Chapter III

E-governance Architecture
CHAPTER 3

E-GOVERNANCE ARCHITECTURE

This chapter\(^1\) provides the concepts and the applications of e-governance. It explains the impact of Information and Communication Technology (ICT) in the government sector. It identifies a typical e-governance application and proposes a new architecture for the application. It also briefly presents how the grid concept can be suitable for e-governance applications.

3.1 Introduction

E-Governance is the use of information and communication technologies to support good governance.

The key characteristics of all e-governance projects are: [93] [139]

a) The number of users of the system are enormous

b) As time progresses, the number of applications will increase. Hence the system has to provide facilities for handling large loads.

c) All e-governance applications must strictly adhere to specifications otherwise, it is liable for legal prosecutions.

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\(^1\)This chapter is an extended version of the article *Usage of Grid in the implementation of e-governance applications*. In Proceedings of the ACST'08 International Conference, organized by IASTED, held at Langawi, Malaysia, April 2-4, 2008.
d) The hardware and software heterogeneity exists in all spheres of e-governance. Hence there is a need for extensive integration.

E-governance can also be defined as the application of electronic means in the:

a. Interaction between government and citizens, government and businesses, and

b. Internal government operations to simplify and improve democratic, government and business aspects of the governance.

In developing countries, governments are beginning to use e-government applications to improve their interactions with citizens and businesses and also automate their internal operations and are shown in figure 3.1. Common applications of e-government include online delivery of government information and services, e-procurement, web-based licensing and registration, online taxation and intra-governmental systems etc. The development related to Geographical Information Systems (GIS) has expanded the scope further.

Figure 3.1 Interactions between stakeholders in e-governance
The success of e-governance depends on the use of ICT in mobilization of government resources and utilization of these scarce resources with an aim to provide better services to citizens. The secret lies in doing away with discretionary powers vested in the hands of a few officials and provide easy access to all relevant information.

Developments in the ICT have been taking place at a rapid pace. India with its e-literate resources is fast emerging as a major initiator in e-governance adoption. This is despite the challenges arising out of conditions related to awareness, literacy, basic infrastructure, bandwidth issues and multilingual and cultural issues. Added to this is the issue of enabling members of the public service make the transition from the traditional approaches to a new and evolving environment that is defined by ICT development. To keep pace with the surrounding development, governments will need mechanisms to respond to these changes. The disciplines of knowledge management and change management provide important tools for public administrators.

3.2 Objectives of e-governance

E-governance is a current reality for developing countries and the main objectives of an e-governance should be: [138] [140]

- To provide citizens access to information and knowledge about the political process, services and choices available.
• To make possible the transition from passive information access to active citizens’ participation by
  o informing the citizens,
  o representing the citizens,
  o encouraging the citizens to vote,
  o consulting the citizens, and
  o involving the citizens;
• To make the system more efficient, more effective, and improve government process. E-governance is much more than just a government website on Internet. The distinctions between the e-governance objectives can be made in terms of internal and externally focused processes.
• External strategic objectives: To fulfill the people’s needs and expectations on front office side, by simplifying their interactions with various online services.
• Internal strategic objectives: To facilitate a speedy, transparent, accountable, efficient and effective process for performing government administration activities. Significant cost savings in government operations can be the result of this.

3.3 Architecture of an e-governance System

Sachdeva [109] provides the architecture of an e-governance system which outlines recipient, channel, processing and source. The figure 3.2 gives a architecture of e-governance system [109].
3.4 Features of e-governance system

The following are the areas that will benefit immensely by e-governance.

1. Agriculture Information such as Crop diseases, weather forecasting, Market Price for agricultural produce, Uzavar Santhai (Farmer’s Shandy)

2. Arms Renewal Information

3. Birth & Death, Domicile, Caste Certificates

4. Building construction approvals

5. Driving License acquisition
6. Electricity bill payment
7. Employment Exchange information
8. E-tendering
9. Filing of Company Returns
10. FIR Registration
11. Government taxes such as Income Tax, Commercial Tax, Sales Tax, Property Tax, Excise Duties, Motor Vehicles Tax
12. Government Forms
13. Government Notifications
14. Government Schemes
15. Information regarding Below Poverty Line (BPL) Families
16. Land Records
17. Missing, Lost and Found information regarding Valuables, Persons, Dead Bodies
18. Motor Vehicle Registration
19. Pension
20. Ration Card
21. Registration of Licenses and Certificates
22. Road, Railway and Airline Time Tables
23. Sanitation
24. Telephone
25. Water connection
Above are the some of the e-governance applications which will be benefited by the effect of information technology. As a scenario, the application of citizen applying for new water connection is chosen in this work.

3.5 Proposed methodology for e-governance system

In this section, proposed architecture for e-governance system is described. The problem under consideration is how to obtain new water-connection from municipal corporation or municipality. It is assumed that both municipal corporation and municipality have computerized their operations and are web-enabled.

The stages in obtaining a water-connection are:

a) The applicant has to submit an e-application for a new water-connection.

b) The web server checks whether the Survey Field Number (SF number) of the land belonging to the applicant has been regularized by the concerned government authorities.

c) Once the web server identifies that the SF number is a regularised one, the building plan is approved and the plan approval charges are calculated and levied.

d) The server also verifies whether the building has obtained an electricity connection from the government electricity board and all necessary charges for the same have been remitted.
e) The server then calculates the house tax based on the plinth area and location of the house.

f) The server then verifies whether the house tax and area development charges have been paid up-to-date.

g) Once all these are completed, the server then approves the water-service connection, allots a water-connection serial number and then calculates the appropriate water-connection charges.

The figure 3.3 shows the sequence of operations. The chain of operations that can be carried out during the citizen applying for a new water connection is clearly given in this figure.
Figure 3.4 provides a flowchart of the operations. The applicant is submitting an e-application for a new water-connection. The web server checks whether the SF number of the land belonging to the applicant has been regularized by the concerned government authorities, then the server also verifies whether the building has obtained an electricity connection from the government electricity board. Finally the server verifies whether the house tax and area development charges have been paid up-to-date. If any one of the condition fails, the e-application will be rejected. Thus the process terminates the operation.

Figure 3.4 Flowchart of the operations
The figure 3.5 gives the series of interactions that are carried out between various servers. The execution of the new water supply schemes/works is done by Combined Water Supply Scheme (CWSS). Through the CWSS, the board will supply water connection to the Public. The operation and maintenance of existing water supply schemes is the responsibility of the village panchayats. The government gives an annual grant to the village panchayats to maintain the water supply and sanitation in the panchayat limit. It is assumed that both municipal corporation and municipality have computerized their operations and are web-enabled.

Figure 3.5  Interactions that take place between various servers

The details of the figure 3.5 are given below.

1. User submitting e-application for new water connection.

2. The process of SF number verification, plan approval verification and house tax calculation sends request to the corporation server.
3. The process of EB connection verification sends request to the EB server.

4. The process of EB connection verification gives response to the corporation server.

5. The process of new water connection sends request to the CWSS server.

6. New water connection approval number allotted to the process.

7. Then new water connection approval number will be allotted to the user.

8. Finally the user is getting the new water connection approval number.

These are the series of actions involved in the process of getting a new water connection.

3.6 Summary

In this chapter, discussion is made on how to create and implement an e-governance framework in grid environment. Implementing an e-governance solution will lower the cost of developing, deploying, managing government solutions and providing better services to citizens. The present research has identified typical areas for e-governance. A citizen applying for a new water connection is described in the present case study.