

Applying the Enterprise architecture describing the processes of gathering data and reporting Czech national environmental indicators within EU

Martin Lukas

Czech University of Life Sciences Prague, Faculty of Economics and Management, Department of Information Technologies, Kamýcká 129, 165 00 Praha 6 - Suchbátka
lukas@pef.czu.cz

Abstract

The article refers to the project National environmental reporting platform (NERP), which is funded by European structural and investment funds (#CZ.03.4.74/0.0/0.0/15_025/0016059). The implementer is Czech National Environment Agency, a ministerial organization established by the Ministry of the Environment. One of its project goals is to get to know and draw the current situation of how the data sets from different Czech organizations are gathered, how the national environment indicators are created and published among the other international institution for environment assessment and analysis, as well for the environmental impact management and sustainable development. The article does not propose the improvement of the current situation, but forces us to think about what should be improved.

Keywords: Data gathering process; Project National environment reporting platform; TOGAT

1. Introduction into the project using Enterprise architecture approach

The project with the full name “Optimization of the system of receipt, validation, processing and reporting of data sets in the environmental sector” starts in June 2020, it is 3 years lasting project. Project objective is summarized as follows - development of existing and introduction of new information processes, procedures and activities associated with the implementation of a new reporting system in the environment, providing methodological and consulting support for owners of environmental data provided by the team established at CENIA, Czech Environmental Information Agency, improving national and international system to support reporting on environmental assessment using national and international open data standards.

The project is developed under the umbrella of Operational program employment, Priority axis and Investment priority (#4.1) – Effective public administration. The specific goals are:

- Specific goal 1 - Optimize processes and procedures in public administration, in particular by strengthening the strategic management of organizations, increasing the quality of their functioning and reducing administrative burdens

- Specific goal 2 - Professionalizing public administration, in particular by increasing the knowledge and skills of its staff, developing policies and strategies in the field of human resources and implementing the Civil Service Act

The Enterprise architecture based on TOGAF framework with the support of graphical notation language ArchiMate is one of the key method commonly used:

- 1) to get to know the scope of environment data gathering and environment indicator reporting among public administration bodies within Czech institutions as well as.
- 2) to get know the complexity of national environment data and indicator reporting, how the indicators are reported (to whom) and published one level up on the european level by European institutions : Europeoan Environment Agency, EUROSTAT, European Environment Information and Observation Network, and others for environment assessment and analysis, as well for the environmental impact management and sustainable development

The article focuses only on the European environment, which is little bit foggy and not clearly known and understandable for project teams as well as for Czech public administration bodies.

2. Specifics of environmental research using the Enterprise Architecture approach

The project **key activities** and their specifics, why use the Enterprise architecture

- 1) Creating a strategy and methodology for setting up processes to ensure the NERP system, including agreements on cooperation with data owners (producers) – KA01
- 2) Pilot verification of data processing, classification, categorization and storage in a SW tool for a specified number of owners (producers) and data sets – KA02
- 3) Development of management tools and their pilot verification in order to determine readiness for routine use – KA03
- 4) Organizing promotional and educational conferences on NERP, including publishing and lecturing activities - key activity will be addressed through the NERP team – KA04
- 5) Organizing training in NERP strategy and methodology for data owners, including methodological support - key activity will be addressed through the NERP team – KA05
- 6) Defining and managing data quality – KA06

The specifics of environmental research are (reasons why NERP project was established and initiated):

- A) missing of unified and standardized rules for data gathering
- B) missing the transparency of related processes (receipt, validation, processing and reporting of data sets in the environmental sector nationally and at the European level)

- C) missing relevant roles and responsibilities (national and European data governance is not in place)
- D) absence of conditions for the use of received, validated processed and reported data
- E) absence of service catalog which all services of European data responsibilities are described in
- F) methods for calculation of same environment indicators are different
- G) a lot of environment indicator definitions as well as duplicated line of reporting (EU reports different values for similar indicator)

2.1 What the NERP project is about

Quality, comprehensive, and available information in the environment area is a basic prerequisite for the protection and improvement of the environment. A number of institutions are responsible for data collection within the Ministry of the Environment¹², which also fulfills the obligation to publish and report relevant data and information to other, whether national or international organizations. The state funds and research institutes are excluded from the project¹³. For reasons of usability, it is necessary to ensure a uniform standard of data across institutions, to treat data ownership and to optimize the methodology of their collection. This issue and its solution are comprehensively protected by a new reporting system in the Ministry of the Environment.

The NERP project aims to ensure the development of existing (AS-IS status) and the introduction of new information processes (TO-BE status), procedures and activities associated with the implementation of a new reporting system in the Ministry of the Environment. It aims to provide methodological and consulting support for owners of environmental data and to improve the national and international system to support reporting and environmental assessment using national and international standards.

2.2 What are the benefits of the NERP project

The project benefits are subdivided into the areas:

¹² Nature Conservation Agency of the Czech Republic (NCA CR), Czech Geological Survey (CGS), Czech Environmental Inspectorate (CEI), Czech Hydrometeorological Institute (CHI), Krkonoše Mountains National Park (KRNAP), Bohemian Switzerland National Park (Národní park České Švýcarsko), Podyjí National park Administration (Národní park Podyjí), Sumava National Park (Národní park Šumava), Cave Administration of Czech Republic (Správa jeskyní ČR)

¹³ They can not be the recipients of european financial support due by conditions

1) **Benefits for public administration bodies (organizations)¹⁴ might be considered as follows:**

- transparent, high-quality, and efficient processing of environmental indicators
- introduction of clear and definitions of environmental indicators at national level
- introduction of EU harmonized definitions of national environmental indicators
- reuse of public sector datasets
- sharing know-how for data owners and digital entities economics with a focus on "opendata" and "open source" applications
- ensuring sufficient capacity for continuous publication and reporting of data sets of various owners (involved NERP members and owners standing outside this platform)"

2) **Benefits for employees of administration public administration bodies might be considered as follows:**

- Improving knowledge and skills at different levels and in the activities of environmental data owners
- streamlining of activities in the processing of data sets of environmental indicators at national and european level (optimization of time intensity from receipt, through validation to national and international reporting)

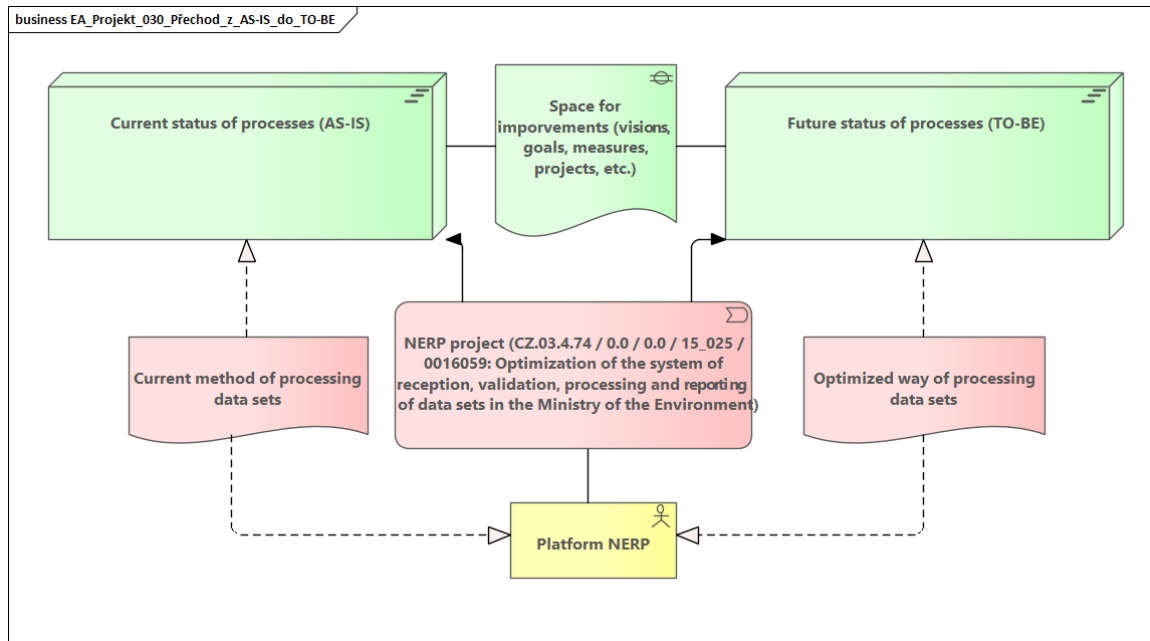
2.3 Benefits for Czech Republic and European bodies

The project benefits at the national level are following:

- 1) Creation of a clear process map of preparation of national data sets and indicators for the needs of reporting towards European institutions and agencies
- 2) Contribute to the improvement of the situation in international reporting by creating a catalog of the Czech Republic's reporting obligations to the EU
- 3) Understanding the different cycles of creating publication plans and conditions for the use of data to practically verify their compliance with Czech and international standards and norms in the CENIA environment (*12 months for national and 18 months for international comparison through Eurostat, European Environment Agency / EEA and Organization for Economic Cooperation and Development / OECD*)

¹⁴ Government bodies, regional and municipality bodies, other subject participated in public andministration (e.g. agencies funded by state budget), etc.

Figure 1: Logic of NERP project



Source: author.

The schema shows the logic of the space (the gap) between current status (AS-IS) and future status (TO-BE). The project is being overbridged the gap and result in NERP platform, which is the main project outcome and delivers the fulfillment of the benefited listed in chapters 0 and 0. This implementation schema is drawn by the elements of implementation level of graphical notation language ArchiMate.

3. Enterprise Architecture – the tool of mapping the structure of business flow on national and European level

The National Architecture Framework (NAF) methodology is a methodology for the realization, maintenance, and usage of Enterprise architecture. It is a binding and repeatable guide for public authorities (including municipalities, regions). Describing relevant processes in the Enterprise architecture lifecycle. The starting point for its design is the TOGAF framework, or rather its part, describing processes of the ADM (Architecture Development Method) cycle. NAF explains **WHAT** we create and **WHEN** we create it. It formulates the requirements for the architecture (eg. strategy approach, motivational factors, business processes, applications, data sets). The output of each phase must be recorded. The ArchiMate graphical modelling language is used for easy understanding.

TOGAF - is an internationally recognized framework for managing development of Enterprise architecture in companies using information technology resources. The original concept was developed in USA but has been used worldwide for more than ten years, including the Czech Republic. The official documentation of TOGAF standard (The Open Group, 2018)¹⁵. Currently, it is the most common standard for describing an organization and its implementation. The goal of TOGAF is to find a way to rapidly develop the architecture while maintaining effective organization management. It does not describe what models should be used in the architecture, but leads the processes for development of the architectures. It is scalable from public administration bodies (municipal authorities) as well as for large authorities (regional authorities, state administration bodies, etc.) TPGAF supports all levels architecture, from business to data and technological architecture.

ArchiMate – is an independent graphical modelling language. It is managed by The Open Group consortium, which has declared the language as standard for describing Enterprise architecture. General standards for ArchiMate modelling (The Open Group, 2017).¹⁶

3.1 Essential elements of Business level

Basic unit in the ArchiMate metamodel is called the element. Used to define and describe the constituent parts of Enterprise architecture and their unique set of characteristics. Following elements from business level were used to draw AS-IS schema of the cooperation between Czech Republic and other European institution on the environment indicators:

- **Business Actor** is an organizational entity capable of performing assigned business within one or more business roles. For example, the Department of Informatics provides for the acquisition and renewal of hardware infrastructure.
- The element of **Business function** is a group of activities according to a given criteria, which may be source, competence, goal or strategy. An example of a business function is the fulfillment of the functions of a departmental organizational unit resulting from its incorporation into the organizational order (eg. implementation of EU fund projects).
- From opposite site, if the activities are organized according to their logical sequence (the order in which they are executed), then the element of **Business Process** is discussed. A typical example is the administrative procedure, which takes place in logical steps in accordance with Act No. 500/2004 Coll., The Code of Administrative Procedure.
- **Business Product** represents a coherent collection of services and/or structure elements accompanied by a contract/set of agreements, which is offered to (internal or external)

¹⁵ <https://pubs.opengroup.org/architecture/togaf9-doc/arch/>

¹⁶ <https://pubs.opengroup.org/architecture/archimate3-doc/>

customers (eg. environment indicator, business data set, physical and/or electronic documents, etc.).

- If the business object carries an information in perceptible form, this element is defined as **Business Representation** (eg. web pages, other forms that deliver the information).
- **Business Function** is defined as a collection of business behavior based on a chosen set of criteria (typically required business resources and/or competencies), closely aligned to an organization, but not necessarily explicitly governed by the organization (eg. delivering the outcomes, providing the results, defining the requirements, etc.).
- The concept that is used within a particular business domain is defined as **Business Object** (eg. European indicators, publishing plan of environment indicators, etc.).
- **Business Role** represents the responsibility for performing specific behavior, to which an actor can be assigned, or the part of actor plays in a particular action or event (eg. National Focal Point, National Reference Centre, etc.).

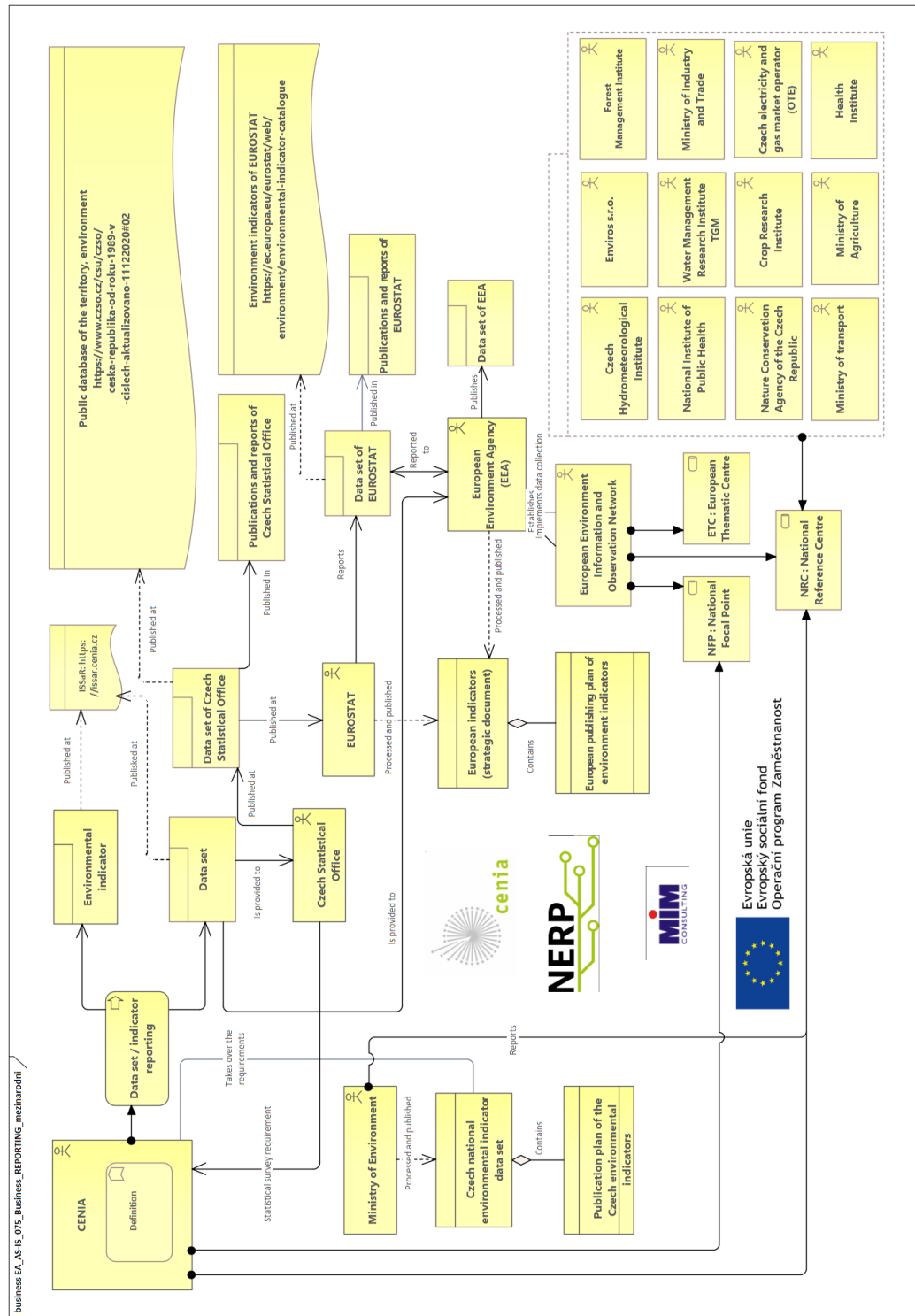
4. Architecture business scheme of cooperation between Czech Republic and other European institution on the environment indicators

The project team (consisting of internal and external experts) reviewed, studied and compiled essential information sources (web pages¹⁷, journals, statistical yearbooks, relevant national and European laws and directives¹⁸). The topics were also consulted with the members of Czech statistical office, Ministry of Environment, Government office, local members of EioNet and other relevant clerks responsible for strategic development and monitoring Czech environment indicators. Based on the consultations, self-study, research as well as on the consultation with members of state administration bodies, the collected information and data were examined and evaluated. Finally, the scheme of current status (AS-IS) of cooperation CENIA, CZSO, EioNet, EEA, EUROSTAT was drawn by using Enterprise architecture approach (business level), please see chapter 0. The schema (see Figure 2) served to create the list of services and obligation that Czech and European legislation places on the environment (eg.CENIA, MoE, etc.). It is not possible to apply the EA approach to the list of reporting services and responsibilities, so it is mentioned only marginally in this article.

¹⁷ <https://www.eionet.europa.eu> and <https://www.eea.europa.eu> and <https://ec.europa.eu/eurostat>

¹⁸ Charter of Fundamental Rights and Freedom 2/1993 Coll., Act. No.106/1999 Coll., on free access to information, Act.No. 123/1998 Coll., on right to environmental information, Directive (EU) 2019/1024 of the European Parliament and of the Council, on open data and re-use of public sector information, Directive (EU) 2013/37 EU of European Parliament and of the Council od 26 June 2013 amending Directive 2003/98/EC on the re-use of public sector information, Act No. 110/20129 Coll., on the processing of personal data, GDPR . General Data Protection regulation

Figure 2: AS-IS process of international data set and environment indicators between Czech Republic and European union



Source: author.

5. Conclusion

The following main findings were discovered and examined during the discussions on the development of the schema:

- There is now precise definition (list) of which environment indicators are reported from Czech Republic towards EU institutions (according to which laws and regulations)
- The responsibility of which public administration body publishes which environment indicators is not defined
- It is highly probable that there is the duplicate publication of environment indicators (if they have similar identifications, also more than one public administration body has signed up for their publication)
- Due to the fact that there are more places in the Czech public administration to publish environment indicators towards EU (ministry organizational units focused on resort statistics, which can duplicate or refine indicators published by the MoE, CZSO and via the EioNet) there is no methodology for development of environment indicators, from what values and who is responsible form them

It was also examined and discovered that CZSO publishes environment indicator based on the following laws and European regulation:

Direction to EUROSTAT

- Regulation (EC) No 691/2011 of the European Parliament and of the Council
- Directive No.466/2020 Col., On the Program of statistical surveys for 2021
- Regulation (EC) No. 538/2014 of the European Parliament and of the Council
- The EBS regulation (formerly known as FRIPS), which reports environmental investment indicator

Direction to EEA

Inputs for the EEA are not coordinated by CZSO (there is no obligation or mandate for CZSO reporting to the EEA), however potential risk of duplicate or similar reporting of Czech Republic through EEA to EUROSTAT still exists.

6. List of abbreviations

ADM	Architecture Development Method
ArchiMate	An open and independent enterprise architecture modelling language to support the description, analysis, and visualization of architecture within and across business domains
CACR	Cave Administration of Czech Republic
CEI	Czech Environmental Inspectorate
CENIA	Czech Environment Information Agency
CGS	Czech Geological Survey
CHI	Czech Hydrometeorological Institute
CZSO	Czech Statistical Office
EA	Enterprise Architecture
EEA	European Environment Agency
EIONET	European Environment Information and Observation Network is a partnership network of the EEA and its 38 member and cooperating countries
ETC	European Thematic Centre
EUROSTAT	Statistical office of the European Union
KRNAP	Krkonoše Mountains National Park
MoE	Ministry of Environment
NCA	CR Nature Conservation Agency of the Czech Republic
NFP	National Focal Point
NPCS	Bohemian Switzerland National Park
NPP	Podyjí National park Administration
NPS	Šumava National Park
NRC	National Reference Centre
OECD	Organization for Economic Co-operation and Development
OTE	Czech electricity and gas market operator
SEIS	Shared Environmental Information System
TOGAF	The Open Group Architecture Framework is the most used framework for enterprise architecture

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