

## **CONCEPT OF ENTERPRISE ARCHITECTURE**

*Vanessa PRAJOVÁ, Ľubica MRVOVÁ and Petra MARKOVÁ*

### **ABSTRACT**

The key objective of Enterprise Information Systems is to provide the most efficient, yet effective support for business processes, business units and, in particular, communication within the company through shared data. The strategic task is, therefore, to identify business processes, their measurement and evaluation, so that it is possible to find out exactly which processes are crucial for the company. Business processes should be designed and implemented in such a way as to bring them into line with the goals and strategy of the company. The need to capture and subsequently optimize business processes is also part of meeting the conditions of certification according to STN EN ISO 9000 Quality management systems and for the implementation of process management of the company.

### **KEY WORDS**

Enterprise Architecture, business processes, information technology, identification

### **INTRODUCTION**

Enterprise Architect (EA) software helps individuals, groups, and large companies design and manage complex information. This is often related to software development and design of IT systems and their deployment, but may also be related to business analysis and business process modelling. Enterprise Architect integrates and integrates a broad range of structural and behavioural information, helping to build a coherent and trusted architectural model that is or will be. It also offers tools to manage versions, find differences, revise changes, and execute project development with security control and enforcement.

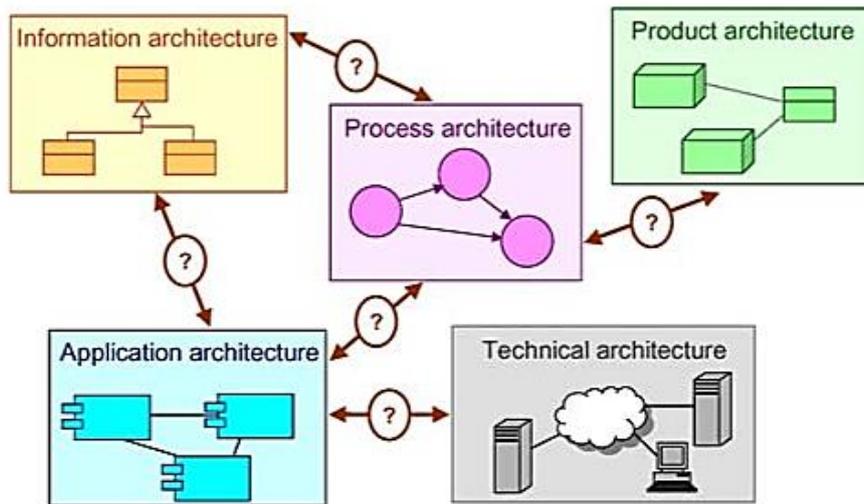
Currently, Enterprise Architecture is defined by multiple authors:

According to Buchalcevova and Gala (2008), *"Enterprise Architecture is an approach, concept, means and tool by which we express the fundamental organization of the relationship between business and its information systems, leading to the fulfilment of the organization's mission system."*

According to Ross et al. (2006) *"Enterprise Architecture is an organizational logic of business processes and IT infrastructure that reflects integration and standardization requirements, based on the company's selected operating model. It provides insight into business processes, systems and technologies so that individual projects build the capabilities of the organization in line with the long-term goal and not just to meet immediate needs"*.

### **WHAT IS ENTERPRISE ARCHITECTURE?**

Enterprise Architect is a Computer-Aided Software Engineering (CASE) tool for designing and designing software systems, modelling business processes, and other generalized modelling purposes. Enterprise Architect is based on the latest UML 2.1 specification ([www.omg.org](http://www.omg.org)). UML defines the visual language that is used to model individual domains or systems (proposed or existing). Enterprise Architect is a progressive tool that covers all aspects of the development cycle and allows you to track requirements from collection, analysis, design and implementation to deployment and maintenance. It also provides support for testing and checking changes. ([www.sparxsystems.com](http://www.sparxsystems.com))



*Fig.1 Enterprise architecture: Integrating architectural domains (Jonkers et al, 2006)*

Enterprise Architect offers the following options ([www.sparxsystems.com](http://www.sparxsystems.com)):

- ✓ model complex information, software and hardware systems using UML-compatible notation;
- ✓ model, manage and track requirements in deployed systems;
- ✓ create detailed and high-quality documentation in RTF and HTML formats;
- ✓ use the Enterprise Architect Framework, which is an industry-standard;
- ✓ generate and reverse engineer code in more than ten programming languages;
- ✓ model databases, create DDL scripts, and analyze database schemas accessible through ODBC through reverse engineering;
- ✓ manage versions with merging support;
- ✓ centralize company-wide documentation of processes and information systems;
- ✓ model dependencies between elements, behaviour and system states;
- ✓ model hierarchies of classes and other components;
- ✓ manage the project vocabulary, tasks and comments on the project;
- ✓ assign resources to the individual elements of the model and compare the planned and real use of these resources;
- ✓ have models using the latest XMI 2.1 format;
- ✓ import models in XMI format from other tools;
- ✓ track Version Control versions using XMI technology with SCC, CVS, or Subversion configurations;
- ✓ use UML Profiles UML Profiles to create user extensions for domain-specific modelling;
- ✓ save complete diagrams as UML patterns and use them later as a template;
- ✓ analyze and record element relationships using the Relationship Matrix;
- ✓ script and automate tasks using the detailed Automation Interface;
- ✓ connect to shared database storage spaces using MS SQL Server, MySQL, Oracle and others;
- ✓ replicate changes in the distributed environment using Controlled XMI Packages;
- ✓ Transform perform model-to-model transformations using Model Driven Architecture (MDA);
- ✓ Model With Model Views you can create and share dynamic views of individual elements and diagrams of the model;
- ✓ Mind record Mind Maps, create Business Process Models and Data Flow Diagrams using UML;

- ✓ visualize your applications using Debug and Profiling Workbench.

## ENTERPRISE ARCHITECTURE GOALS

In taking a holistic approach, starting from the business needs of an organization, the main objectives of enterprise architecture is building a culture of reuse through a common language, as shown in Fig. 2. This should be done in an evolutionary, not a revolutionary, way, with a governance team acting in an operational environment with different scopes: the global business and strategy scope, the information systems scope, and the projects scope. Support should be provided using the right tooling for promoting reuse throughout the organization. (www.oracle.com)

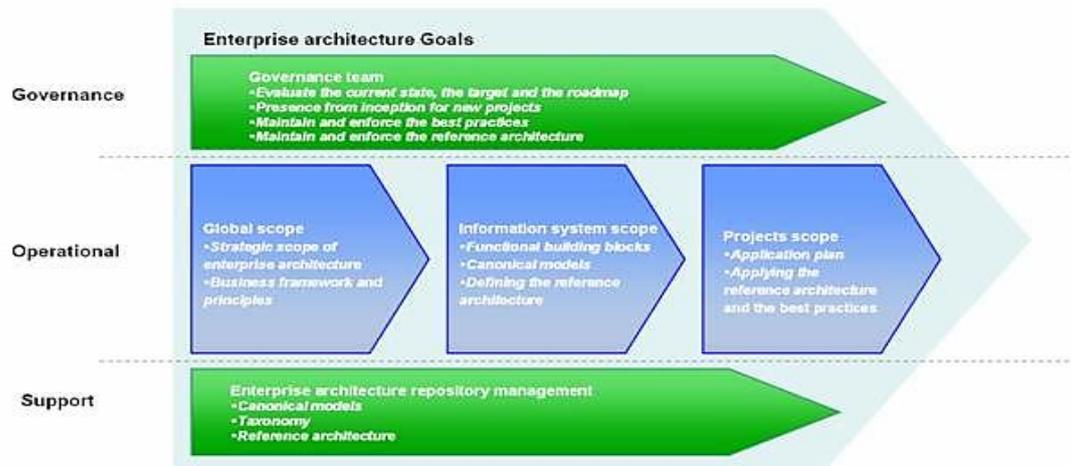


FIG.2 Enterprise architecture goals ([www.oracle.com](http://www.oracle.com))

**Governance team** - should create and maintain assets reflecting the current state of the organization in terms of existing functional blocks. In those assets, a global description of the current state is done; this should help identify the silos of the current information system. A target state should also be defined associated to a roadmap. To be able to apply the roadmap to the target, the governance team should be present in the new project from their inception, providing guidelines and enforcing common rules and best practices throughout the organization. Principles, policies, taxonomies, enterprise canonical data models, data repositories, best practices, reusable assets, and guideline should be defined and maintained with the governance team involving all lines of business and IT. (Sheer et al., 2005, www.oracle.com)

**Global business and strategy scope** - The enterprise architecture should align IT with the strategy of the organization. It has the objective of providing an agile information system that can be adjusted easily to the continuous changes of the business. This dictates the business frameworks and principles leading to the functional building blocks that are necessary for the composition, and recomposition of the business processes. (Sheer et al., 2005, www.oracle.com)

**Information systems scope** - The enterprise architecture team references the existing functional building blocks. It also defines new functional building blocks needed for the business processes as defined in the global business scope in the business processes plan. The information systems scope relates to the functional plan and should provide the correct level of abstraction using a common language understandable by business and IT. Information systems assets are defined in the functional plan. This definition includes the communication

between applications in the functional level along with canonical enterprise data models, common language, taxonomy, and data repositories. The access to those assets should be defined and controlled. The work on the functional plan should be mapped to applications in the applications plan. Standards and product support should be identified in association with the aspects covered by the each of the applications. The reference architecture is defined within this scope. (www.oracle.com)

**Projects scope** - On the operational level, most of the actions should be done with projects to insure that the principles and guidelines are applied. Architects from the governance team should insure that the detailed technical requirements and project architectures are in compliance with the enterprise principles, policies, and uses of the enterprise common language. Applying the architecture blueprints to deliverables for projects in the early stages of the investment cycle increases the odds of delivering on time, on budget, to specification, with quality, and with enhanced reuse capabilities. In this way, projects can provide new SOA building blocks that can be reused throughout the entire organization. (Sheer et al., 2005, www.oracle.com)

## BENEFITS AND RISKS OF IMPLEMENTING ENTERPRISE ARCHITECTURE

It follows from EA characteristics ability to connect the business and ICT community to create an environment in the enterprise that enables management to make informed IT decisions and prevent mistakes and wasted investments in the current environment of radical ICT, business and, last but not least, the need to comply with standards and legislation. Table 1 gives examples of EA's tasks in different situations. (Basl et al., 2011)

**Tab.1** Examples of EA tasks in different situations (Basl et al., 2011)

<b>Characteristics of the situation</b>	<b>The role of EA</b>
The concept of "Service-Oriented Computing, SOC," which introduces the concept of services into the ASW environment and creates the conditions for providing them from Cloud Computing with the possibility of offering and consuming "anything as a service", represents a radical change in ICT.	EA allows through an appropriate business footprint perspective view among stakeholders to identify business services, application services ASW and infrastructure services ICT their addition.
Globalization and customer orientation mean significant business changes that need to address through the process, product, organizational and marketing innovations. Informatics must respond to these initiatives in such a way as to support the functioning of the organization in such a turbulent environment flexibly and effectively.	EA can then be a means to detect the impact of business innovation on IS / ICT and can formulate specific and precise tasks that IT needs to accomplish for business changes to be met.
As a result of various scandals which pointed to a discrepancy between the information provided and the actual state of operation of the company, a number of measures of a legal nature, such as SOX, Basel II, HIPA, United States Patriot Act.	By its description, EA enables clear documentation of the link between business, information and responsible persons.
The organization made a strategic decision to significantly reduce investment and operating costs in all commodity areas, including IT. It has rightly identified the need for significant progress in consolidating the application architecture and standardizing the technology infrastructure.	EA makes it possible to identify all components of the application and technology architecture and convert them to business requirements. Ultimately, EA is able to translate the required changes leading to savings on the side of the main and support processes into changes in the IT architecture and to align them with changes taking place autonomously in IT.

In addition to the examples given below, which may serve as arguments in assessing the introduction of EA, the competitor's experience and its applications can also be used as arguments.

However, it is important to be aware of the potential risks when assessing EA. In particular, the findings made by Lankhorst (2005) are opposed to the introduction of EA, which points out that "*EA will be an important means and tool in planning and managing IT development in line with business needs only when the company is at the third level, i.e. formalized*". It also appears to be risky when an organization with the EA concept implemented does not review changes resulting from various business initiatives in their overall impact on society or focuses only on the technological aspect of change. In such cases, EA becomes an irrelevant strategic management tool and, instead of being the driving force behind change, it becomes an obstacle to it. (Obitz, et al., 2009)

## **CONCLUSION**

Enterprise Architecture is a new concept that extends the strategic management practices of the company. The concept introduces a complex and holistic view of the business in a difficult economic environment, allowing management to make informed decisions about the business's direction, recognizing all the consequences of such decisions.

Since the enterprise architecture model reflects the state of the system, which is constantly evolving, changing and improving, it is important to realize that Enterprise Architecture will never be completed and its model should be continuously updated in a controlled manner.

## **ACKNOWLEDGMENT**

This publication has been written thanks to support of the Operational Program Research and Innovation for the project: Research of advanced methods of intelligent information processing (ITMS code: 313011T570, Grant agreement number: 035/2019/OPVal/DP), co-financed by the European Regional Development Fund.

## **REFERENCES**

- BASL, J. a kol., 2011, *Inovace podnikových informačních systémů*, Profesional Publishing, Praha, ISBN 978-80-7431-045-4
- BUCHALCEVOVÁ, A., GÁLA, L.: 2008, *Architektura v podnikové informatice*, Systémová integrace, roč.15, č.3, s.7-22. ISSN 1210-9479
- JONKERS, H., LANKHORST, M. M., ter DOEST, H. W., ARBAB, F., BOSMA, H., & WIERINGA, R. J.: 2006, *Enterprise architecture: Management tool and blueprint for the organisation*. *Information systems frontiers*, 8(2), 63-66, Springer Science+Business Media, LLC 2006, DOI 10.1007/s10796-006-7970-2
- LANKHORST, M., et. al.: 2005, *Enterprise Architecture at Work: modelling, communication, and analysis*. Berlin, Springer, ISBN 978-3-540-24371
- OBITZ, T., BABU, M.K.: 2009, *Enterprise Architecture Expands its Role in Strategic Business Transformation: Infosys Enterprise Architecture Survey 2008/2009*, s.1.; In: Infosys Technologies
- ROSS, J.W., WEILL, P., ROBERTSON, D.C.: *Enterprise architecture as strategy: creating a foundation for business execution*. Boston: Harvard Business School Publishing, ISBN 1-59139-839-8
- SHEER, A-W., JOST, W., HESS, H., KRONZ, A., 2005, *Corporate Performance Management, ARIS in Practice*, Springer, Berlin, ISBN 3-540-30703-6

<https://www.oracle.com/technical-resources/articles/enterprise-architecture/introduction-part2.html>

[www.sparxsystems.com](http://www.sparxsystems.com)

[www.omg.org](http://www.omg.org)

**Kontaktné údaje autorov:**

**Ing. Vanessa Prajová, PhD.**

**Ing. Ľubica Mrvová, PhD.**

**Ing. Petra Marková, PhD.**

Ústav priemyselného inžinierstva a manažmentu

Materiálovotechnologická fakulta

so sídlom v Trnave, STU Bratislava

J. Bottu 25

917 24 Trnava

Email: [vanessa.prajova@stuba.sk](mailto:vanessa.prajova@stuba.sk)

[lubica.mrvova@stuba.sk](mailto:lubica.mrvova@stuba.sk)

[petra.markova@stuba.sk](mailto:petra.markova@stuba.sk)

