GEOGRAPHICAL INFORMATION SYSTEM (GIS) AND E-GOVERNMENT AND E-GOVERNANCE CONCEPTUAL DATA MODELS (CDM)

Vlatko Maček
University of Zagreb
Faculty of Organisation and Informatics Varaždin
e-mail: vlatko.macek@foi.hr

Valerija Škorić
Municipality of Zagreb
Data Processing Centre
e-mail: valerija.skoric@gzaop.hr

Zdravko Krakar
University of Zagreb
Faculty of Organisation and Informatics Varaždin
e-mail: zdravko.krakar@foi.hr

Abstract:
This paper deals with the Geographical Information System (GIS) as it is influenced by e-Government and e-Governance conceptual models. Government Administration (GA) is a very complex living business system and this is a reason why the conceptual model of e-government and e-governance should be carefully chosen. CDM can generally follow the general conceptual structure, but e-government and e/governance have a new opportunity which is not to follow the existing CDM graphical presentation completely. Two possible graphical presentations of the conceptual e-Government and e-Governance data models will be discussed. The first model is a standard Conceptual Data Model (CDM) of data organisation presentation. It allows easy inheritance justification and verification of the data design validity. The usage of the PowerDesigner interface software is also discussed as a CDM tool. CDM generates the Physical Data Model (PDM) which specifies the physical implementation of the data bases. Second is a hexahedron presentation (HP) of the CDM. It can function as a visualisation of the complex situation in the e-Government and e-Governance domain. The advantages and disadvantages of both techniques are discussed and their joint usage is suggested.

Introduction
First we have to define and explain the functions of the e-Government, e-Governance services, [5], [6], and the required conceptual data models from the GIS point view. E-Government focuses its services primarily on providing GIS information to the citizen (G2C, typical one way communication). [1.] It is a transaction type of service by which the citizen receives one answer per question (e.g. information from attribute/graphical cadastre and land books data bases). The open data accessibility of the Government data bases (including the data security measures) is a limiting factor in this kind of service. There are hundreds of GIS oriented web sites world wide to support this kind G2C service (the USA are the leading country). E-Governance focuses on the citizens by using interactive web sites, to allow the citizens to get the information but also to express their opinions, comments or requests regarding the space data. This is G2C but at the same time C2G communication as well (e.g. e-voting). In this environment, the conceptual data models (CDM) should cover this complexity at this stage not having in mind details of actual physical implementation. CDM represents the overall logical structure of GA databases. It is independent of the kind
of software that will be used later or of the data storage structure. CDM will give us a formal presentation of the data needed to run the e-Government and e-Governance services. Croatia expects to have IBM DB2 as RDBMS.

**Presentation of GA GIS data in a graphic format**

The Conceptual Data Model (CDM) is a standard way of data organisation presentation. It allows us easy verification of data design validity. If we use the PowerDesigner interface software, CDM generates the Physical Data Model (PDM). PDM specifies the physical implementation of the data bases. In our case, the CDM objects are: building permit, site ownership certificate, sanitary permit, site location approval, site marking certificate, citizenship certificate and tax certificate. Inheritance is shown in Figure 1. It is assumed that a building permit requires one sanitary permit, site location approval, site marking certificate and one or more citizenship certificates, a tax certificate and site ownership certificate.

![Conceptual Data Model (CDM) inferences of the relevant objects to get the Building permission.](image)

Figure 1: Conceptual Data Model (CDM) inferences of the relevant objects to get the Building permission.

It is also important to stress that the present CDM example serves only for the presentation of the CDM technique in the GIS domain. The present CDM example is made in a clear way, but as a graphical presentation it is restricted to only one e-Government or e-Governance event. It is obvious that GA services are sharing the GA database resources and the standard CDM doesn’t show it. Although it is indisputable that for each e-Government or e-Governance event adequate an CDM should be separately shown, we are going to show the hexahedron presentation (HP) for more complex CDM graphical presentation purposes. HP improves the transparency of the whole e-Government and e-Governance domain. [2], [3]. It allows a graphical presentation of the CDM regarding the currently treated event (which is getting the building permit) and the e-Government and e-Governance portals axe, Intermediate Web sites axe, CDM Objects axe and relevant Data bases axe. Figure 2.
Figure 2: The hexahedron presentation (HP) of the CDM for the building permit event.

The CDM inherences of the objects are shown by using the standard inherences symbols. Great transparency, planning opportunities and possible presentation of the several CDMs at the same time are obvious. The important advantage of the HP graphical method is also the presentation of all data bases which are used to create the CDM objects.

Conclusion

The mentioned methods of the CDM graphical presentation should be used jointly. It is visible if we compare Figure 1. in comparison to Figure 2. While the standard CDM graphical presentation gives a clear view of the single event (like getting the building permit), the HP allows us to see many single events at the same time. The HP allows also the viewing of the possible common usage of the same SDM’s objects by different e-Government and e-Governance GIS events. Finally, HP gives a complete overview of the e-Government and e-Governance domain, portals, intermediate sites, objects and data bases.

References:


