E-GOVERNANCE PHASED SECURITY MODEL

Vani Jain

Research Scholar, Department of Computer Science & Engineering,
Suresh Gyan Vihar University, Jaipur, India

Dr. Devesh Bandil

Associate Professor, Department of Computer Science & Engineering,
Suresh Gyan Vihar University, Jaipur, India

Dr. Bright Keswani

Professor, Department of Computer Science & Engineering,
Suresh Gyan Vihar University, Jaipur, India

Neha Paliwal

Research Scholar, Department of Computer Science & Engineering,
Suresh Gyan Vihar University, Jaipur, India

ABSTRACT

E-Governance is basically the use of internet expertise as a tool for exchanging information, providing services and transacting with people, businesses and other areas of government. E-Governance provides a sound approach to reinforce overall governance. It not only perk up accountability, intelligibility and effectiveness of government processes, but also smooth the progress of sustainability and inclusive growth. E-Governance also provides an instrument of straight delivery of public services to the trivial segments of the society in the remotest corners, without having to deal with mediators. This paper deals with analysis of the existing models and find out threats at each level and develop a new model to overcome these threats.

Key words: e-governance, security service, authentication, e-services, threats.

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1. INTRODUCTION

The idea of e-government started with the introduction of government websites in the early 1990s. The structure of government is flat, fixed hierarchical regulated, whereas web is dynamic, smooth and unregulated. Government's function is like enormous, where one hand

does not know what the right hand is doing. With the advancement of Information Technology and increased reliance on the internet as a transaction medium to develop government websites into a highly potential channel for supporting a frontend and backend applications. E-government security is a key dilemma for every E-government systems. E-Government security models are used in the implementing and developing e-government security systems. The diverse security models are applied in different countries due to the deference situation of the countries. The five different models of e-governance, which can be applied for e-governance security system.

These models are:

Table 1

MODELS	DESCRIPTION
Broadcasting model	<ul style="list-style-type: none"> • Broadcasting model is a mass diffusion of government information which is already available in the public sphere using ICTs. • This raises responsiveness among the society about ongoing government processes and government services that are available to them and how they can advantage from them.
Comparative Analysis Model	<ul style="list-style-type: none"> • This model is least-used but a high potential e-governance model for developing countries. This model is used to authorize people by comparing good governance with the bad governance and then analyze, the reasons and people behind the bad governance, and how the condition can be improved. • The model is based on using vast capacity of ICT and social media to review the information given with comparable information available in the public or private sector.
Critical flow model	<ul style="list-style-type: none"> • The model is based on dissemination of information of 'critical' value to targeted viewers using ICTs and other tools. • Those who reveal such kind of information include upright officials and workers, whistleblowers, affected parties and those who were themselves involved in bad governance practices but have now changed their minds or may wish to deal such information for soft punishments.

E-Advocacy Model	<ul style="list-style-type: none"> • This is one of the most often used Digital Governance model and that come to the aid of the global civil society to impact on global decision-making processes. • The model is based on setting-up a planned, directed flow of information to build strong practical allies to complement actions of the real world. • Virtual communities are formed which share similar values and concerns, and these communities in turn link up with or support real-life groups/ activities for concerted action. • The potency of this model is in its multiplicity of the virtual community, and the ideas, expertise and resources accumulated through this virtual form of networking. • The model is able to assemble and influence human resources and information beyond geographical, institutional and bureaucratic barriers, and use it for intensive action.
Interactive-Service model	<ul style="list-style-type: none"> • It is a consolidation of the other digital governance models and opens up potential for one-to-one and self-served participation of individuals in government processes. • The involvement is direct and not through representatives. • This model brings better objectivity and simplicity in decision-making processes, and provides a better feeling of involvement and empowerment. • Under this model, the diverse services offered by the Government become directly available to its citizens in an interactive Government to Consumer to Government (G2C2G) channel in various aspects of governance.

2. THE PHASES OF E-GOVERNMENT SECURITY MODEL

The phased structure of a model prevents our government from various categories of threats related to a single or multiple e-services. Each phase of a model will lessen the group of threats related to e-services. The five phases were selected as a part of any strong security programme. The phases are: the technical phase, the strategical phase, the proficiency phase, the operational and management phase, and the decision phase. The phases were constructed from the bottom to the top based on the importance of each level, the frequency of their implementation in government, and how they complement each other.

Figure 1 The five phases structuring the new security model

The concept behind this model is to analyze the security needs and requirements for any e-enabled government in order to permit or not to permit the exchange of information between each other in e-government. The new abstract model is expressed as-

Figure 2 Pyramid phased model

In this model every phase is sub divided into multiple sub phases to make the structure more understandable and reliable. The splitting of phases into sub phases gives the model a flexibility to expand it into n-number of cells based on the needs of the government. The idea of having x-number of phases with y-numbers of cells in each phase and the combination of these phases with sub-phases provide a enhanced level of security that what we considers a “new secured model” or a “new secured approach”.

The Extended Multi Phased Security Model						
Security Levels	Sub Layers/Cells					
Technical Layer						
Strategical Layer						
Proficiency Layer						
Operation Management Layer						
Decision Layer						

Figure 3 The matrix oriented model

2.1 The Technical Security Phase

The technical phase is subdivided into 12 sub phases that are as follows::

2.1.1 Right of entry Control

It is a mechanism of controlling entry . The control might be through prevention of unofficial entries, monitoring official entries, or limiting entries through predefined rules and roles. An e-government model will have a strong prerequisite of access control to the computer centers where governmental data are stored, government offices where staff handles the data, and even cables that carry the data between governmental departments.

2.1.2 Interruption detection and prevention

Interruption detection system (IDS) and prevention system (IPS) are key elements of any security system. They ensure the safety of systems and networks. Both technologies rely on either statistical and signature databases or on the behavior of the network through Artificial Intelligence (AI) agents. Both technologies sent alerts to the authorized staff whenever there is an attack sign.

2.1.3 Anti-virus & malicious codes scanners

Antivirus and malicious codes scanners are tools that perform a check on the technical body of the government and prevent viruses from being transferred through numerous channels and can cause serious damage to the government. The antivirus programs and users alertness will prevent the spread of computer viruses .

2.1.4 Authentication and passwords

Information system is the heart of any government. The requirement of protecting the privacy and the integrity of the information is very important. Authenticating the identity of the user is one of the fundamental factors a government needs to focus on. There is a need of 3-level security. First, Authentication through identification (password). Second, Authentication through something that they have (id card) Third, Authentication through something that is part

of them (fingerprint). Permutation and Combination of these three factors make the authentication more accurate and hard to be searched..

2.1.5 Files reliability checks

Data reliability is one of the main security factors required in any government. Different tools can be used to ensure the data reliability such as digital signatures, certificates or hashing mechanism. A fall in the integrity of the data can cause a disaster if the data is related to medical, personal, or application to governmental service.

2.1.6 Cryptography

Cryptography is the art of hiding information from those who are not authorized to view it. Cryptography solves problems that involve secrecy, authentication and integrity. Cryptography contributes highly in building the trust of any e-government service.

2.1.7 Virtual private network (VPN)

VPN is becoming very popular in the today's business world. VPN services act like a tunnel to secure connection on wifi and protect your data. It play a major role in providing the staff working in supporting the e-government a mean of extending support to the infrastructure virtually, extend the work environment to the homes, and make the government information resources accessible to authorized users.

2.1.8 Vulnerability scanning tools

Vulnerability scanners for any security department trying to be in the proactive arena. Knowing the vulnerabilities of any government system, network, or application can add value to the security system of the government E-government will need to have scanners and tools for scanning the vulnerabilities and a group to analyze the result of these scanners.

2.1.9 Digital signature and digital certificate

"A signature or multiple signatures on the paper guarantee its authenticity". The digital signature is used to verify authenticity, integrity, non-repudiation, i.e. it is assuring that the message is sent by the known user and not modified, while Digital Certificates on the other hand is used to verify the identity of the user, maybe sender or receiver. The main purpose of this technology is to become a main method of use in the electronic transactions in e-government services without being forgeable

2.1.10 Biometrics

Biometrics is the most technical tools providing logical and physical access control to information resources. It uses metrics related to human characteristics where no duplicate can appear. It prevents imitation by matching the database of traits to the traits owners. The usage of biometrics in e-governments can vary from accessing critical systems to accessing physical restricted areas such as computer centers.

2.1.11 Logical access control (Firewalls)

Firewalls are logical access control mechanism allowing and jamming entries to the government network by setting up some policies An e-government with several applications will need application layer firewalls to guard the systems infrastructure and boundary firewalls to protect the admission of users from different government departments and Internet.

2.1.12 Security protocols

Security protocol plays a very important task in encrypting data during its transaction from a one point to another. A table indicating all resources covering the information security technologies.

Table 2 Technical Phase

Technical Phase				
A1: Right of entry Control	A2: Interruption Detection Prevention	A3: Anti-Virus & Malicious Codes Signature	A4: Authentication and Passwords	A5: Files reliability Checks
A6: Cryptography	A7: VPN	A8: Vulnerability scanning Tools	A9: Digital Signature and Certificate	A10: Biometrics
A11: Logical Access Control (firewall)	A12: Security Protocols			

2.2 The Strategical Security Phase

Security policies are essential for building every successful information programme. The number of security policies can differ based on the needs of the government and the area of security meant to guard against a well defined threat. These policies can increase and has no limit. The model will still hold the idea to have the right combination of policies with the other phases in the model.

Table 3 Strategical Phase

Security Strategical Phase				
B1: Password Management	B2: Log-in-Process	B3: Logs Handling	B4: Computer Viruses	B5: Intellectual Property Rights
B6: Data Privacy	B7: Privilege Control	B8: Data Confidentiality	B9: Data Integrity	B10: Internet Connectivity
B11: Administrative Policies	B12: Encryption Policies	B13: HR Security Policies	B14: Third Party Policies	B15: Physical Security Policies
B16: Operation security Policies				

2.3 The Proficiency security Phase

Due to the proliferation of the Internet and the usage of the citizens of the government wide e-services, government departments must invest on the human capital of the information security departments. The proficiencies listed will help the government department to enhance the security control and narrow the gap of the information between the different government security departments. It will contribute in uplifting the trust on the security programmes between the government departments and will increase the usability of the e-services by the citizens due to the strong confidence in the security level of the government departments.

Table 4 Proficiency Phase

Security Proficiency Phase				
C1:security Operation and Management	C2:Security Architecture and Development	C3:Ethical Hacking	C4:Security Policies Development	C5:Computer Forensics
C6:Cryptography	C7:Security programming	C8:Laws and Regulations	C9:Security Implementation and Configuration	C10:Security Analysis

2.4 Security operations and management Phase

The National Institute of Standards and Technology (NIST) categorized the security controls into three categories; technical, operational, and management: Security concerns vigilant monitoring and management of critical assets and information resources. Management and operational tools are must to have in order to facilitate the security practitioner to perform the task and achieve the best objectives.

The most important facet of this phase is how the government runs its operation. The operational policies and procedures are the rules and regulations where the security operational staff will follow in performing the tasks expected from them.. These operational policies and procedures will spell out the security policy approved in the government and shall have strong reference to it.

Table 5 Operations and management Phase

Security Operations and Management Phase				
D1:Operational Policies and Procedures	D2:Management Tools	D3:Correlation and Data mining	D4:Reporting and response	D5:Analysis and Human Intervention

2.5 Decision

Reaching the right decision for launching or not launching an e-service will have a direct impact on the success or failure of the e-service. Taking one direction or another can affect the overall model in selecting policies, technologies and hiring the right staff to run the security programme. awareness, technologies and having the appropriate staff are what construct the right combination of the security programme of any organization.

Table 6 Decision Phase

Decision Phase				
E1:Cost	E2:Awareness	E3:Need	E4:Technologies availability	E5:FUD

3. THE MODEL EVOLUTION

The new model will be used as a reference to identify the security levels applicable to government services. In addition, a rating process will be applied on the different phases and sub phases by a group of selected security practitioners in order to confirm the applicability of the phases/sub phases proposed in the new model.

Table 7 Model Evaluation

The Extended Multi Phased Security Model						
Security Levels	Sub Layers/Cells					
Technology Phase	A1: Right of entry Control	A2: Interruption Detection Prevention	A3: Anti-Virus & Malicious Codes Signature	A4:Authentication and Passwords	A5:Files reliability Checks	A6: Cryptography
	A7:VPN	A8:Vulnerability scanning Tools	A9:Digital Signature and Certificate	A10:Biometrics	A11:Logical Access Control (firewall)	A12:Security Protocols
Policy Phase	B1:Password Management	B2:Log-in-Process	B3:Logs Handling	B4:Computer Viruses	B5:Intellectual Property Rights	B6:Data Privacy
	B7:Privilege Control	B8:Data Confidentiality	B9:Data Integrity	B10:Internet Connectivity	B11:Administrative Policies	B12:Encryption Policies
	B13:HR Security Policies	B14:Third Party Policies	B15:Physical Security Policies	B16:Operation security Policies		
Competency Phase	C1:security Operation and Management	C2:Security Architecture and Development	C3:Ethical Hacking	C4:Security Policies Development	C5:Computer Forensics	C6:Cryptography
	C7:Security programming	C8:Laws and Regulations	C9:Security Implementation and Configuration	C10:Security Analysis		
Operation Management Phase	D1:Operational Policies and Procedures	D2:Management Tools	D3:Correlation and Data mining	D4:Reporting and response	D5:Analysis and Human Intervention	
Decision Phase	E1:Cost	E2:Awareness	E3:Need	E4:Technologies availability	E5:FUD	

4. CONCLUSIONS

This paper deals with analysis of the existing models and find out threats at each level and develop a new model to overcome these threats. The concept behind this model is to analyze the security needs and requirements for any e-enabled government in order to permit or not to permit the exchange of information between each other in e-government.

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