIGIN OF RESEARCH WORK

As Citizen are the ultimate beneficiaries of the society, Government must take appropriate measures to provide all possible services efficiently at the door steps of the Citizen. The use of Information and Communication Technology (ICT) will specially help the Government of the developing countries to achieve this goal in cost effective manner. To fulfil this objective, the Government must uniquely identify the particular Citizen, so that no confusion is generated during the electronic communication. In India, Citizen are having several identity instruments which mostly comprises of common parameters of an individual. Also Government is launching several identity instruments regularly to deliver various services to the Citizen. Apart from the Government, the financial institutions like Bank, Credit Societies, etc. are also providing several debit cards, credit cards, smart cards, etc., to its account holders for performing several financial transactions. As a result, Citizen are forced to carry multiple identity instruments to perform several electronic transactions, which ultimately provide an appropriate platform to the hackers to fulfil their ill intentions. To find solution to these problems, we have proposed a Citizen centric multivariate electronic smart card based E-Governance mechanism, which is explained in the next section of this paper.

III. PROPOSED E-GOVERNANCE MECHANISM

Our proposed mechanism whose schematic diagram is shown in Fig 1, will help to perform all types of electronic transactions. Thus, the description of our proposed E-Governance **[1, 2, 3, 4, 5, 7, 8, 9, 11, 13, 14, 15, 16, 17, 18]** mechanism are mentioned below :

1. We have proposed a Citizen centric multivariate electronic smart card based E-Governance mechanism.
2. Our proposed electronic smart card, named as Multipurpose Electronic Card (MEC) will act as the ultimate interface for various types of electronic transactions between the Citizen and the Government.
3. Government will issue this electronic smart card to uniquely identify the Citizen during various electronic transactions.

4. This proposed smart card will contain vital parameters of the Citizen like, name, date of birth, signature, etc.
5. Based on these vital parameters, Government will issue the Citizen ID, which will help to uniquely identify the Citizen.
6. On the other hand, Citizen will use this proposed smart card to access various services provided by the Government.
7. Government will allow the Citizen to avail the facilities only after proper authentication **[12]** of the Citizen, so that hackers are not allowed to infiltrate into the E-Governance mechanism.
8. Fig 1 shows the schematic diagram for any type of Citizen-to-Government (C2G) type of E-Governance transaction. For example, transactions during payment of telephone bill may be described below :

a. Citizen will use the proposed smart card to initiate the E-Governance transaction.
b. Citizen will provide its own Citizen ID through the Internet to the E-Governance mechanism.
c. Government or an agent acting on behalf of it, will verify the identity of the Citizen using various authentication procedures, before initiating the actual E-Governance transaction.
d. In case of authentication failure, negative acknowledgement is send to the Citizen to abort the transaction.
e. In case of successful authentication, Citizen provides its own bank account details to the Bank Server of the proposed E-Governance mechanism for payment of the telephone bill. The name of Server will change based on the type of electronic transaction carried out between the Citizen and Government.
f. Based on the information provided by the Citizen, the Bank Server of the proposed E-Governance mechanism will communicate with the respective server of the Bank for payment of the telephone bill.
g. After successful verification of the Citizen, who is also the account holder of the respective bank, the bank authority will pay the telephone bill and send an acknowledgement to the Citizen.

9. Thus, the Citizen-to-Government (C2G) type of transaction i.e payment of telephone bill through our proposed Citizen centric multivariate electronic smart card based E-Governance mechanism is completed successfully.

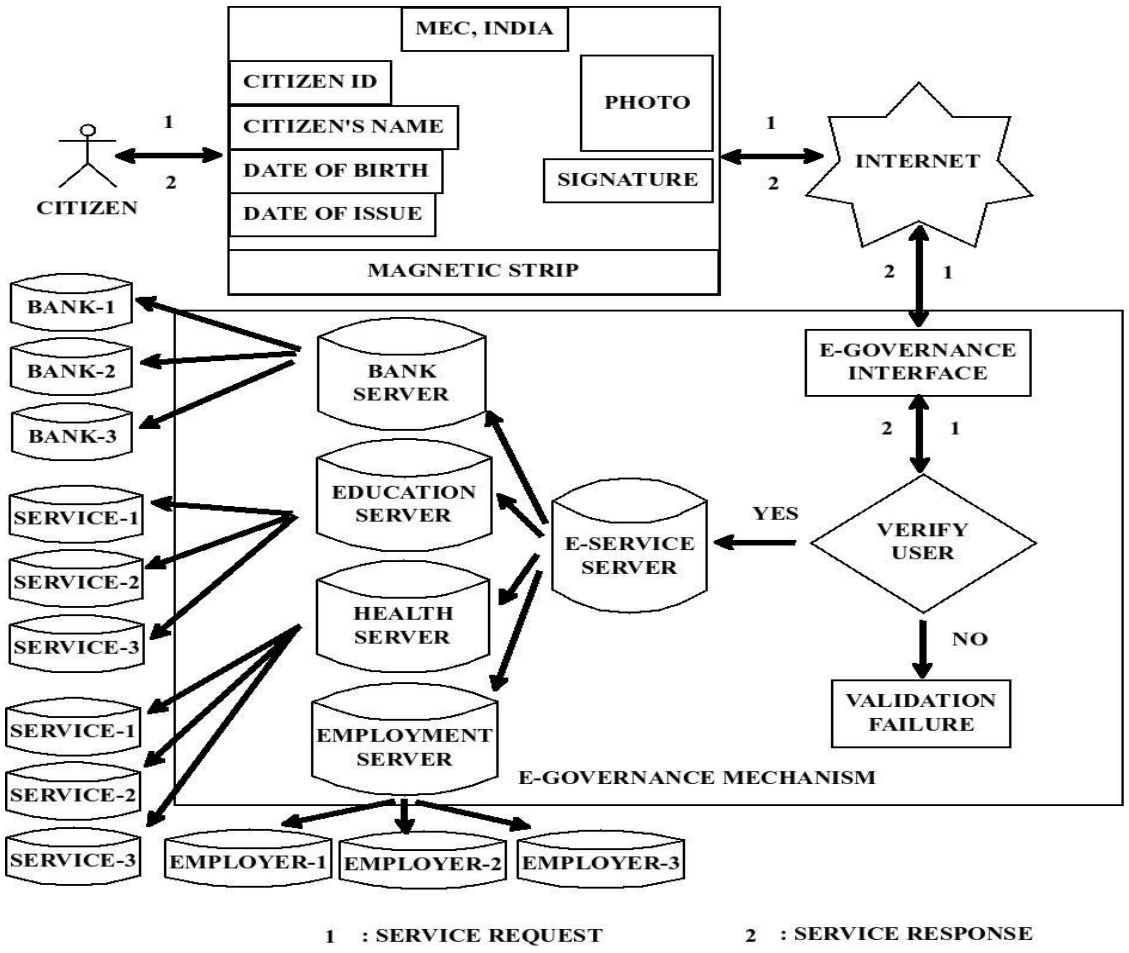

Fig. 1 Schematic diagram of proposed C2G type of E-Governance transaction.

So far we have only introduced the concept of our proposed E-Governance mechanism mainly to describe its inter-domain relations during its operations, which is revealed by the involvement of bank transactions during the entire process. This multivariate aspect of our proposed E-Governance mechanism is further explored in the next section of this paper.

IV. MULTIVARIATE ASPECT OF PROPOSED E-GOVERNANCE MECHANISM

Fig. 2 shows the multivariate aspect of our proposed mechanism, where our Citizen centric multivariate electronic smart card (i.e Multipurpose Electronic Card, *MEC*) based E-Governance mechanism is used during E-Commerce transaction with the Bank authority. As the schematic diagram of our proposed E-Governance mechanism is already shown in Fig. 1, in Fig. 2 we have only shown the Citizen-to-Government-to-Bank (C2G2B) transaction through our proposed application during online payment of telephone bill. In both the diagrams the Citizen, who is also the Bank Account Holder of *BANK-1*, sends the *SERVICE REQUEST* through *Path-1* and receives the *SERVICE RESPONSE* through *Path-2*. Only in case of successful verification of the user, *Path-2* will send *POSITIVE* acknowledgement, else it will send *NEGATIVE* acknowledgement to its user. For simplicity of application, we have used single database within the Electronic Data Interchange (EDI) of *BANK-1*, which should be replaced by distributed database management system to avoid database failure during real world implementation. As the entire electronic transaction will execute based on the proposed unique *CITIZENID* of the Citizen, as per our better understanding, the database of *BANK-1* at least should contain the database tables which are shown in Fig. 3.

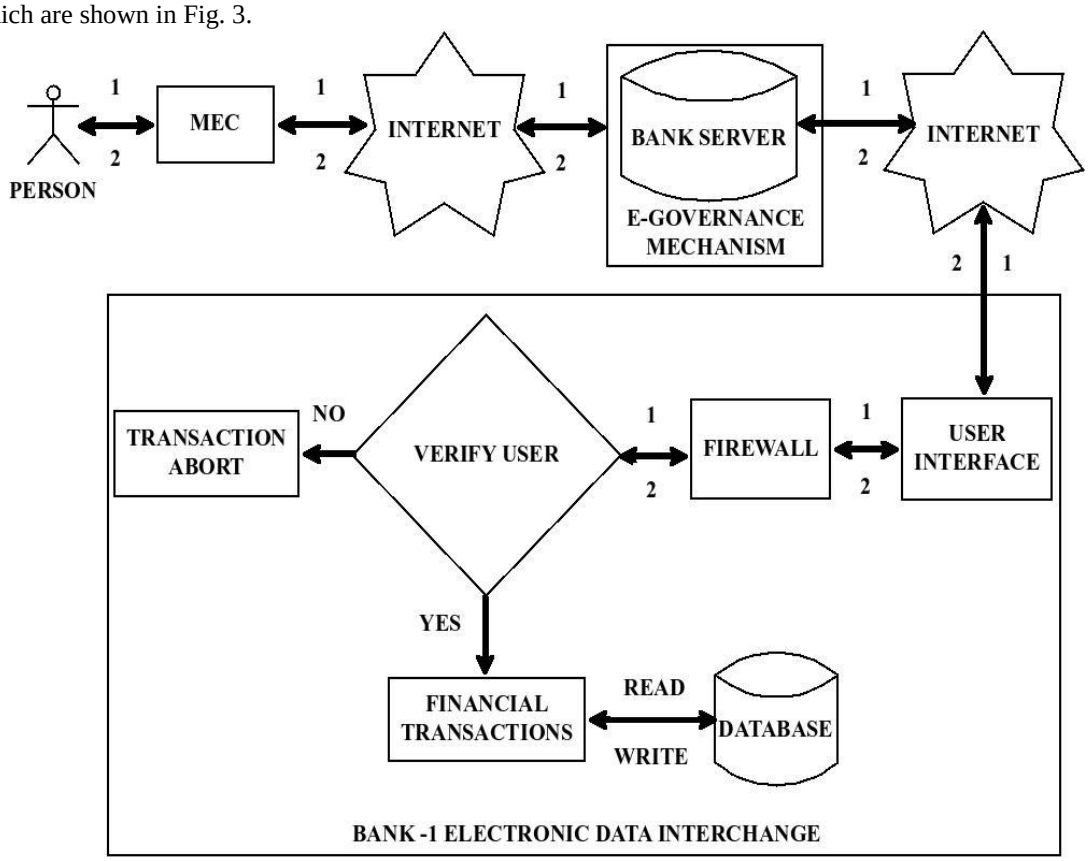

Fig. 2 Multivariate aspect of proposed E-Governance mechanism during C2G2B type of E-Commerce transaction.

CITIZENID	ACCOUNTID	BRANCH CODE

CITIZEN MASTER

ACCOUNTID	BALANCE	TRANSACTION

ACCOUNT MASTER

TIME STAMP	CITIZENID	ACCOUNTID

BANK ADMIN

Fig. 3 Database Tables of *BANK-1*.

The attributes of the tables shown in Fig. 3, are further described below :

1. *CITIZEN MASTER:* This table contains the primary attributes of a Citizen who is also the Account Holder of this Bank. The attributes of this table are further mentioned below :

(a) *CITIZENID* : As this attribute helps to uniquely identify the Citizen, it acts as the *PRIMARY KEY* of this table.
(b) *ACCOUNTID* : As this attribute helps to identify the account of the Citizen, it should be *UNIQUE* and *NOT NULL* in nature. This attribute helps to build logical relations with the *ACCOUNT MASTER* table.
(c) *BRANCH CODE* : As this attribute helps to identify the branch where the account of the Citizen is located, it should be *UNIQUE* and *NOT NULL* in nature.

2. *ACCOUNT MASTER:* This table contains the primary attributes for the accounts of the Bank, which are further mentioned below :

(a) *ACCOUNTID* : As this attribute helps to uniquely identify the bank account of the Citizen, it acts as the *PRIMARY KEY* of this table.
(b) *BALANCE* : This attribute stores the financial record of the account holder of this Bank.
(c) *TRANSACTION* : This attribute stores the description of the transaction carried out over this bank account.

3. *BANK ADMIN:* This table contains the log book of the transactions carried out in this Bank. The attributes of this table are further mentioned below :

(a) *TIMESTAMP* : To maintain consistency of the Bank database, logically a Citizen should perform a single bank transaction at a particular point of time stamp. To accurately trace the transaction record as per the time stamp, this attribute should be *UNIQUE* and *NOT NULL* in nature.
(b) *CITIZENID* : This attribute is same with the *CITIZEN MASTER* table, which helps to uniquely identify the account holder of this Bank and hence helps to build logical relations with that table. The prime attributes i.e. *TIMESTAMP* and *CITIZENID* collectively will act as the *PRIMARY KEY* of this table.
(c) *ACCOUNTID* : This attribute is same with the *ACCOUNT MASTER* table, which helps to uniquely identify the bank account of the Citizen and hence helps to build logical relations with that table.

The database structure shown in Fig. 3 just represents the minimum attributes which are necessary for logical design of this mechanism. However, during real world implementation it is obvious that more attributes will be required to defend the run time anomalies. Thus, we have discussed the importance of our proposed E-Governance mechanism during E-Commerce transactions. This aspect will also help the Government to keep record of the financial transactions carried out under its jurisdiction to prevent various financial scams which destroy the economic stability of the Citizen. As per our declared objective of this paper, we have focused only over the multivariate aspect of our proposed mechanism, which will provide ample scope for further research works in this field. Thus, the conclusion drawn from the entire discussion is mentioned in the last section of this paper.

V. CONCLUSIONS

The objective of this paper was to show the application of our proposed Citizen centric multivariate electronic smart card based E-Governance mechanism during E-Commerce transactions. This is done to explore the scope of further research works during E-Governance as well as E-Commerce transactions using our proposed mechanism, mainly to keep record of the financial transactions by the Government, so that no one can destroy the financial stability of the Citizen. For this purpose, the security features and database design during E-Commerce transactions using our proposed E-Governance mechanism may be considered as the next part of this paper.

REFERENCES

1. **Abhishek Roy**, Sunil Karforma, *Data Modeling of a multifaceted electronic card based secure E-Governance system*, Chapter No: 12 of Book *Emerging Mobile and Web 2.0 Technologies for Connected E-Government* by Dr. Zaigham Mahmood, University of Derby, United Kingdom (UK), Published by: IGI Global, USA, Pp: 280-299, DOI: 10.4018/978-1-4666-6082-3.ch012
2. **Abhishek Roy**, Sunil Karforma, *Stream cipher based user authentication technique in E-Governance transactions*, International Society of Thesis Publication Journal of Research in Electrical and Electronics Engineering (ISTP-JREEE), May 2014, Volume 3 Issue 3, Pp: 31-37, ISSN 2321-2667.
3. **Abhishek Roy**, Sunil Karforma, *A Study on implementation of security in E-Governance using cryptography*, International Journal of Advanced Research in Computer Science and Software Engineering (IJARCSSE), April 2014, Volume 4 Issue 4, Pp: 652-659, Print ISSN 2277 6451 Online ISSN 2277 128X.
4. **Abhishek Roy**, Sunil Karforma, *Coupling and cohesion analysis for implementation of authentication in E-Governance*, ACEEE Conference Proceedings Series 02, Fourth International Joint Conference - Advances in Engineering and Technology (AET) 2013, December 13-14, 2013 **(Elsevier)**, Pp: 544-554, Organised by: The Association of Computer Electronics and Electrical Engineer (ACEEE), The Association of Mechanical and

Aeronautical Engineers (AMAE), The Association of Civil and Environmental Engineers (ACEE), Sponsored by : Indian Society for Technical Education (ISTE), NCR, INDIA. ISBN 978-93-5107-193-8.

5. **Abhishek Roy**, Sunil Karforma, *Object oriented metrics analysis for implementation of authentication in smart card based E-Governance mechanism*, Researchers World – Journal of Arts, Science and Commerce, October 2013, Volume – IV Issue – 4(2) Pp: 103 – 109 Print ISSN 2231-4172 Online ISSN 2229-4686.
6. Sumita Sarkar, **Abhishek Roy,** *Survey on Biometric applications for implementation of authentication in smart Governance*, Researchers World – Journal of Arts, Science and Commerce, October 2013, Volume – IV Issue – 4(1) Pp: 103 – 114, Print ISSN 2231-4172 Online ISSN 2229-4686.
7. **Abhishek Roy**, Sunil Karforma, Subhadeep Banik, *Implementation of authentication in E-Governance – An UML Based Approach*, Book published by LAP Lambert Academic Publishing 2013 1 *Ed*, Germany, ISBN 978-3-659-41310-0
8. **Abhishek Roy**, Sunil Karforma, *UML based modeling of ECDSA for secured and smart E-Governance system*, Computer Science & Information Technology (CS & IT - CSCP 2013), Proceedings of National Conference on Advancement of Computing in Engineering Research (ACER13) organized by Global Institute of Management and Technology, March 22 - 23, 2013, Pp: 207 - 222, ISSN 2231 - 5403, ISBN 978-1-921987-11-3, DOI: 10.5121/csit.2013.3219
9. **Abhishek Roy**, Sunil Karforma, *Object Oriented approach of Digital certificate based E-Governance mechanism*, ACEEE Conference Proceedings Series 03, International Conference on IPC&ITEeL ACT&CIIT CENT&CSPE 2012 Proceedings, December 03-04, 2012 **(Elsevier)**, Pp: 380-386, Organized by: The Association of Computer Electronics and Electrical Engineer (ACEEE), Chennai, INDIA. ISBN 978-93-5107-194-5.
10. **Abhishek Roy**, Sunil Karforma, *A Survey on digital signatures and its applications*, Journal of Computer and Information Technology Vol: 03 No: 1 & 2, August 2012 Pp- 45-69, ISSN 2229-3531.
11. Anamul Hoda, **Abhishek Roy**, Sunil Karforma, *Application of ECDSA for security of transaction in E-Governance*, Proceedings of Second National Conference on Computing and Systems - 2012 (NaCCS - 2012) organised by the Department of Computer Science, The University of Burdwan, March 15 - 16, 2012, 1st Edition - 2012, Pp: 281-286, ISBN 978-93-80813-18-9.
12. Sumita Sarkar, **Abhishek Roy,** *A Study on Biometric based Authentication*, Proceedings of Second National Conference on Computing and Systems - 2012 (NaCCS - 2012) organized by the Department of Computer Science, The University of Burdwan, March 15 - 16, 2012, 1st Edition - 2012, Pp: 263-268, ISBN 978-93-80813-18-9.
13. **Abhishek Roy**, Sumita Sarkar, Joydeep Mukherjee, Arindom Mukherjee, *Biometrics as an authentication technique in E-Governance security*, Proceedings of UGC sponsored National Conference on "Research And Higher Education In Computer Science And Information Technology, RHECSIT-2012" organised by the Department of Computer Science, Sammilani Mahavidyalaya in collaboration with Department of Computer Science and Engineering, University of Calcutta, February 21 – 22, 2012, Vol: 1, Pp:153-160, ISBN 978-81-923820-0-5.
14. **Abhishek Roy**, Sunil Karforma, *Risk and Remedies of E-Governance Systems*, Oriental Journal of Computer Science & Technology (OJCST), Vol: 04 No:02, Dec 2011 Pp- 329-339. ISSN 0974-6471.
15. **Abhishek Roy**, Subhadeep Banik, Sunil Karforma, *Object Oriented Modelling of RSA Digital Signature in E-Governance Security*, International Journal of Computer Engineering and Information Technology (IJCEIT), Summer Edition 2011, Vol 26 Issue No. 01, Pp: 24-33, ISSN 0974-2034.
16. **Abhishek Roy**, Sunil Karforma, *A Survey on E-Governance Security*, International Journal of Computer Engineering and Computer Applications (IJCECA). Fall Edition 2011, Vol 08 Issue No. 01, Pp: 50-62, ISSN 0974-4983.
17. **Abhishek Roy**, Subhadeep Banik, Sunil Karforma, Jayanta Pattanayak, *Object Oriented Modeling of IDEA for E-Governance Security*, Proceedings of International Conference on Computing and Systems 2010 (ICCS 2010), November 19-20, 2010, Pp: 263-269, Organized by: Department of Computer Science, The University of Burdwan, West Bengal, INDIA. ISBN 93-80813-01-5.
18. Chayan Sur, **Abhishek Roy**, Subhadeep Banik, *A Study of the State of E-Governance in India*, Proceedings of National Conference on Computing and Systems 2010 (NACCS 2010), January 29, 2010, Pp: a-h, Organized by : Department of Computer Science, The University of Burdwan, West Bengal, INDIA. ISBN 8190-77417-4.

