Open information system  
for Masaryk University

Topics for preliminary market consultation, ICS Masaryk University, January 2019

# Initial situation and context

Masaryk University (hereinafter referred to as MU) builds and operates a heterogeneous university information system (UnIS), composed of software components of its own and other production, with the intent to provide users with maximum functions/services of these components through a united – homogeneous – user interface (UI), thus eliminating the need to become familiar with different design and behavior (logic and control methods) of the components. MU has four such UIs (listed in order of the degree of specialization of information the UI is used for – from more general to more specialized)

* UI for web presentation systems (a web and newsletter set implemented in a uniform visual style of MU)
* UI for the internal MU Portal (a central link site for internal information, and the UnIS communication, data and data-processing services)
* UI for internal systems:
  + Academic system UI (IS MU)
  + Economic-administrative intranet UI (INET MU).

All of the above-mentioned UIs are developed by the university itself, and each of them covers selected relevant components of the UnIS.

An obvious requirement for such a designed information system is the data and process integration of the used components. At MU, this integration is at high level – with few exceptions, no data and functionalities are duplicated. However, the component interfaces (APIs) are not general – with rare exceptions, they are designed to meet the requirements of the components and MU (the given UI). This means that the components are monolithic, without open APIs.

The key components of the UnIS include the supplier-economic and personnel-payroll system (EIS), covered by INET.

# Subject of preliminary market consultations

The current EIS version does not meet the requirements and needs of the university in terms of the data and processing functions, and especially in terms of integration and communication interfaces. Therefore, MU is mapping the options of the software market through preliminary market consultations. The consultations do not primarily cover the functions or contents of software systems (what data the systems work with and what processing functions they have), but their APIs and technical and technological aspects: such as what APIs these systems have and what integration and communication links the systems allow the customer to build having to collaborate with the vendor.

Note: A necessary prerequisite for efficient use of such APIs is the technical and technological erudition on the part of the customer, i.e. MU.

The aim of market consultations is to learn more about the current market offer and its expected development and to find out how this offer maps the INET and UnIS concept in general and how the approached suppliers will respond to the INET/UnIS concept based on their experience and practice.

# General requirements for the “Open Information System for Masaryk University”

The basic requirement for the “Open Information System” is to have a generally designed and documented API with a unified framework and clear rules that will enable user-defined and implemented data processing functions for different usage purposes defined by the system. Data processing functions include both single-step data access (read/write, including bulk read/write with transactional integrity) and more general multi-step processing functions. In other words, it is a “design manual” for creating data content, which will then be available to users through the INET UI.

The basic version is a set of conditions, rules and recommendations on how to implement the data processing functions, including the design of rule implementation and enforcement. The higher version has a more complex API addressing technical aspects of inter-system communication – security, data transformation, prototyping, batch processing, etc. The API should allow outsourcing of function implementation that cannot be accomplished by internal capacity in order to meet the customer’s requirements and to be reusable by other customers.

# Questions for market consultations

The following questions to determine the status and options of the software market for the implementation of the above-mentioned INET concept are based on the assumption that the existing systems on the market do not correspond to the INET concept. Their aim is to find out if the concept is feasible and implementable in the near future.

The questions have not been designed as a test; there is no correct or wrong answer. If any function is not available or cannot be implemented, MU wants to use this survey to find out the reason and to adjust its expectations and requirements if need be.

## System architecture

* What is the architecture of the main parts of your system – does it have 2/3/4 layers? Do you envisage developing multi-layered architecture? Or something else?
* Does your system have an API to access its functions and data? Are you planning to develop such an API? Why?
* Can you imagine that your system would work primarily as a basis for the customer’s internal UI? Only administrators would directly work with it.

## Data layer

How is the data layer designed in your system?

* Does it have a classical fixed relational DB bound by logic, is it based on a model-driven approach (logic running over its own conceptual model), or designed in another way?
* Is the data layer system ready for customization (new types of data, structural change, etc.)?
* If the data layer can be configured, in what way? In a program (client/supplier), with metadata (XML, etc.), or in the UI?

## System API

* Is/Will be your system developed with an open API, or are you planning to implement a custom-made API for the customer? Why?
* What part of the functionality can be controlled purely through the API? Reading and writing? Can be the API used to handle more complex processes (financial control, etc.)? How do you ensure continuity (e.g. when termination of the financial control leads to an event, can it be recorded via the API)? Can the API be used to provide the resulting data of the defined sets?
* Do you focus rather on ready-made solutions to meet the customers’ needs, or is the API designed to allow the customers to build their own advanced functions on it?
* What technologies for APIs do you support? Is there a SDK for your API? For which programming languages?
* Are you planning to use/do you use the microservices architecture[[1]](#footnote-1)?
* If the system has a scalable data layer, are the changes reflected in the API?

## IT security

* How are the stored data secured? How is the authorization and authentication designed?
* How are the data secured during transmission (e.g. via the API)?
* Can the employees of Masaryk University perform penetration testing and a security audit of a test instance of the system you offer?

## Licensing policy

* Are the system source codes available to the customers using your system?
* Who owns the code designed for a specific customer?
* How is the information system operated? Is it an On-Premise or Software as a Service (SaaS) – Cloud model?
  + For the On-Premise model, please specify the hardware requirements. Is hardware part of the delivery?
  + As for the SaaS model, are there any specific requirements for connectivity or other parts of the customer's infrastructure?

## System integration

Every major organization deals with the integration of heterogeneous systems. We would like to know your opinion on the feasibility and implementability of the INET concept, and we would appreciate your comments, suggestions, ideas, questions and practical experience.

1. <https://en.wikipedia.org/wiki/Microservices>, <http://www.martinfowler.com/articles/microservices.html> [↑](#footnote-ref-1)