USING THE "BUILDING BLOCKS" FOR MODELING DATA

Vassil Milev

Summary: Concept of "Building Blocks" has become in recent years as a leader in developing both the architecture of the enterprise as a whole and the individual components and − business applications, data and infrastructure. The report proposed approach of using "Building Blocks", in developing the architecture of data and accurate in their modeling. The possibilities are described that offered the types of objects such as "Building Blocks". Presented taxonomy is used for modeling the basic types of objects / entities, based on PER model . Here are concrete examples. We examined the practical applicability of the developed taxonomy.

Keywords : enterprise architecture, data architecture, business processes, data modeling, architectural frameworks models, taxonomy.

ИЗПОЛЗВАНЕ НА МЕТОДА "ГРАДИВНИТЕ БЛОКЧЕТА" ПРИ МОДЕЛИРАНЕ НА ДАННИТЕ

Васил Милев

Резюме: Концепцията „Building Blocks" се утвърждава през последните години като водеща при разработване както на архитектура на предприятието като цяло, така и на отделните й компоненти – бизнес, приложения, данни и инфраструктура.
В доклада е предложен подход за използване на „Building Blocks" при разработване на архитектура на данните, и по точно при тяхното моделиране. Описани са възможностите, които предоставя разглеждането на типовете обекти като „Building Blocks". Представена е таксономия на използваните при моделирането основни типове обекти от данни, на база модела PER . Дадени са конкретни примери. Изследвана е практическата приложимост на разработената таксономия.

Ключови думи: Архитектура на предприятие, архитектура на данни, бизнес процеси, моделиране на данни, архитектурни рамки/модели, таксономия

Доклада е публикуван в :

1. INTRODUCTION

The architecture of the enterprise is now a key tool for synchronizing business and information technology supporting it. It is a set of building blocks presented in an architectural model and specification of how these architectural elements are connected and meet common business requirements (Dalin and Sjularenko, 2007).

In the development of enterprise architecture in recent years the leading concept is "Building Blocks" (TOGAF 8.1.1,(2008),(Ganesan and Paturi,2008), which enables reuse of proven architectural practice.

Purpose of the report is to propose an approach for using "Building Blocks", in developing the architecture of data, their modeling, and develop taxonomy of "Building Blocks" and appropriate software tools.

2. APPROACH USING THE CONCEPT OF "BUILDING BLOCKS"

Figure 1 presented functional diagram of the approach. The taxonomy of building blocks (Denise and Bedford,2008) is developed, based on requirements associated with business processes. The building blocks constitute the basis for describing the architecture of data (Lewis *et al.*,2001) where answer the following questions:

- What is the physical structure of data?
- For what business processes are designed to?
- Which applications are using the data?
- Who owns the data?
- Who is responsible for data?
- Who are the users of the data?
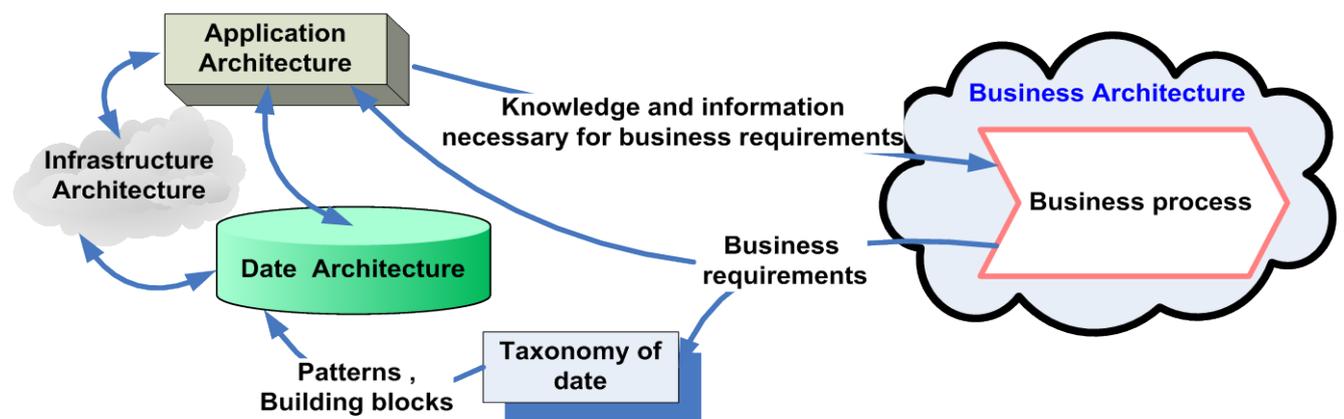- What volumes up and how fast growing?
- What level of security they need?

Figure 1. Functional scheme of the approach "Building Blocks"

3. TAXONOMY OF BUILDING BLOCKS

3.1. TERMINOLOGY

Taxonomy (from Greek taxis – location, order, grade, and nomos – law) – theory of classification and systematization of complex organized fields of activity, having a hierarchical structure. It deals primarily with determining taxonomical categories and systematizes them in a manner allowing the construction of consistent and convenient classification most related to corresponding (examined) subject area.

Taxonomical categories – characterize the method of construction of specific objects for classification and logical principles for solving the tasks of the their typology

Corporate taxonomy – it is an essential component of the corporate system for knowledge management and its place on the accumulation of data, information and knowledge, coordination and their optimal usage.

Taxonomy of data – arranged according to taxonomic categories selected building blocks, which represented elements of the data model.

3.2. REASONS FOR USING THE TAXONOMY OF DATA:

- Avoiding duplication of data.
- Systematization of final architectural solutions.
- Reuse of practically verified architectural solutions.
- Standardization of terminology used in data modeling.
- Appropriate tools for training in data modeling.

3.3. SETTING THE MAIN CATEGORIES

The basic taxonomy of categories of data stem from the relational data model. Codd (Codd,1990), (Tujarov and Mihailov, 2004) in its relational theory identifies three components through which it is possible to model the real things into computer world – objects / entities, properties and links. The first two components (objects and properties) are included as categories in the taxonomy and relationships between objects are presented graphically.
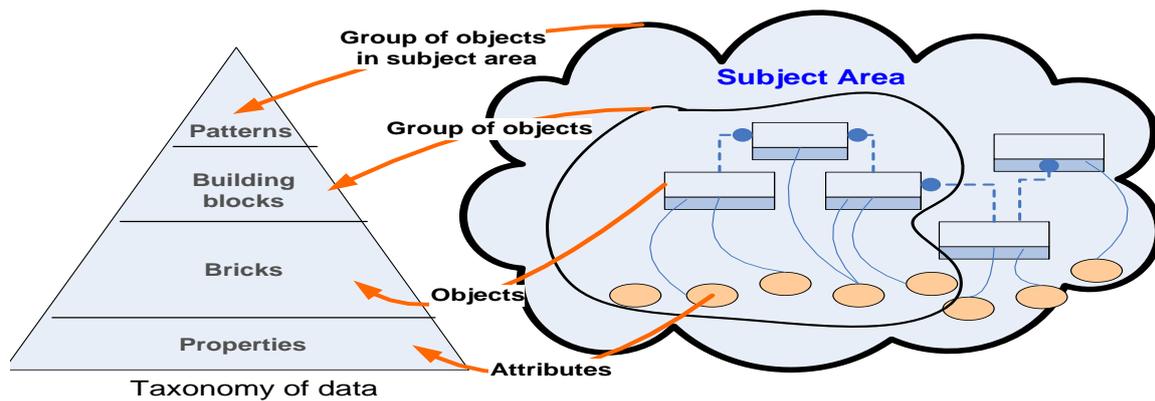
Figure 2. Taxonomy of data

Category "Properties" – properties of the types of objects applicable to the specific environment. Example: "Client ID", "Client name".

Subcategories "Properties" determined the type of each attribute – primary key, secondary key, key up and characterization.

Category "Bricks" (elementary building block) – a type of object (relation) that can exist independently and the user may wish to maintain data for it. The type object is an abstract concept, which corresponds to specific implementations in the real world (e.g. customer, employee, sale, products sold).

Subcategories "Bricks" are categorized according to object classes set in PER model (Tujarov and Mihailov, 2004). Example is shown in figure 3.
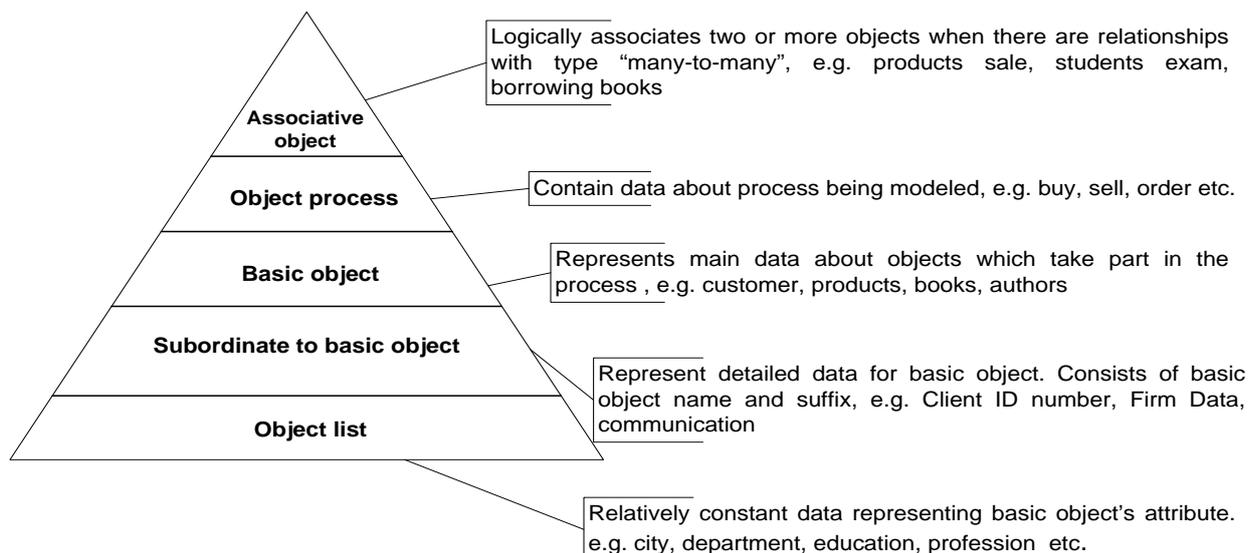

Figure 3. Taxonomy of sub-categories of "Elementary building block".

Category "Building blocks'' are functionally distinct group of objects that implement a specific function within the template. Here are some examples:

Block "Subject ID Number" – individual data for all individuals (customers, suppliers, students, staff, etc.). Block "Subject Firm Data" – company data only when the subject is firm.

Fig.4. "Subject ID Number" and "Subject Firm Data"

Block "Communications" – storing data for communication with the entity (personal phone, work phone, mobile phone, fax, email, etc.). A block often used in contemporary communications.

Fig.5. "Communications"

Block "Content" – used to store unstructured data. In data model describes the data owner, relevant document and its hyperlink. This solution enables greater opportunities for integration of structured and unstructured data.
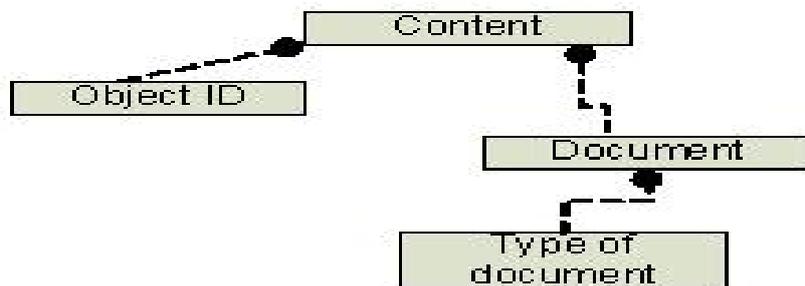

Fig. 6. "Block Content"

Category "Patterns" – a model of the subject area, which includes all objects. It is like a framework, the content of which depends on the specific business requirements and implementation based on its applications. The next figure 7 is presented an example for "Pattern - Clients".
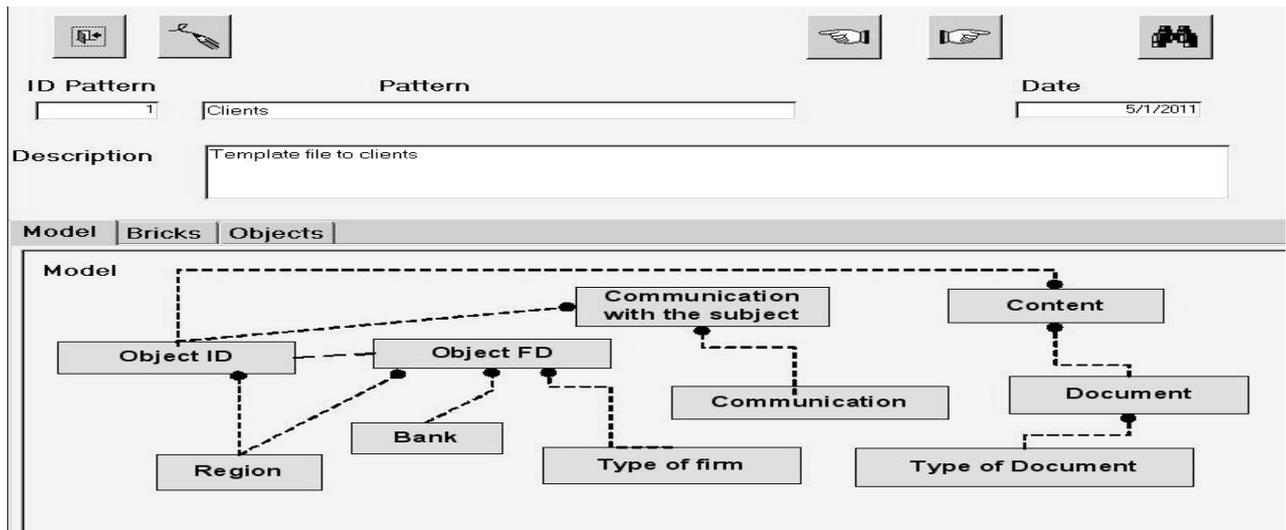
Fig.7. "Pattern - Clients"

Figure 7 shows PER model (Tujarov,2007) ,(Tujarov,2008) pattern 'customer files, they have included all objects involved in the pattern divided into four building blocks – object ID Number, Firm Data object, communications with the entity, content.

Subcategories "Patterns" are classified in two categories (cabinet and sub-files). An example of a sub-system is presented in figure 8.
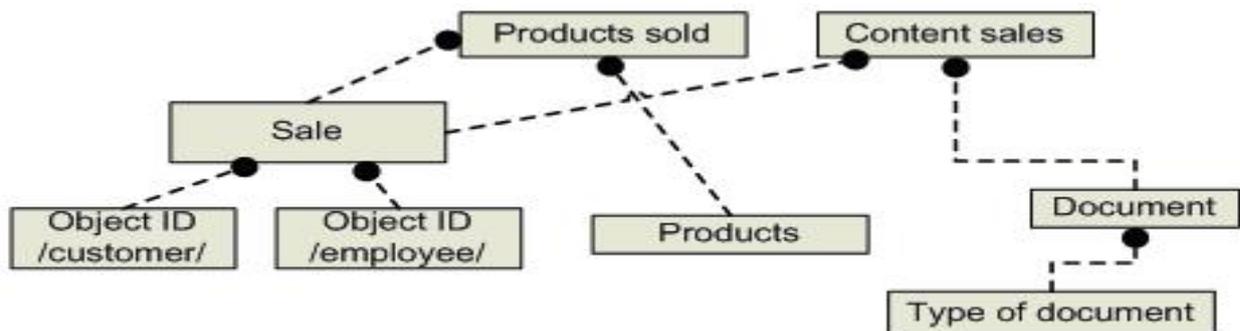

Fig.8. Pattern "Sales"

4. IMPLEMENTATION OF THE APPROACH

4.1. METHODOLOGY FOR PDCA

For the realization of the approach it is appropriate to use a methodology known as "Planning - DO – Check - Action" (PDCA) (Gubta P., 2007).
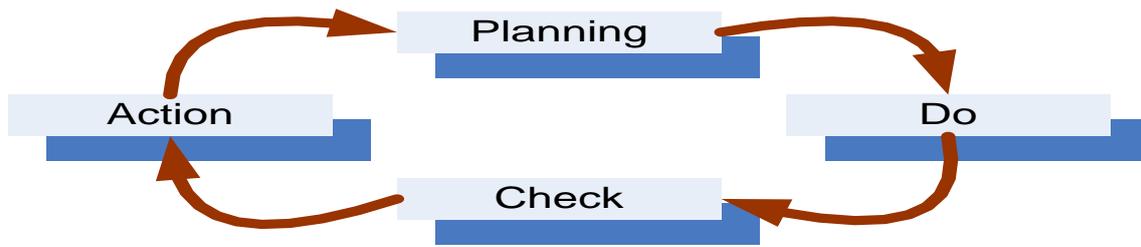
Fig. 9. Phases of implementation of the approach.

Planning

Used approach 5W 1H in which to give answers to the following six questions:

- What? (What?) **–** depending on the particular business process is the template that should be modeled.
- Why? (Why?) – to justify the need for and links to other templates.
- Who? (Who?) – who will determine the shape data and corresponding building blocks.
- How? (How?) – determining the method (s) of performance.
- Where? (Where?) – determine the scope.
- When? (When?) – worked out a plan (schedule).

Do

Data are modeled in the categories of construction blocks. The physical data model and database rare developed.

Check

At this stage we evaluate (the functions of) how the building blocks and template as a whole are functioning.

Action

They are two types of actions depending of the results of the investigation at this stage:

- Introducing a new standard template of the organization.
- Perform corrective actions to develop and improve the template for the next cycle to achieve an even higher level.

5.PROGRAMMING TOOL

- Service taxonomy has developed a program in an environment of MS Access. Here are some of the features of the program.
- The program provides opportunities for storage of taxonomic categories subject areas and corresponding business processes.
- The program provides opportunities for reports by category and subcategory.

- The program provides opportunities for statistics on usability of individual building blocks.
- The program provides opportunities for training in data modeling.

The introduction screen from program, templates "Pattern- Clients" is shown on figure 7.

6. CONCLUSIONS

Approach described in the report optimized the process of modeling the data. It allows for repeated use of architectural solutions tested in practice.

Developed taxonomy of data service and software enable acceleration of the process of database design and avoid errors and duplication of data.

7. REFERENCES

Codd, E.F.(1990), The Relational Model for Database Management. Addison Wesley Publishing Company.

Dalin, A.B., A.I., Sjularenko (2007), Enterprise Architecture, http://www.intuit.ru/department/itmngt/entarc/0/.

Denise A. D. Bedford (2008), Enterprise Taxonomies – Context, Structures & Integration Presentation to American Society of Indexers Annual Conference – Arlington Virginia, http://www.asindexing.org/site/conferences/conf2004/Enterprise.ppt.

Flowler,M. Foemmel, E.Hieatt, R.Mrr,R.Stafford (2002), Patterns of Enterprise Application Architecture, Addison Wesley.

Ganesan E.,R. Paturi (2008) Building Blocks for Enterprise Business Architecture, Labs Briefings, http://www.infosys.com/offerings/it-services/architecture-services/white-papers/documents/enterprise-business-architecture.pdf.

Goldfedder, Joy of Patterns (2001), Using Patterns for Enterprise Development, Addison Wesley.

Gubta P. (2007), Business process management http://qmconsult.eu/free_books/model-PDCA.pdf.

Lewis, G., Comella-Dorda, S., Place, P., Plakosh, D., & Seacord, R., (2001), Enterprise Information System Data Architecture Guide Carnegie Mellon University.

TOGAF 8.1.1 (2008) ,Building Blocks, http://www.opengroup.org/architecture/togaf8-doc/arch/chap32.html.

Tujarov, Hr. (2008) ,Data base modeling,http://www.tuj.asenevtsi.com/MetodA/MetodA30.htm.

Tujarov, Hr. (2007) , Semantic data models developing,http://www.tuj.asenevtsi.com/DB2007/BD57.htm.

Tujarov, Hr., I.,Mihailov (2004), PER model – Semantic data models developing, CompSysTech, http://ecet.ecs.ru.acad.bg/cst04/Docs/sIIIB/313.pdf.