# INCEPTION REPORT

## Strengthening Health Statistical Information System and Its Harmonization with EU Requirements

## Information System of Health Indicators

## Contract No: 200300499503-0601-0003

Elaborated by:
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SOFTEC

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**Approval by Recipient's project manager**

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## Used abbreviations

| Abbreviation | Description |
|---|---|
| ASCII | American Standard Code for Information Interchange |
| CCTA | Central Computer and Telecommunications Agency |
| CFCU | Central Finance and Contract Unit |
| CIU | Collection of Intelligence Units |
| CRHCP | Central Register of Health Care Providers |
| CRMS | Central Register of Medical Staff |
| CSV | Comma Separated Value |
| DMZ | Demilitarized Zone |
| DRY | Don't Repeat Yourself |
| EU | European Union |
| GUI | Graphical User Interface |
| HCP | Health Care Provider |
| HINC | Health Information National Centre |
| IHIS | Institute of Health Information and Statistics |
| ISHI | Information System of Health Indicators |
| ISO | International Organisation for Standardisation |
| IU | Intelligence Unit |

| Abbreviation | Description |
|---|---|
| J2EE | Java 2 Platform Enterprise Edition |
| LAN | Local Area Network |
| MIS | Managerial Information System |
| MS | Microsoft |
| ODBC | Open Data Base Connectivity |
| OECD | Organisation for Economic Cooperation and Development |
| OLAP | Online Analytical Processing |
| OMG | Object Management Group |
| PPN | Public Private Network |
| SAD | Small Auxiliary Database |
| SR | Slovak Republic |
| SR-MH | Ministry of Health of the Slovak Republic |
| STN EN ISO | Slovak Technical Standard for the Quality Control System |
| SW | Software |
| UML | Unified Modelling Language |
| WHO | World Health Organisation |
| XLS | Microsoft Excel File Format |
| XML | Extensible Markup Language |

# 1. Summary for the Management

The aim of the project Information System of Health Indicators (hereinafter referred to as ISHI) is to develop the information system to support the standardized process of meeting demands for new health indicators. ISHI shall standardize and automatize the whole process of acquisition of necessary data, via statistical forms and reports, appropriate data storage, calculation of health indicators, provision of indicators data in the form required by international and domestic institutions and analysts from the respective fields. To achieve this, following steps are to be done:

- Development of the information system in the steps requirements analysis, system design, programming and internal testing in the environment of the SOFTEC company.
- Implementation of developed information system in recipient's environments (IHIS and SR-MH) and acceptance testing of the information system functionality during a pilot operation in the recipient's environment.
- Delivery of system and user documentation of the information system.
- Training of administrators, operators and trainers of the information system.
- Delivery of the system.

## 1.1. Document objective

The present document shall outline goals of the ISHI project, detailed plan of project solution, project deliveries, procedures and methods used during project solution and acceptance of project deliveries.

## 1.2. Project scope

Scope of the project was defined by the ISHI requirements indicated in conditions of public procurement and the solution of requirements was proposed in the provider's accepted offer.

Within ISHI requirements analysis, current process context of procedures to be partially or fully supported by ISHI, has been investigated and requirements of ISHI recipients have been adjusted to the current state of knowledge and to recipient's expectations.

List of adjusted system requirements is included in the document "ISHI Requirements Analysis" which is delivered to the recipient together with this inception report. The amended document ISHI Requirements Analysis based on recipients comments shall define a binding list of requirements to the system and to the way of satisfying the requirements by system architecture and functionality. The list of requirements resulting from the amended document ISHI Requirements Analysis based on recipients comments is shown in the Annex No. 1 to this report ISHI list of requirements.

Scope of project outputs is defined in Chapter 4 Project.

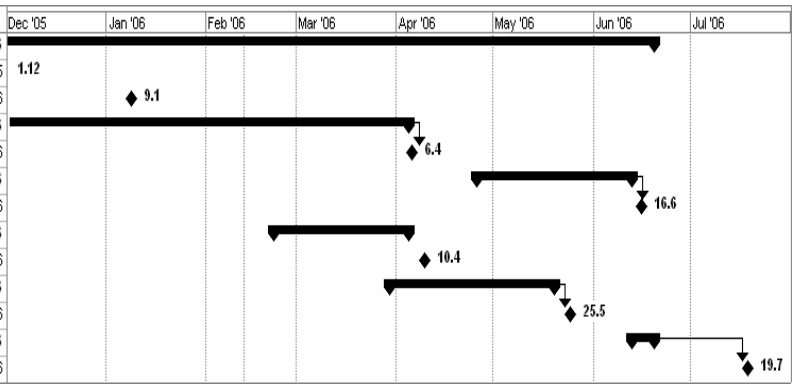
## 1.3. Project stages

Detailed project plan is described in Chapter 3.3 Detailed project working plan .

Administrative start of the project commenced on 01. 12. 2005.
Protocol handover of the fulfilment of the ISHI project contract objective is planned on 19. 06. 2006.

Main project stages are as follows:

| ID | Úloha | Trvanie | Začiatok | Koniec |
|---|---|---|---|---|
| 1 | **ISZI** | **137 d** | **Thu 1.12.05** | **Mon 19.6.06** |
| 2 | *Administrative start of the project* | 1 d | Thu 1.12.05 | Thu 1.12.05 |
| 3 | ***Inception report*** | 1 d | Mon 9.1.06 | Mon 9.1.06 |
| 4 | **Development of SW solution** | **86 d** | **Fri 2.12.05** | **Tue 4.4.06** |
| 20 | ***Interim report after development of SW solution*** | 1 d | Thu 6.4.06 | Thu 6.4.06 |
| 21 | **Implementation and testing** | **32 d** | **Wed 26.4.06** | **Mon 12.6.06** |
| 26 | ***Interim report after implementation and testing*** | 1 d | Fri 16.6.06 | Fri 16.6.06 |
| 27 | **Documentation elaboration** | **30 d** | **Wed 22.2.06** | **Tue 4.4.06** |
| 30 | ***Interim report after documentation elaboration*** | 1 d | Mon 10.4.06 | Mon 10.4.06 |
| 31 | **Training** | **33 d** | **Thu 30.3.06** | **Fri 19.5.06** |
| 36 | ***Interim report after training*** | 1 d | Thu 25.5.06 | Thu 25.5.06 |
| 37 | **Handover** | **5 d** | **Tue 13.6.06** | **Mon 19.6.06** |
| 41 | ***Final report*** | 1 d | Wed 19.7.06 | Wed 19.7.06 |




Project stages Development of SW solution and Implementation and testing follow each to other. After completion of each of them, preliminary report is to be elaborated. According to general contract conditions, the following stage may be started upon the approval of preliminary report of the preceding stage. The stage Implementation and testing shall follow after the stage Development of SW solution is finished and the respective interim report approved.

## 1.4. Project monitoring

Monitoring of the project advance shall be done by supervision of all tasks included in the matrix of deliveries and in the detailed project plan.
The project works progress shall be submitted in the form of preliminary reports of project status after the individual project stages are finished.

## 1.5. Project closing

The project shall be objectively closed at the stage Project handover.

The project shall be administratively closed upon approval of the project Final report.

# 2. Introduction

## 2.1. Recipient's intention and goals

A basic goal of the Institute of Health Information and Statistics (hereinafter referred to as IHIS) is the development of material and professional basis to provide development of health informatics and statistics in the Slovak Republic.

Within the project "National Health Data Centre" with a project solver being the company STAPRO, s. r. o. , which was part of the 2003 – 2005 project of the World Bank carried out at the SR-MH, it is required to establish institutions at the Department of the Ministry of Health which would provide acquisition and analysis of key data with respect to the support of strategic decisions and control at the Ministry as well as at the intermediate administration elements level – hospitals, outpatient clinics, medical facilities, higher territorial units.

IHIS shall have the function of the national centre of health information. Within this function, IHIS will be a partner to equivalent EU institutions abroad (EUROSTAT, WHO, OECD).

To fulfil the function of the national centre of health information successfully, harmonization of health indicators was realized according to foreign institutions – a workgroup constituted from SR-MH, IHIS representatives and foreign experts within the project Twinning Light No. 2003-004-995-03-06. A result of the workgroup activity, harmonized set of health indicators was attached to public procurement documents in the SAD database as at the end of the year 2004.

The goal of the ISHI project is to standardize the realization process of health indicators data requirement. To standardize and automatize individual activities in the process of acquisition of necessary data, via statistical forms and reports (input through defined standard interfaces in XML, XLS, CSC formats, forms also over the Web interface), appropriate data storage, calculation of health indicators, indicators output. To make calculated indicators available to users in internal IHIS and SR-MH environments for analysis; for users in external environment to provide indicators in the form of predefined reports (in Slovak and English) as well as in the form of dynamically defined data interfaces (in XML, XLS formats).

## 2.2. Project goals and strategy

Within the ISHI project, the SOFTEC company shall provide requirements analysis, develop software solution which will be implemented in recipients environment, perform acceptance testing according to prepared testing plan in this environment, deliver system (operation) and user (instruction) documentation and train administrators, operators and instructors.

The project shall be controlled by the well-proven SOFTEC methodology being a guarantee of successful fulfilment of goals and expected results.

The ISHI project goal is to create a modern information system of health indicators which would allow:

- To define health indicators required by EUROSTAT. To provide solution of data input, appropriate storage, calculation of indicators and output reporting according to the EU statistical requirements.
- To provide data input to calculate indicators from statistical filled forms based on dynamically defined interfaces through import of files in standard formats CSV, XLS, XML as well as over the Web interface by primary data providers.
- To store any information required for the health indicators calculation.
- To provide several mechanisms of access to stored data and for individual analysis: printed reports in English and Slovak exactly reflecting defined requirements, export of data files in defined structure based on dynamically defined interfaces, display of data on workstations for users at IHIS and SR-MH.

# 3. Project working plan

## 3.1. Project stages

Fulfilment of the contract objective is divided into four development stages:

- ✓ Development of SW solution
- ✓ Implementation and testing
- ✓ Documentation elaboration
- ✓ Training

and single handover stage:

- ✓ Handover

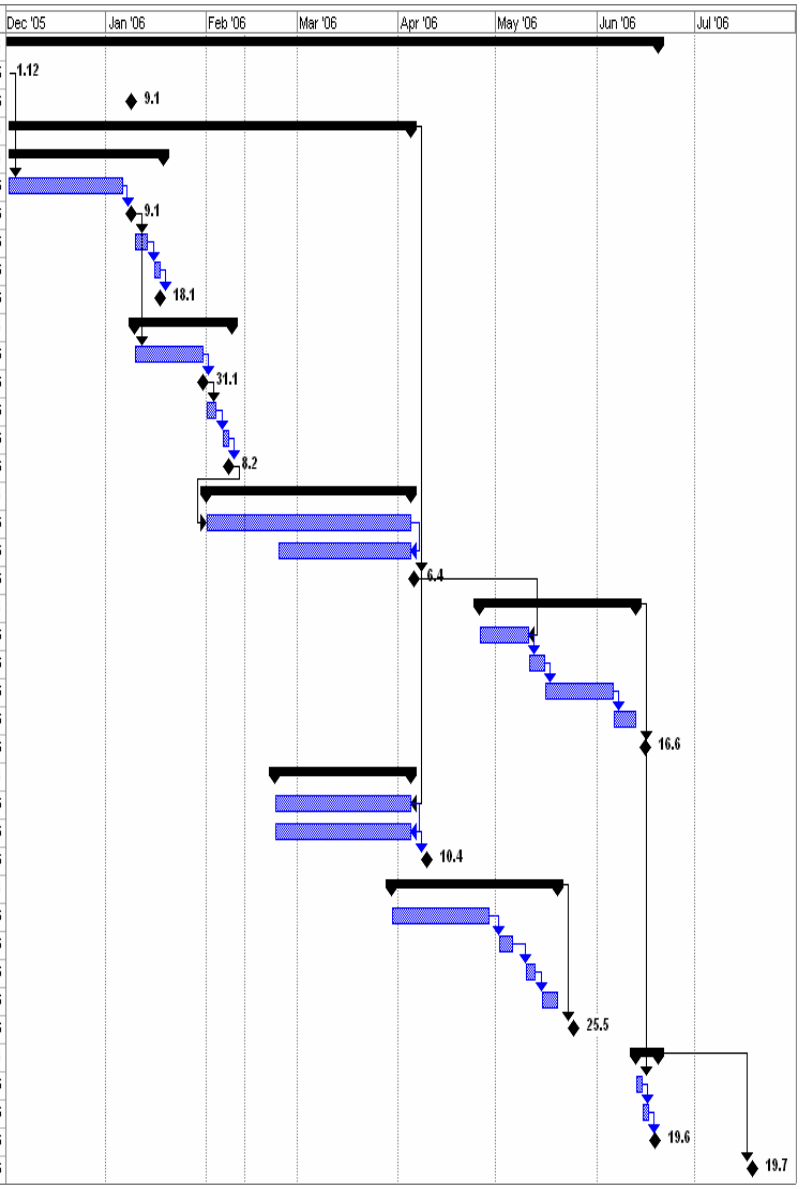
Project working plan is detailed in Chapter 3.3.

## 3.2. Project monitoring

Project monitoring shall be realized by the monitoring of all tasks included in the detailed project plan and in the delivery matrix. Progress of work shall be submitted in the form of interim reports on project fulfilment after each development stage is finished. After project closing, the final project report is to be elaborated.

# 3.3. Detailed project working plan

| ID | Úloha | Trvanie | Začiatok | Koniec |
|---|---|---|---|---|
| 1 | **ISZI** | **137 d** | **Thu 1.12.05** | **Mon 19.6.06** |
| 2 | *Administrative start of the project* | 1 d | Thu 1.12.05 | Thu 1.12.05 |
| 3 | ***Inception report*** | 1 d | Mon 9.1.06 | Mon 9.1.06 |
| 4 | **Development of SW solution** | **86 d** | **Fri 2.12.05** | **Tue 4.4.06** |
| 5 | **Analysis** | **32 d** | **Fri 2.12.05** | **Wed 18.1.06** |
| 6 | Requirements analysis | 24 d | Fri 2.12.05 | Thu 5.1.06 |
| 7 | Delivering Requirements analysis | 1 d | Mon 9.1.06 | Mon 9.1.06 |
| 8 | Examining Requirements analysis | 4 d | Tue 10.1.06 | Fri 13.1.06 |
| 9 | Amending Requirements analysis | 2 d | Mon 16.1.06 | Tue 17.1.06 |
| 10 | Delivering Requirements analysis amended | 1 d | Wed 18.1.06 | Wed 18.1.06 |
| 11 | **Design** | **22 d** | **Tue 10.1.06** | **Wed 8.2.06** |
| 12 | System design | 15 d | Tue 10.1.06 | Mon 30.1.06 |
| 13 | Delivering System design | 1 d | Tue 31.1.06 | Tue 31.1.06 |
| 14 | Examining System design | 3 d | Wed 1.2.06 | Fri 3.2.06 |
| 15 | Amending System design | 2 d | Mon 6.2.06 | Tue 7.2.06 |
| 16 | Delivering System design amended | 1 d | Wed 8.2.06 | Wed 8.2.06 |
| 17 | **Programming** | **45 d** | **Wed 1.2.06** | **Tue 4.4.06** |
| 18 | Software solution development | 45 d | Wed 1.2.06 | Tue 4.4.06 |
| 19 | Internal testing | 29 d | Thu 23.2.06 | Tue 4.4.06 |
| 20 | ***Interim report after development of SW solution*** | 1 d | Thu 6.4.06 | Thu 6.4.06 |
| 21 | **Implementation and testing** | **32 d** | **Wed 26.4.06** | **Mon 12.6.06** |
| 22 | Implementation and testing plan elaboration | 9 d | Wed 26.4.06 | Wed 10.5.06 |
| 23 | SW solution implementation | 3 d | Thu 11.5.06 | Mon 15.5.06 |
| 24 | Testing during pilot production | 15 d | Tue 16.5.06 | Mon 5.6.06 |
| 25 | Pilot production evaluation and amending | 5 d | Tue 6.6.06 | Mon 12.6.06 |
| 26 | ***Interim report after implementation and testing*** | 1 d | Fri 16.6.06 | Fri 16.6.06 |
| 27 | **Documentation elaboration** | **30 d** | **Wed 22.2.06** | **Tue 4.4.06** |
| 28 | System documentation | 30 d | Wed 22.2.06 | Tue 4.4.06 |
| 29 | User documentation | 30 d | Wed 22.2.06 | Tue 4.4.06 |
| 30 | ***Interim report after documentation elaboration*** | 1 d | Mon 10.4.06 | Mon 10.4.06 |
| 31 | **Training** | **33 d** | **Thu 30.3.06** | **Fri 19.5.06** |
| 32 | Training preparation | 20 d | Thu 30.3.06 | Fri 28.4.06 |
| 33 | Administrators training | 4 d | Tue 2.5.06 | Fri 5.5.06 |
| 34 | Operators training | 3 d | Wed 10.5.06 | Fri 12.5.06 |
| 35 | Instructors training | 5 d | Mon 15.5.06 | Fri 19.5.06 |
| 36 | ***Interim report after training*** | 1 d | Thu 25.5.06 | Thu 25.5.06 |
| 37 | **Handover** | **5 d** | **Tue 13.6.06** | **Mon 19.6.06** |
| 38 | SW solution reimplementation | 2 d | Tue 13.6.06 | Wed 14.6.06 |
| 39 | Closing protocol handover | 2 d | Thu 15.6.06 | Fri 16.6.06 |
| 40 | Closing handover of SW solution and documentation | 1 d | Mon 19.6.06 | Mon 19.6.06 |
| 41 | ***Final report*** | 1 d | Wed 19.7.06 | Wed 19.7.06 |



# 4. Project outputs

Following deliveries will be realized within the ISHI project[1].

## 4.1. Overview of deliveries

| ID | Name | Contents | Deadline |
|---|---|---|---|
| **1** | Inception report (document) | Detailed working plan including list of activities and time schedule of the contract performance.<br>Identification of potential risks, limits, requirements and list of persons intended for the contract performance by SOFTEC, if already known.<br>Conclusions resulting from the analysis of current state.<br>Clear defined functions of designed system of the software application of health indicators according to the SOFTEC's offer to ISHI.<br>Detailed design of working plan of the contract performance including detailed description of project stages, procedures, rules and methods applied during the contract performance with exact definition of contents and acceptance of processes for each provided procurement object. | 09.01.2006 |
| **2** | Preliminary report (document) | Important information of works progress allowing check of tasks fulfilment resulting from the working plan of the inception report.<br>Identification of important modifications, problems and ways of solutions arisen in the course of contract performance. | Within 5 workdays after closing of each stage |
| **3** | Final report (document) | Realization summary of the contract performance.<br>Strong and weak points of the project.<br>Effectiveness of project application and project efficiency.<br>List of seminars and meetings (if appropriate).<br>Critical study of main problems (also operation-related) with recommendation how to avoid future similar situations. | Within 30 days after handover of contract performance objective |
| **4** | Requirements analysis (document) | Reconsidering of system requirements, requirements for international reporting, identification and description of relevant processes, data formats and tools, information resources and contents, future system users with their specific needs and abilities, evaluation of available infrastructure of hardware environment. | 09.01.2006 |
| **5** | Requirements analysis amended (document) | same as ID 4 | 16.01.2006 |
| **6** | System design (document) | ISHI architecture design including design of databases replication between IHIS and SR-MH, elaboration of data model which will include health indicators data, as well as necessary metadata.<br>Functional description of Web application, menu system of internal application, definition of interfaces, defining the control set of indicators and its subset whose metadata will be filled by SOFTEC, satisfying requirements of the requirements analysis by designed system functionality and initial metadata. | 31.01.2006 |
| **7** | System design amended (document) | same as ID 6 | 08.02.2006 |

[1] In the description of deliveries, used terms recipient, customer, provider, project manager are defined in section 10.1 Project management.

| ID | Name | Contents | Deadline |
|---|---|---|---|
| **8** | Implementation and testing plan (document) | Time schedule of SW solution installation, databases and metadata filling.<br>Testing scenarios, acceptance criteria of the SW solution, plan of acceptance testing during pilot operation. | 10.05.2006 |
| **9** | Training of administrators, operators, trainers and system users | Training of all types of staff including delivery of related documentation.<br>Technical documentation will include:<br>✓ architecture description,<br>✓ description of conceptual and physical system design,<br>✓ description of database structure,<br>✓ description of metadata and mechanism of application,<br>✓ technical description of defined indicators and OLAP cubes.<br>Administrator documentation will include system administration manual and manual of system filling by other metadata, new indicators, new input forms and interfaces.<br>User documentation will include system user manual also available on-line when using the application. | 02.05.2006 – 19.05.2006 |
| **10** | Handover of the contract performance object to customer. | Under presence of recipient's project manager and customer, SOFTEC performs acceptance and control tests. Upon handover of the contract performance objective SOFTEC shall submit results of executed tests providing fulfilment of requirements of realized contract performance to recipient's project manager. | 16.06.2006 |
| **11** | Protocol handover of project solution (SW product + documentation) | Developed SW solution on CD carrier in two identical copies.<br>Developed SW solution shall be delivered in the form allowing eventual further modification.<br>Installation tools for the developed SW solution shall be part of the delivery.<br>System (operational) documentation in two identical printed copies and in two identical electronic copies for any partial documentation.<br>User (instruction) documentation in two identical printed copies and in two identical electronic copies for any partial documentation. | 19.06.2006 |

Reports are project administration deliveries, other deliveries are of objective character.

Takeover and approval of administration project delivery including items 10 and 11 shall be confirmed by recipient's and provider's project manager upon signing the reports and completion certificate with indication of takeover and approval date.

Takeover of other project deliveries shall be confirmed by recipient's and provider's project leader upon signing the completion certificate with indication of handover date. One copy of completion certificate of other project deliveries shall be given to recipient's project manager (SR-MH).

Completion certificates shall be elaborated in three copies: one copy is given to customer, recipient and provider.

## 4.2. Process of orders acceptance

| ID | Order name | Process of order acceptance |
|---|---|---|
| **1** | Inception report (document) | By approval of recipient's project manager.<br>The submitted report can be either approved or not approved by recipient's project manager through presenting of written comments on the report with the requirement of report amendment within 15 days since the date of report submission. If no opinion on report is delivered by recipient's project manager within 45 days since the date of report submission, the report shall be regarded as approved.<br>If the report is approved or not approved by recipient's project manager after 15 days since the date of report submission and according to time schedule and the start of certain stage depends on the report approval, provider is not on default, if the real start of the respective stage and other stages depending on the respective stage is postponed by the number of days equal to the period between15-th day since the report submission and the date of the report approval or disapproval through presenting of comments on the report by recipient's project manager. |
| **2** | Preliminary report (document) | same as ID1 |
| **3** | Final report (document) | same as ID1 but the period for submission of project manager's opinion on the report is 30 days instead of 15 days. |
| **4** | Requirements analysis (document) | Provider presents the contents of the document Requirements analysis to recipient's project solvers at a special meeting being a place of discussion of respective document issues, and makes an agreement on those issues. Recipient shall deliver comments to provider within terms set out in the detailed project working plan. |
| **5** | Requirements analysis amended (document) | Upon signature of completion certificate by the recipient's project leader. |
| **6** | System design (document) | Provider presents the contents of the document System design to recipient's project solvers at a special meeting being a place of discussion of respective document issues, and makes an agreement on those issues. Recipient shall deliver comments to provider within terms set out in the detailed project working plan. |
| **7** | System design amended (document) | Upon signature of completion certificate by the recipient's project leader. |
| **8** | Implementation and testing plan (document) | Upon signature of completion certificate by the recipient's project leader. |
| **9** | Training of administrators, operators, trainers and system users | Upon signature of completion certificate of delivery of training attendance lists. |
| **10** | Protocol acceptance of the contract performance object. | Upon signature of acceptance protocol by recipient's project leader immediately after fixing all registered critical issues of the contract performance objective (those preventing the product from utilization).<br>Other issues shall be removed within warranty period not later than 30 days since protocol acceptance of the contract performance objective. |
| **11** | Protocol handover of project solution (SW product + documentation) | Upon signature of handover protocol. |

Acceptance protocol (item 10) shall be elaborated in three copies: one copy is given to customer, recipient and provider.

# 5. Requirements and limits

Project realization requires fulfilment of customer's necessary requirements and creates certain limits.

## 5.1. Requirements laid on Recipient

- ✓ Close cooperation of recipient's staff during requirements analysis and system design.
- ✓ Keeping deadlines according to project working plan. Especially, amendment procedure of individual outputs and their acceptance are concerned.
- ✓ Continuous operative providing relevant information by individual field experts during design and development of software solution.
- ✓ Providing data consistency and defining data range for Central register PZS and Central register of medical staff, by migration of which register data in the new system will be initially filled not later than 30 days since the closing of the stage Development of SW solution.
- ✓ Preparation of necessary HW and infrastructure, provision of infrastructure and necessary cooperation to establish training centre as well as environment for pilot operation and routine operation within terms set out in the project working plan.
- ✓ Specification of the staff responsible for making requirements of change before the start of pilot operation and arrangement of their participation in the ECHO application training course (application of the SOFTEC company for monitoring and entering user issues).
- ✓ To comment on records from analytic and design meetings within two workdays since the delivery by provider.
- ✓ Information necessary for the document System design shall be submitted to IHIS at least 10 days prior to handover date indicated in the detailed project working plan.
- ✓ Recipient shall provide standard administration of ISHI operation and database system at his own cost.

## 5.2. Limits

- ✓ Thin web client gives certain limits in the application design as well as in application logics.
- ✓ Metadata-based register administration is very complex, less intuitive from the user perspective and requires trained users.

# 6. Solution description (contract)

## 6.1. ISHI Key properties

Documents of the public procurement for the development of information system of health indicators defined list of ISHI requirements. From the viewpoint of system architecture, following properties are the most important ones:

1. Flexible and parametric system with modular conception.
2. System of three-layer architecture on the J2EE platform by using thin client on the basis of a web browser.
3. Securing the information.
4. Considering existing hardware and software.
5. Automatization of processes of statistical data acquisition, processing, evaluation and output for other organizations to the maximum extent.

The aim of the submitted design is to fulfil of all requirements laying emphasis on maximum quality and optimality of the solution.

Basic precondition of achievement of system stability and robustness is to derive functions from primary processes to be supported by the system. High flexibility and parameterization (external criteria) is to achieve by modular structure (internal criterion), which utilizes modern techniques allowing further increase in flexibility and parametrization. In our solution, we design subsystems supporting data acquisition processes, their processing and providing to other organizations. Subsystems are designed with minimum number of links (loose coupling), thereby allowing flexibility.

Design of analytic models is a tool considerably supporting flexibility. Within our solution, we assume design of such models in the graphic specific UML language. Flexibility and parameterization at a lower level is to be achieved by high-quality object-oriented design utilizing design patterns and components which is also supported by application of top programming tools allowing object-oriented and component programming. Such object-oriented and component design with indication of sites of high flexibility degree can be done after the realization of detailed functional model. Excellent possibilities for the component development are provided by the J2EE standard.

Systems with J2EE–based three-layer architecture using thin client on the basis of a web browser currently represent the most progressive top technology in information systems architecture. In our design, we describe the solution for such architecture, which is based on three layers – database layer (back end), application layer and presentation layer. Database layer which consists of the database control system provides centralized storage of application data. Moreover, it includes selected part of application logics providing data consistency, user access rights and optimisations enhancing application performance. Application layer includes own system functionality based on object-oriented principles utilizing Java language and J2EE technologies. Presentation layer is also based on J2EE technologies on the server side, which allows fulfilment of thin client requirement based on standard web browsers. Standardization of user interface and decrease in the level of application maintenance of client workplaces is thereby attained.

Standard web browsers can be used at client workplaces (staff at SR-MH, IHIS, and medical facilities).

Centralized architecture accessible through Internet represents a very progressive solution which is however, also very security-demanding. Along with standard security requirements (especially authentication, allocation of access rights), communication security and protection against outer attacks from the Internet are required. To effectively protect ISHI against outer attacks from the Internet we assume to create a special demilitarized zone isolated from the Internet and LAN by firewall. Demilitarized zone includes a portal which is isolated and protected against external (internal) users by protocol firewall. Described topology decreases the risk of penetration into local networks of SR-MH and IHIS.

Requirement of utilization of existing hardware and software is one of the key preconditions of public procurement, which was fulfilled from our side to the maximum extent. Within the solution design, we assume SR-MH an IHIS server and databases utilization as specified in the Annex 6 of public procurement documentation to the Development of information system of health indicators.

## 6.2. Functionality overview

System shall allow indicators storage and description.

For data import, input interfaces will be de defined through which the system will be filled by provider's data. By analogy, output interfaces will be defined to transform outputs into the form required by e.g. EUROSTAT, OECD, WHO.

Printed reports will be defined in the system. Input and output interfaces will support ASCII, CVS, XLS, XML formats.

Web interface will be also an input, by which input forms can be filled by the staff of intelligence units.

System will allow defining forms (statistical reports) and their modules at the meta level.

System will support several ways of data acquisition: filling of forms through web interface by data providers via Internet or other staff and file import in defined formats.

System will support management of acquisition of provider's data. Based on the defined periodicity, data acquisition plan will be elaborated. Moreover, records of provided data of any provider will be allowed. User access to data in filled forms (e.g. by provider) through user interface will be enabled.

System will allow analyzing provider's data. We assume the most used functions will be displaying of indicators according to selected indicator dimensions, value aggregation, filtering, graph representation and printing.

System will provide generation of reports (e.g. printed reports, files in required format) for data recipients (e.g. EUROSTAT, OECD).

System will support tracking and maintenance of users and user groups, allocation of user rights to individual users and user groups, backups, replication and administration of certificates and encryption. Emphasis will be laid on system security.

## 6.3. System architecture

ISHI shall be realized by using two independent applications:

- ✓ ISHI web application for management of indicators, input and output interfaces, other metadata, data import and input, preparation of reports and system administration.
- ✓ Analytic application used for statistical data analysis.

Applications are divided into subsystems, whereas each subsystem covers a special functional area. Subsystems are not isolated and independent; they represent logic system organization according to areas. Modularity is the key factor to achieve transparency and flexibility of the information system.

### 6.3.1. ISHI Web application

From the user's viewpoint, the system is regarded as a group of interconnected web pages. We support uniform graphic design of the whole system which is based on division of the webpage into several sections.

Each page section integrates homogeneous information featuring the same navigation:

**Header** – contains title, logo and other elements according to professional graphical design, the part of which can be a menu with basic navigation and information links for general purposes. Header will be shown in the upper part of all application pages.

**Left menu** – contains list of system items (functions), hierarchically sorted according to their contents. By running the menu item, selection from subthemes is displayed or data into central space are loaded. Left menu is displayed on all pages in the left part below the header.

**Information block** – it can contain a search tool or other information. Contents of information blocks will be specified in the course of system design and detailed analysis. Information block will be displayed on all pages in the right part below the header.

**Central space** – it will contain objective information for the user and related controls. In the top part, navigation path which displays nesting level and helps to find orientation in complex information, will be shown. Type of information and navigation elements will be displayed depending on user navigation through header or left or right menu. Central space will be displayed in the centre of any page.

**Footer** – it will contain copyright information and some useful links of general character.

Detailed view of ISHI pages including corresponding colour scale will be designed during system realization by a professional graphic designer. As an illustration, general schematic division of the webpage into basic sections and navigation areas are shown.


Fig. 1 General schematic partition of the webpage.

## 6.3.2. Analytic application

Analytic application represents the main tool for analyzing statistical data.

Data will be stored in the format typical for Managerial Information Systems (MIS).

Because of that format, ISHI can provide the staff with complex information being necessary for the process. This system provides to users perspectives of view (dimensions) to selected indicators, which allow gaining useful information for their activity. Provision of indicators and perspectives of view is enabled only due to multidimensional modelling. Methodology of creation of multidimensional models is based on special schemes suitable for provision of data for decision-making support.

By applying these methods and procedures during ISHI development, simple data access, provision of detailed or aggregated data, building operative outputs (ad hoc analyses) with various view perspectives of individual indicators, predefined reports and graphs are enabled.

Due to standard data format, any OLAP analytical tool can be applied for analysis. With respect to procurement conditions, we recommend to use MS Excel as an analytical tool, due to its availability for all users without necessity to purchase other products. MS Excel includes broad range of OLAP functions for the work with data warehouse.

MS Excel OLAP functions allow:

- ✓ to display individual indicators by any indicator dimensions,
- ✓ to aggregate indicators values by those dimensions,

- ✓ to specify dimensions placement (horizontal and vertical),
- ✓ to filter and sort values,
- ✓ to show indicators plotted in graphs,
- ✓ to print defined tables and graphs.

Following samples show some MS Excel OLAP functions.

| | A | B | C | D | E |
|---|---|---|---|---|---|
| 1 | Drop Page Fields Here | | | | |
| 2 | | | | | |
| 3 | Sum Of UDAJ | | OBDOBIE | | |
| 4 | KRAJ_TEXT | OKRES_TEXT | 2002 | 2003 | Grand Total |
| 5 | Banskobystrický kraj | Okres Banská Bystrica | 127194 | 103046 | 230240 |
| 6 | | Okres Banská Štiavnica | 32613 | 25116 | 57729 |
| 7 | | Okres Brezno | 119798 | 90005 | 209803 |
| 8 | | Okres Detva | 95837 | 79474 | 175311 |
| 9 | | Okres Krupina | 181764 | 135319 | 317082 |
| 10 | | Okres Lučenec | 217635 | 185934 | 403569 |
| 11 | | Okres Poltár | 114811 | 95156 | 209967 |
| 12 | | Okres Revúca | 72843 | 73012 | 145855 |
| 13 | | Okres Rimavská Sobota | 442016 | 379995 | 822011 |
| 14 | | Okres Veľký Krtíš | 1110279 | 887755 | 1998034 |
| 15 | | Okres Zvolen | 174824 | 119288 | 294112 |
| 16 | | Okres Žarnovica | 35299 | 26460 | 61759 |
| 17 | | Okres Žiar nad Hronom | 95074 | 64367 | 159441 |
| 18 | Banskobystrický kraj Total | | 2819986 | 2264927 | 5084913 |
| 19 | Bratislavský kraj | | 1018741 | 939611 | 1958352 |
| 20 | Košický kraj | | 2009587 | 1726590 | 3736177 |
| 21 | Nitriansky kraj | | 5752345 | 5522343 | 11274688 |
| 22 | Grand Total | | 11600659 | 10453471 | 22054130 |
| 23 | | | | | |

Fig. 2 Sample of analytical OLAP application

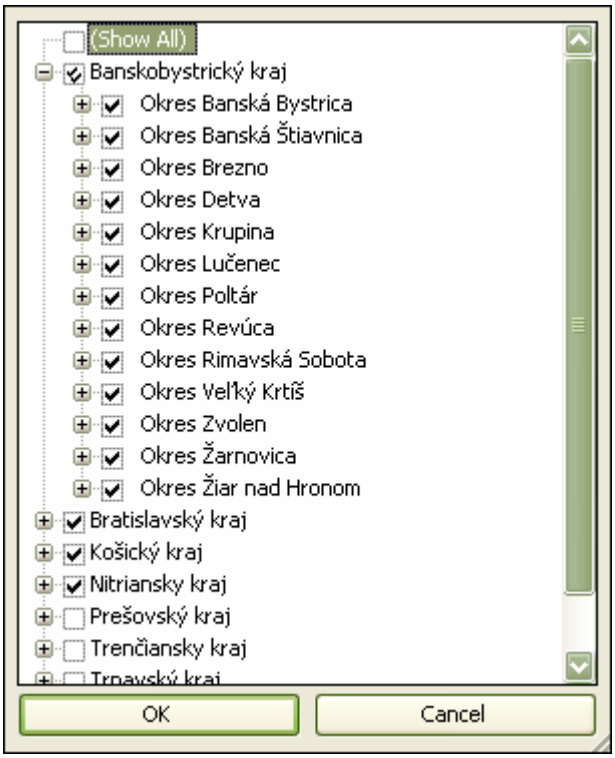


Fig. 3 Illustration of display and filtering by hierarchical dimensions

## 6.4. ISHI Subsystems

Individual activities handled by applications shall be divided into subsystems. Organization of subsystems is shown in Fig. 4. Individual subsystems are described in detail in this Chapter.

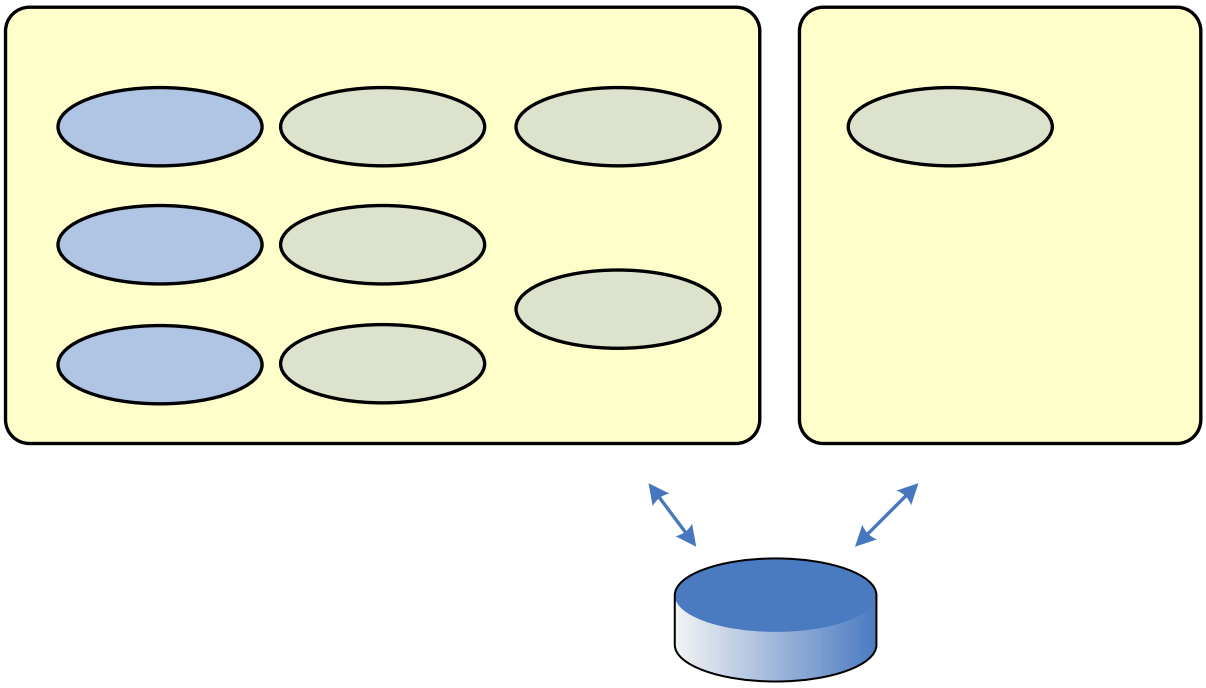


Fig. 4 ISHI subsystems and their relation to applications

### 6.4.1. Metadata management subsystems

**Indicator definitions**

Subsystem shall provide indicators storage and description. Indicators systemization, way of aggregation, definition of the calculation method, components the indicator consists of, data availability and list of organizations requiring the indicator. This subsystem will be accessible for internal users.

System will store individual characteristics of particular indicator, its Slovak and English name, topic domain and systematic indicator category belong to basic ones. Within such indicator, aggregation criteria by certain parameters (e.g. regions, gender, and age groups) can be entered. For each indicator, mathematical formula will be defined to calculate the respective indicator. Indicator can consist of other indicators. Such indicators[2] will be used in the formula and enter mathematical operations. For each indicator, relation to other indicators, periodicity of its recalculation and the period of its availability may be defined. List of recipient (international) organizations will be assigned to each indicator.

**Interface definitions**

By using this subsystem, following interfaces are defined:

- ✓ input interfaces for system filling by providers data,
- ✓ output interfaces for transforming outputs into form required by recipients of processed statistical data (e.g. OECD, WHO),

[2] In the SAD database the term “Component,“ which has the meaning of single indicator in ISHI, is used.

- ✓ output interfaces in the form of printed reports,
- ✓ data transformation and mapping between input and output data format (ASCII, CVS, XLS, XML formats) and structure of form data in the system.

Web interface is also regarded as the input interface by which providers may fill the forms. Form screens to be filled in through the web interface are generated automatically based on the form definition in the subsystem Data gathering management.

**Form definitions**

Form definitions (statistical reports) and their modules at the meta-level is a part of this subsystem. Modules consisting of individual items are also defined within this subsystem. To each item, limits of data available (number, string, enumeration/list value) for the respective item are assigned.

### 6.4.2. Data gathering subsystems

There will be three ways of input of data in the system:

a) Providers fill the forms over the Internet through the web interface. In such case, data are stored immediately in the system.

b) Providers send files in defined format to import them in the system. Files may be delivered on electronic carrier or read through web interface.

c) Providers deliver filled forms in print which will be typed in the system by IHIS staff.

Some of the data will be provided by e.g. the National Bank of Slovakia, OECD, and the SR-Statistical Office. Such data will enter the system in an analogical way.

**Data gathering management**

The subsystem shall support data acquisition management from data providers. In this subsystem, relations between providers and forms (statistical reports) are defined; i.e. competency of each provider to fill certain forms. Register of data providers will be also included.

Data acquisition plan will be elaborated based on form metadata, with specified periodicity of acquisition. The subsystem allows checks of data acquisition plan. The subsystem also allows setting the deadlines (alarm clock) of sending the requirement of data delivery to providers, the requirement of provider's notification in the case they failed to provide data within the agreed period etc. Sending the requirements or notification will be handled by the system automatically in the electronic form.

In addition to the acquisition planning, the subsystem provides records of received data from each provider.

Accessibility of data of filled forms by a specific user (e.g. internal user and provider) through the user interface will be part of this subsystem.

**Data import**

The subsystem shall provide data import from providers to the system and its control. Import will be realized through interfaces parametrically defined by using the subsystem Interface definitions. The input data format will be ASCII, CSV, XLS or XML. The subsystem Data import will serve for input of data from providers in electronic files.

**Data input through web interface**

Data filling through the web interface allows providers to download forms data over the Internet and internal users to download forms data over the same interface from the printed forms. Filled data will be stored in the system after respective checks.

### 6.4.3. Subsystems of data analysis and presentation

**Data analysis**

The subsystem provides analysis of data from providers. This subsystem shall be a part of independent analytic application. Only SR-MH and IHIS staff will have access to this subsystem. An analytic OLAP tool being part of MS Excel and accessible for all authorized users will be used for data analysis. Basic functions allow viewing of OLAP cubes defined in the system, display of indicators by selected indicator dimensions, aggregation of indicators values, value filtering, graph presentation, printing etc.

Examples of the subsystem utilization for data analysis are also described in Chapter 6.3.2 Analytic application.

**Report management**

The subsystem shall provide generation of reports (printing reports and files in the required format) for data recipients (e.g. EUROSTAT, OECD). Reports will be generated automatically. Availability of actual data (delivered by providers within set terms) is a precondition of generating reports.

Output will be realized as the printing report in Slovak or English or as the export of data files of defined structure based on dynamically defined interfaces of the subsystem Interface definitions.

Within the subsystem Report management, all created reports containing additional information on time and operator, will be recorded.

### 6.4.4. Other subsystems

**Administration**

The subsystem will serve for system administration and record-keeping of users and user groups and allocation of access rights to individual users and user groups, backups, replication, administration of certificates and encrypting. The subsystem shall include journal of user activities (login) where login level for application functions can be set.

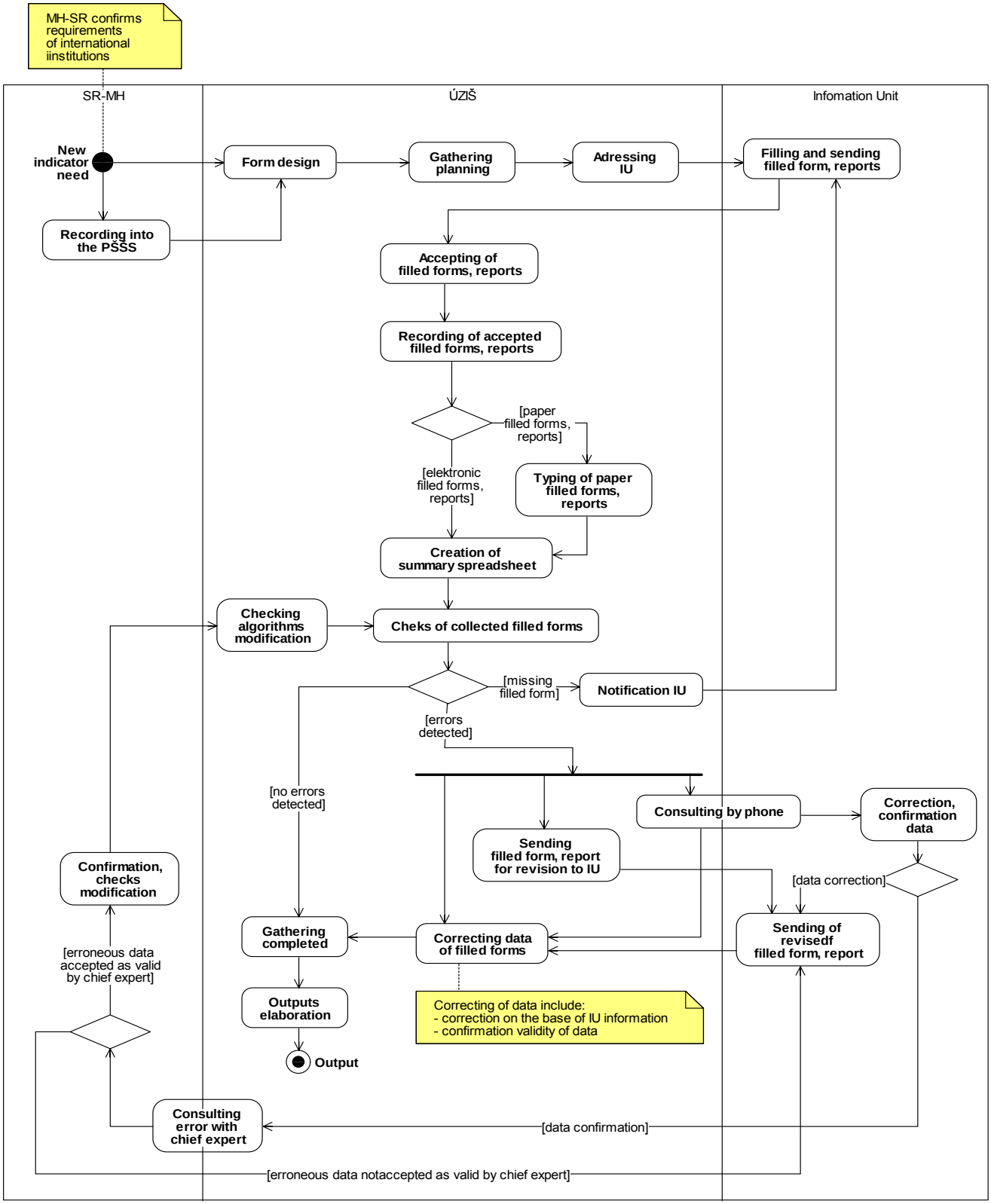
The subsystem allows setting up access rights of users or user groups which are related to system functions. It also allows setting up access rights of users or user groups to application objects for viewing or modifying. E.g. staff responsible for heath indicators from the methodological point of view, will be allowed to modify them (create new indicators, modify and delete). Remaining staff will have access only to view indicators and their definition, without the option to modify them.

Subsystem functionality provides the ability to backup and archive system data for specified period through the user interface. Backuping can be also started automatically.

# 7. Analysis of the current state

## 7.1. System process context

Basic processes implemented within data acquisition and processing and creation of outputs of health indicators are shown in the following diagram and described below.




The whole process is started by the **need to monitor a new health indicator**. Requirement of indicator monitoring can be submitted by Slovak or international organizations authorized by law for

IHIS outputs. Any requirements of monitoring and providing indicators are subject of approval by SR-MH.

Health indicator can consist of single or more components obtained from intelligence units within governmental statistical surveys. If these components are not collected, a new statistical survey **included in the Program of state statistical surveys (PSSS)** is organized.

IHIS shall elaborate **design of the new form** - its modules, module items, organization of items. It develops acquisition method including criterion of intelligence units selection. The acquisition periodicity shall be determined

Further, IHIS shall elaborate the **gathering plan**. The plan shall include exact collection of respective intelligence units indicating the unit names and the time of acquisition.

According to the plan, IHIS shall **address** the **intelligence units**. Such contact shall be made once a year. In the case a new intelligence unit, it shall be addressed on a flexible basis. In line with the addressing forms and methodological instructions are sent. Documents are sent in print as well as electronically.

Information unit shall **fill the report form and send** it back to IHIS. Printed filled forms and reports are sent by regular mail, electronic forms by e-mail.

IHIS accepts **filled forms and reports**.

IHIS shall keep printed records of filled forms. **Each accepted filled form, report** shall be recorded.

All accepted printed filled forms and reports are **typed** by IHIS staff and electronically stored in the system.

All filled forms, reports related to a single gathering are **stored in single** Excel **summary spreadsheet.** They are usually aggregated at the level of districts or regions.

**Checks of collected filled forms** are executed. Filled forms are being checked for the collection of intelligence units. Data checks according to criteria defined in the methodology of surveys, are also performed.

Ideally, no errors are found and data gathering can be closed.

In the case when it is found through comparison of the collection of intelligence units with that of accepted filled forms, that the filled form was not provided by any intelligence unit, IHIS **shall notify the intelligence unit** to do so by the given deadline. Notification shall be in writing in print or by e-mail. If intelligence unit does not respond, it is contacted by phone.

In the case data errors are detected by checks, IHIS staff shall remove them. Based on the error evaluation, the respective operator can directly **correct wrong data**. Such corrections and operator's identification are recorded.

If error data are detected in too many filled forms or too many error data are detected in a single filled form, **the filled forms are sent back to intelligence units for revision**.

Information unit shall provide **revised filled form** or report with repaired errors.

Revised input shall be entered in the summary spreadsheet.

If detected errors are found only in few accepted report forms, IHIS operator **consults** the error data **by phone** directly with intelligence unit.

If intelligence unit finds the data to be erroneous, the respective operator enters the repaired data in the system, but the intelligence unit shall provide revision report.

If intelligence unit confirms correctness of the data detected during the check as erroneous, IHIS **shall consult the error with the chief expert**.

If chief expert confirms validity of control criterion, intelligence unit shall send the revision report or message.

If chief expert accepts data submitted by intelligence unit, he declares the control criterion invalid and **proposes its modification**.

IHIS shall **modify checking algorithm** and repeat execution of checks.

When all filled forms or reports are received in such number that the gathering is declared to be finished closed and data are free of errors, data **gathering is completed**.

Processed data are analyzed and **required outputs are elaborated**.

Processing is completed upon creation of final standard outputs. Comparison of selected standard outputs with foregoing period is one of the ways of the check. This type is important especially for report forms.

## 7.2. Summary of current state analysis conclusions

Current process of data acquisition and processing of statistical reports features several problems to be solved by the designed ISHI.

- ✓ Currently, data of individual filled forms are not stored in uniform structure and single database which makes analytical view of collected data more complicated.
- ✓ No catalog of available data elements exists and therefore, it is not clear in the case of a new indicator requirement, if the indicator can be calculated from existing data or a new survey is necessary, or an existing survey can be modified.
- ✓ With respect to legislative ambiguity of terms medical facility and professional body, these terms are differently interpreted by various administrative institutions which results in problems related to update of the Central register of health care providers (CRHCP) and of the Central register of medical staff (CRMS). This also results in problems during creation of intelligence units set as well as it will be considerable problem for the assumed granularity change of reporting units (transformation from details at the district level to the details at level of professional bodies).
- ✓ Process of CIU establishment and subsequent control of plan realization is not automatized which results in increased workload.
- ✓ Statistical reports are delivered to IHIS usually in print, thus requiring manual typing in the system by IHIS staff.
- ✓ Processing of filled forms and reports is not metadata controlled, which results in modifications of program equipment in the case the form are changed. The same applies for generation of output reports and messages.

Currently, gathering of filled forms in the electronic format is introduced within the new system Universal. Acceptance of the system Universal data in the ISHI system is assumed (after their check and consolidation by the system Universal).

IHIS staff regards as conceptually fixed the part of the future IHIS system - Model reality – with following characteristics:

- ✓ IHIS logically divided Model reality into two parts: Model 1 and Model 2.
- ✓ Central entity of Model 1 (which is referred by the majority of other entities in Model 1) is HCP. Model 1 contains the Central register of HCP (CRHCP), Central register of medical staff (CRMS) and statistical filled forms related to PZS and ZP which not contain personal data.
- ✓ Model 1 is described by the entity-relation diagram and contains a MS Access database partially filled with data.
- ✓ Central entity of Model 2 (which is referred by the majority of other entities in Model 2) is patient or insured person. Currently, Model 2 represents IHIS data of records of hospitalization and of reports – medical registers and registrations. Model 2 is under construction.
- ✓ Agenda Hospital will be a part of Model 2 which is currently in the phase of internal completion in IHIS.

In the ISHI system, SOFTEC shall initialize within the delivery of pilot operation metadata for SAD database indicators, being not regarded by IHIS as current because it contains indicators required by international organizations, which are effective just by the end of 2004. Moreover, no algorithms of calculation from filled forms and reports data are defined. Due to this fact and to the provision of standard tools for the introduction of a new health indicator by ISHI it was agreed that the acceptance criterion of the ISHI project will not be the metadata filling for indicators of the SAD database but indicators of the verification set which will be defined in the document System design. For the sake of pilot operation, metadata of a part of the indicators shall be filled by ISHI staff of the SOFTEC company and of the rest part of indicators by the IHIS staff.

It is acceptable for IHIS to use user-friendly definitions of indicators calculation in most cases. In the remaining cases SQL language will be used.

It is acceptable for IHIS that ISHI provides thick client user interface for internal users in LAN IHIS in the following cases:

- ✓ CRHCP and CRMS – they are crucial for the determination of intelligence liability of individual data acquisitions and specification of the collection of intelligence units. It is assumed that ISHI will provide the user interface for administration of these registers by IHIS staff based on documents of other organizations. Due to the ambiguity between CRHCP and CPMS structures, which have been continually amended, it is acceptable to build within ISHI CRHCP and CRMS registers based on metadata defining roles, relations and liabilities for legal and physical entities.
- ✓ Management of metadata defining health indicators, input forms, input interfaces, and data input from report forms, output reports.

IHIS shall be transformed into the National centre of health information in the first quarter of 2006, having competencies of a Slovakia-wide methodological guarantee and operator of central registers of health care providers, medical staff and register of appearance of tracked clinical events. The ambition of IHIS is to approach architecture and functionality of the ISHI system to these goals as

close as possible which is, with respect to project goals and project time and capacity limits, only partially acceptable.

- ✓ CRHCP a CRMS central registers shall be used in the future not only to support CIU generation but also to maintain full information on health care providers and medical staff which is updated by various external subjects within allocated competencies as well as to analyze included information. Support of this functionality is not required within ISHI. Extending maintained information as well as updating specialized web interfaces by external subjects within their competencies is assumed within future projects.
- ✓ Based on reports, various registers of monitored clinic cases (e.g. register of oncology diseases, register of cardiovascular diseases, and register of children's congenital defects) are maintained. It is assumed to integrate registers into common register of occurrence of clinic cases. This intention goes beyond the ISHI project scope. However, realization of this project may help to execute this intention.

# 8. Identification and elimination of risks

At the project initial stage, following project risks were identified:

| Risk description | Risk evaluation | Measures of risk mitigation |
|---|---|---|
| Short term of realization | high | Consequent project management, timely indication of possible delays, immediate implementation of corrective measures and providing information to recipient's project manager. |
| Requirements of changes during development | high | Due to press of time for project and a single-transition non-iterative development, to accept only such requirements of modification which would not change the scope of project solution specified in the document Requirements analysis which results in meeting the deadlines of completion of individual stages.<br>To discuss requirements beyond the project scope at a meeting of project management. |
| Requirements beyond the scope of web technology | medium | At the analytical stage, subsystems used exclusively by recipient's internal staff were assumed which will be programmed in the client-server technology (thick client). To stick to this trend at the stage of project design. |
| Requirement of data structure change without programmer's intervention | high | At the design stage to define possible ways of realization of this requirement and to agree final solution with the customer within the pre-implementation stage. |
| Recipient's cooperation | medium | Eventual delay in the provision of recipient's cooperation shall be discussed at the project management meeting. |
| Insufficient cooperation of professionals in a filed | medium | Elimination of this risk shall be based on motivating experts and in illustration of practical usefulness of the developed solution. |
| Failures of key experts | low | Consequent planning of capacities, application of motivation factors, education of full-valued deputies. |
| Security ISHI aspects according to ISHI security project | high | IHIS did not provide ISHI requirements within the current state analysis, which result from the IHIS security project.<br>Within the document System design it shall be explicitly stated, how the system meets security requirements or how to modify the IHIS security project. |
| Inconsistency of migrated data | high | At this stage, to define clearly necessary preconditions of successful migration, to authorize recipient to secure consistency of migrated data in time. |
| Non-delivery of information required for system design in time | medium | In the case of non-delivery, the issue shall be settled at the project management meeting. |
| Changes in interfaces for input from report and message form data | high | In the document Requirements analysis, limits for interfaces of data files input shall be defined to provide integrity and importability of data from report and message forms in the system by data files import. |
| Security of system with web-based interface and external users interacting with the system over the Internet | high | Within the document System design, principles of creation of demilitarized zone to prevent non-authorized access from the Internet or LAN, allocation of certificates for external users and authentication of external users shall be explicitly described. |

| | | |
|---|---|---|
| System availability after infrastructure component breakdown | low | Within the document System design, it shall be explicitly defined, how the required system availability is provided. |
| Infrastructure capacity sufficiency | medium | System shall be operated on the LAN in new IHIS premises and IHIS did not define Internet connectivity and LAN speed.<br>In the document System design, minimum requirements of Internet connectivity and LAN speed shall be stated. |

## 8.1. Risk management

Well-proven risk management of the SOFTEC company allows to control the project risks. The project shall be monitored: from the viewpoint of risk priority changes, new risks occurrence as well as events leading to possible risk and indicating the need of taking adequate steps. Risk management shall be regular part of the implementation process. It will be repeated in any event of project change, issue or risks related to important decisions on project progress. Methods of risk management shall include:

- ✓ Identification of risks
- ✓ Evaluation of risks
- ✓ Defining measures of risk management
- ✓ Introduction of resulting tasks in the project schedule
- ✓ Regular monitoring of each risk status

# 9. Procedures and methods

For the project solution, standard and reputable procedures of management and development used by SOFTEC during analysis of information systems, strategic designs of integrated information systems and development of information systems from the analysis stage through programming up to the long-term service of the installed information system at the customer will be used.

## 9.1. Methodology of SW development

Development methodology of software systems used by the SOFTEC company is based on the object-oriented methodology Rational Unified Process. The Rational Unified Process methodology is a process-based extension of specification UML language.

Methodology is based on three main principles:

- ✓ iterative and incremental development
- ✓ architecture based
- ✓ use case controlled

Incrementality means the development of system by increments. Iterativity means the development of system increments in iteration cycles. Increment development by iteration passes all processes or most of them: determination of requirements, analysis, design, programming, testing. Iterations can be divided into four parts (stages): initialization, detailing, construction, and application.

In case of ISHI project, the system will be developed in a single increment and iteration cycle due to an extremely short time required for project completion. Requirements of changes against Requirements analysis documents at ISHI and the ISHI project design will be accepted only in the case they do not significantly alter the project workload.

The term architecture-based means that the system is developed based on models. Graphic models are designed in the UML specification language being a standard of the OMG association as well as currently the most used specification language. System architecture consists of a set of such models.

The term ‘use case controlled’ means that use cases initiate and determine content of individual processes during each iteration.

Designer uses the following basic[3] customization and extension of the original Unified Process methodology:

1. Extension by text specification languages. Unified Process methodology does not regulate the form of text specification. Designer uses the Cockburn form of entry for use case specification. For other forms of text specification, designer’s well-proven pre-defined structure formats are used.
2. Defining the system context with modelling of relevant part of enterprise processes to be supported by the developed software system. These activities are applied in projects upon the agreement with customer, where, prior to project start, the system context is not sufficiently defined. Modelling of enterprise projects is based on the methodology of Rummler Brache

[3] In line with principles of the Unified Process methodology, more detailed project customization is possible.

utilizing graphic UML language. These activities do not belong to standard parts of Unified Process methodology; they may be its possible extension.

3. Customization of process steps. The basic principle is maintained – the development is controlled by use cases which are initially identified and structuralized. Model and system creation is done by increments from use cases of top priority. Main differences to the original Unified Process methodology are as follows:
    - ✓ Formal specification of user requirements with mutual relations in tabular form before identification and specification of use cases. (This step is not required by Unified Process methodology.)
    - ✓ More emphasis is laid on main graphic models being class and use case diagrams and less emphasis is laid on supplementary graphic models such as sequence and state diagrams.
    - ✓ Design of class diagram based on static elements (relation between classes and attributes) against the method based class roles in Unified Process.
    - ✓ Utilization of automated instruments (generators and frameworks) at the design stage, which allows simplifying of the process using less manually created outputs.

As compared with the Unified Process methodology, activities in the programming process are customized according to used programming tools. In addition to customization resulting from the requirements of producer of programming tools and designer company know-how, procedures are often taken from the reputable international literature. For instance, programming in the company FAAST framework utilizes, along with basic specific steps and rules characteristic for this framework, also the rules set out by Scott Meyers and published in his well-known books: Effective C++ and More Effective C++.

Testing process consists of several detailed phases: testing of subsystems (compliance with specification of each subsystem is checked), integration testing (correctness of subsystem interface is checked) and system testing (system is tested as a whole). Regress testing is a special case of testing to verify whether system modification preserves system functionality and properties which have not been changed. In addition to mentioned testing procedures, external testing form by user in the form of acceptance testing is assumed. Design of acceptance testing is done in the process of analysis of the software system development.

For automatized support of development, programming and testing, provider uses software tools. For the stage of design and analysis, it is the CASE System Telelogic Tau UML Suite extended by code generators made by designer and documentation generator for MS Word editor. In the programming stage, integrated development environments according to project type, often extended by provider-made frameworks e.g. WAFT framework for web applications in Java environment, are available. For configuration management and administration of user notifications, provider developed custom system PRIKOR and its web shell ECHO to enter and monitor solution status of user notifications. To manage source files in the Windows environment, the system SourceSafe of Microsoft Corporation or custom system featuring analogous functionality, are used.

## 9.2. Methodology of project management

In the SOFTEC company, elements of PRINCE 2 methodology which is part of the SOFTEC‘s certified Quality management system ISO 9001:2000, are applied for project management.

PRINCE 2 is a **British** methodology elaborated by the CCTA agency for controlled project management. PRINCE 2 supports utilization of standard methodologies and helps to comply with ISO 9001:2000 standards.

Documented procedures of the SOFTEC's Quality management system utilizing knowledge of PRINCE 2 methodology cover the following areas with respect to project management:

- ✓ Project initialization
- ✓ Project planning
- ✓ Project realization and management
- ✓ Configuration management
- ✓ Output analysis (does not apply to non-software outputs, usually documents)
- ✓ Control and testing (applies to project software outputs)
- ✓ Operative management of non-identical product
- ✓ Management of project changes
- ✓ Correctional activities
- ✓ Output control
- ✓ Delivery and activation
- ✓ Manipulation and service

Project management shall comply with certified Quality manual of the SOFTEC company. The Quality manual is a document describing the implementation way of requirements of the STN EN ISO 9001:2000 standard for quality management and provision in all production processes of the company.

## 9.3. Application frameworks

In the course of the ISHI web application development we plan to apply our company frameworks WAFT and FAAST C++.

### 9.3.1. WAFT

Some aspects, finally increasing quality level of the final product, are characteristic for the development utilizating WAFT framework with thin web client.

**Object model**

Object model created and maintained by the CASE tool represents focus of the application. Model allows graphic design of a part of the application. In the CASE tool it is possible to document the designed model. Existence of central model provides uniform expression tool for application developers to communicate on the common basis and contributes to re-usage of application parts.

**Component front end**

Front end application, i.e. programming of the application look and logics of its visual behaviour is often a most demanding part of the application development. WAFT is specially oriented on

increasing labour productivity during front end design. Application programmer must not concentrate itself on trivial and tedious activities. These are handled by the framework and programmer can focus on substantial problems. Front end will be realized by component approach and allows programmer simply to create custom visual components, thereby reaching a high level of reusability. Application programmer writes a very small amount of code (the DRY rule - Don't Repeat Yourself) which results in more simple and readable application and finally, in increased quality of the final product.

**Separation of application look from functionality**

Framework allows independent work on graphic application look and the work on functionality. Therefore, experts in both fields can take advantage of their knowledge to the maximum extent.

**Service application architecture**

Internal architecture of the application developed by using WAFT is service-oriented; i. e. application programmer develops services available for use by other programmers or application levels. This concept supports automated testing and allows, simply and usually without programming, to provide amount of delivered functionality over these services, e.g. single behaviour of access rights to services, auditing and logins for service use or publishing services to other applications (integration).

**Automated testing**

From the beginning, application architecture is so designed that it can be automatically tested in a simple way. Automated testing considerably influences application quality as well as provides code refactoring which results in its long-term quality and serviceability.

### 9.3.2. FAAST C++

**Characteristics of FAAST C++**

FAAST C++ (hereinafter referred to as FAAST) is an object-oriented framework for the support of agenda-type applications with client-server architecture. It supports object design and application implementation using relational databases and GUI interface.

It is based on the strict separation of application system logics from data display and storage. The framework handles data display and storage and lets programmer do the application logics.

FAAST-based applications allow non-modal work with multiple windows simultaneously, thus giving more freedom to the user. In case of applications with graphic environment (e.g. office applications etc.), user usually works with more windows and switches between them. FAAST transfers this mode of work into agenda-type database applications. Consistency and identity of application objects are still monitored to prevent conflicts.

The FAAST products consist of two parts:

- ✓ Code generator for the CASE tool (FAASTGen C++)
- ✓ Implementation environment (class library, FAASTLib C++)

Moreover, it includes environment to support automated testing which may be but must not be included in the designed application (FAASTTest).

**FAAST C++ architecture**

Thick client application in FAAST technology consists of three layers: database, application and presentation layer:

- ✓ ***Database layer*** – provides any basic communication with relational database as well as object mapping into relation tables. This layer is handled by FAASTLib and no additional custom programming is assumed.
- ✓ ***Application layer*** – consists of application classes in the C++ language introduced in the FAASTLib framework. The IS design means primarily design of this layer; also an application programmer does his work primarily in this layer. The basis of application layer is generated from the design by FAASTGen. Remaining functionality is to program manually. Application model core is developed by the application designer using the CASE tool Telelogic Tau UML Suite. This core is extended by application functionality created by application programmer. It is to emphasize that framework is so designed that the application programmer shall program just problem-related functionality (in application layer) and he must not take care how to retrieve/save object from/into the database, how to present it to the user etc. At the level of application layer framework handles some important issues: object identity, distribution of changes, access rights and transaction-like behaviour of objects.
- ✓ ***Presentation layer*** – there is no need to program because it is common for all FAAST applications and is handled by FAASTLib. The role of presentation layer is to display information from the application layer and to manage interaction with user in the user interface. User interface is dynamically created during application run according to declarative information stored in the database. Look of screens may be changed and subsequently sorted in the database during application run.

Technology provides a broad range of standard functionality based on declarative descriptions of application classes. Therefore, majority of activities of application programmer is represented by design of data model and implementation of application functions.

**FAASTGen C++**

The extension of the CASE Telelogic Tau UML Suite tool by generation of source codes is a part of the framework. This tool allows (provided that design methodology is maintained) direct transition from the stage of physical design to the implementation stage. It also allows design modification and projection of changes in the implementation while maintaining the generated application code. This facilitates the work of application programmers and primarily provides synchronization of the object model (stored in the CASE tool) and of the implementation. This is very important for documentation and further maintenance of the information system.

**FAASTLib C++**

FAAST C++ implementation environment is a library of classes in C++ named FAASTLib C++. It defines application architecture and implements standard, application-independent functionality. Through inheritance, it allows to define custom so-called application classes which realize functionality of particular designed application.

**FAASTTest**

FAASTTest is the optional extension of FAAST C++ technology allowing efficient automated regress testing of applications designed using this technology.

This tool is a part of tested application. This close relation of the tool and the application along with properties of FAAST technology allows writing the test scenario in a high-level language. Script containing the scenario is easy to understand and maintain.

The tool allows the script creation also based on the observation of user's work. To write the script, no knowledge of script language is required. The user just works with the application in the usual way and the tool itself generates the script simulating the user's work.

The used script language is the VBScript extended by commands of application control and testing. Script written in this language is simple, easy to read. However, it is still capable of writing complicated scripts.

The tool creates well-arranged log file containing history of script execution. Log file contains also detailed description of executed actions and testing summary.

**Environment supported by FAASTLib C++**

Run-time environment:

- Platform Microsoft Windows 9x, NT 4.0, Windows 2000, Windows XP.
- Relational database server accessible through ODBC interface.

## 9.4. Change request management

To manage change requests, a company web application ECHO will be used. This application allows recipient's selected staff to enter requests for change or for elimination of detected errors. Application allows also to monitor progress of the request solution. The only precondition of application utilization is the access to the Internet and web browser.

Despite the work with this application is rather easy, recipient's staff supposed to work with the application, will be trained for this purpose during the training.

# 10. Resources

## 10.1. Project management

For the purpose of this contract, following denotations of project participants are used:

Customer: Ministry of Finance of the SR – Central finance and contracting unit (SR-MF – CFCU)

Recipients: Institute of health information and statistics (IHIS)

Ministry of health of the SR (SR-MH)

Provider: SOFTEC

Structure of the project management and participation of project members:

| Position | Responsibility | Staffing |
|---|---|---|
| Recipient's project manager | On recipient's side, recipient's project manager is responsible for proper administrative performance of the contract, i.e. for takeover of elaborated reports, protocols, acceptance letters etc., their verification and submission to the Ministry of Finance of the SR, particularly at CFCU, confirmation by recipient, fulfilment of conditions for advance payment and final payment, submission of required number of reports in print to external recipients.<br>Convenes meetings of administrative project management if necessary.<br>Signs reports and handover/acceptance protocols for sections 10, 11 (see Article 4 Project outcomes, section 4.1 Overview of deliveries.) | Zuzana Škublová |
| Provider's project manager | Partner of recipient's project manager on provider' side.<br>Submits administrative project outputs to recipient's project manager.<br>Convenes meetings of administrative project management if necessary. | Slavomír Gnip |
| Recipient's project leader | Takes responsibility for objective project solution on recipient's side, provides cooperation of the recipient upon request of recipient's project leader, submits expert opinions on outputs of project stages.<br>Signs handover protocols of objective project outcomes and acceptance protocol. | Ján Slovík |
| Provider's project leader | Takes responsibility for objective project solution, provides cooperation with recipient.<br>Submits objective project outcomes to recipient's project leader.<br>Signs handover protocols of objective project outcomes. | Mária Ambrošová |

## 10.2.Provider's solvers

List of persons participating in the ISHI project realization is shown in the following table.

| Name | Position | Responsibility |
|---|---|---|
| Gnip Slavomír | Provider's project manager | Approves the range of modifications.<br>Approves deliveries.<br>Takes responsibility for project administration.<br>Takes responsibility for concentration of all project activities to reach the set goals.<br>Guarantees harmonization of management and project documentation with agreed rules.<br>Regularly and timely monitors development, budget, and reporting within the project.<br>Takes overall responsibility for the successful project progress.<br>Defines quality management processes.<br>Provides quality of implemented system according to requirements defined by recipient and those stated in the contract.<br>Acts as quality management advisor in provider's team and performs quality checks.<br>Provides management of capacities planning.<br>Monitors daily activities within the project and supervises compliance of quality management processes with those mentioned in the quality plan.<br>Guarantees that deliveries meet requirements specified in the contract.<br>Approves change requests.<br>Guarantees recipient's satisfaction and acceptance.<br>Participates in operative planning, monitoring of activities and control. |
| Ambrošová Mária | Provider's project leader,<br>senior analyst | Substitutes provider's project manager in cases stated above.<br>Responsible for objective project solution.<br>Guarantees objective cooperation and harmonization with recipient through recipient's project leader.<br>Provides smooth project progression according to approved schedule.<br>Coordinates and manages work of the whole project team.<br>Accepts, handles and manages change requests in the project.<br>Verifies completion of system testing. |
| Červeň Juraj | Systems manager | Manages analytic and design meetings with recipient.<br>Systematically manages, coordinates and supervises activities of other experts. Analytic activities, solution design, coding, implementation and testing are concerned.<br>Supervises elaboration of testing scenarios, internal and external |

| Name | Position | Responsibility |
|---|---|---|
| | | acceptance criteria.<br>Supervises elaboration of the whole software documentation and training of users, operators and administrators.<br>Responsible for specification of system and integration testing strategy.<br>Responsible for filling the system by metadata. |
| Šoltís Ján | Chief designer<br>Web and client-server technologies expert | Participates in workshops oriented on design of software solution.<br>Dominantly participates in preparation of all design outputs.<br>Designer's main task is to specify the overall design of HW and SW architecture according to project requirements.<br>Defines programming standards.<br>Controls development team, plans development capacities and receives developed software solution, defines standards of software solution. |
| Šolc Roman | Chief designer<br>Web technologies expert | Defines programming standards. |
| Blšták Peter | Web technologist | Defines programming standards.<br>Manages development team, plans development capacities and receives developed software solution, defines software solution standards. |
| Kováč Ondrej | Senior analyst, designer, expert for web forms generation tool | Participates at meetings oriented on recipient's requirements analysis and system design.<br>Dominantly participates in preparation of all analytic and design outputs.<br>Participates in application development.<br>Creates database logical model.<br>Specializes in mapping aspects of object module in relational database using the Tapestry tool within system design and development. |
| Doričová Katarína | Junior analyst | Participates at meetings oriented on recipient's requirements analysis.<br>Dominantly participates in preparation of all analytic and design outputs.<br>Takes responsibility for multidimensional cubes testing. |
| Medrická Jaroslava | Junior analyst, documentarist | Participates in preparation of all analytic and design outputs.<br>Elaborates documentation. |
| Štít Juraj | Senior analyst | Participates at meetings oriented on recipient's requirements analysis.<br>Dominantly participates in preparation of all analytic and design outputs.<br>Participates in metadata design for report forms control and report form data input in ISHI. |
| Brandis Jaroslav | OS and database administrator | Configures services of operating system.<br>Manages database security and surveillance strategy.<br>Elaborates recovery and disaster procedure strategy. |

| Name | Position | Responsibility |
|---|---|---|
| | | Manages physical database implementation at various levels - development, testing, training and operation. |
| Vakerman Zdeno | Database administrator,<br>Tool specialist for mapping object data model into relational data model | Manages database security and surveillance strategy.<br>Elaborates recovery and disaster procedure strategy.<br>Manages physical database implementation at various levels - development, testing, training and operation.<br>Hibernate specialist. |
| Doležalová Soňa | Web technologies and installation specialist / Member of development team | Provides design and development of software solution of preparation of software tools for multidimensional processing and analyses.<br>Provides creation of specific reports of multidimensional cubes. |
| Rakús Michal | Web and client-server technologies specialist / Member of development team | Participates in design of application components.<br>Participates in web application development. |
| Mariničová Eva | Web technologies specialist / Member of development team | Participates in design of application components.<br>Participates in web application development. |
| Horský Ľuboš | Member of development team | Participates in web application development. |
| Žarnovičan Vojtech | Web and client-server technologies specialist / Member of development team | Participates in development of web and client-server application.<br>Takes responsibility for data migration. |
| *will be selected later* | Tester | Takes responsibility for elaboration of system and integration testing strategy.<br>Detailed plans of system testing. |
| *will be selected later* | Trainer | Takes responsibility for user training. |

## 10.3.Project status reports

Interim project reports and the final project report in Slovak and in line with project deliveries will be elaborated by provider's project leader (part 4.1 Overview of deliveries). Reports will be submitted to the recipient's project manager by the provider's project manager as at terms indicated in the detailed project working plan (part 3.3 Detailed project working plan ). Reports will be accepted by the recipient's project manager according to the process of acceptance of project reports (part 4.2 Process of orders acceptance ).

Accepted project report in English will be submitted to the recipient's project manager by the provider's project manager within 10 workdays after the project acceptance.

## 10.4. Project status meetings

Project status meetings will be held upon customer's or provider's request – as soon as possible and with the meeting program agreed by project managers of both contracting parties. Minutes of the meeting indicating the adopted decisions should be taken.

Kick-off meeting of the project was held on 01. 12. 2005 at SR-MH premises. Project management staff, as indicated in the section 10.1 Project management, was appointed from representatives delegated by contracting parties. Basic rules of cooperation as well as dates of initial analytical meetings were settled. Minutes of this meeting are shown in Annex No. 2 to this report.

| | |
|---|---|
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| Technical editor: | Mária Ambrošová |
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# 1. Catalog of requirements

List of basic requirements to specified system delivered by IHIS or determined in the first project phase “ISHI Analysis“. Catalog of requirements represents a full list of system requirements.

## 1.1. Catalog of resources

Requirements were identified based on written documents comprehended in the following table. Individual columns are of the following meaning:

Source ID - Unambiguous identifier of source document

Source name - Text description of the source

| Source ID | Source name |
|---|---|
| SP | Public procurement documentation |
| ZML | Contract |
| PON | Offer of the company SOFTEC s.r.o. |
| Z1 | Minutes of the analytical meeting No. 1 |
| Z2 | Minutes of the analytical meeting No.2 |
| Z3 | Minutes of the analytical meeting No.3 |
| Z4 | Minutes of the analytical meeting No.4 |
| Z5 | Minutes of the analytical meeting No.5 |
| Z6 | Minutes of the analytical meeting No.6 |
| PrAPv1 | IHIS comments on Requirement analysis, version 1.0 |

## 1.2. Detailed catalog of requirements

Requirements are listed in the following table with columns having the following meaning:

Requirement ID - Unambiguous requirement identifier

Requirement text - Text of the requirement

Source - ID of the resource the requirement results from

Ref. - Reference to another requirement the respective requirement results from or is related to

Note - Note to the requirement

| Requirement ID | Requirement text | Source | Ref. | Note |
|---|---|---|---|---|
| 1. | Development of software application of the information system of health indicators (ISHI) for purposes of health statistics in line with requirements of SR-MH, EUROSTAT and other international organizations (OECD, WHO). | SP | | A basic requirement detailed in following requirements |
| 2. | ISHI shall provide statistical data for international organizations and national institutions. It shall handle data acquisition, processing and analysis. | PON | | |
| 3. | ISHI shall cover all health indicators set out based on the mutual agreement between Softec and IHIS by the end of January 2006. Algorithms for the indicators calculation shall be part of the agreement. Emphasis shall be laid on OECD and WHO indicators. | SP. PON, Z5 | | Requirement wording was specified at the meeting No. 5 |
| 4. | For these indicators, system shall provide input and output solution, appropriate data storage and reporting in line with EU statistical requirements. | SP, PON | | |
| 5. | ISHI shall provide access to stored data in more ways:<br>Data viewing in the same form when data entered system.<br>Data viewing in the form of predefined reports (messages).<br>Data viewing by analytic application.<br>Data export in dynamically adjustable formats. | SP, PON | | |
| 6. | ISHI will store information required for calculation of health indicators and make them available through the user interface. | SP, PON | | |
| 7. | Store information consists of acquired data for calculation of indicators as well as of metadata describing character of acquired data, e.g. data source, acquisition date, methodological description and classification. | SP, PON | | |
| 8. | System shall provide data input through import in standard formats CSV, XLS, XML. | SP, PON, Z5 | | Requirement wording was specified at the meeting No. 5 |
| 9. | Import modules shall be programmed to allow import of all required indicators in ISHI based on dynamically defined interfaces. | SP, PON | | |
| 10. | ISHI shall provide functionality access also over the web interface, to allow data acquisition and provision over the Internet for primary data providers. | SP, PON | | |

| Requirement ID | Requirement text | Source | Ref. | Note |
|---|---|---|---|---|
| 11. | Functionality access shall be provided based on allocated access rights and required security. | SP, PON | | Security requirements will be specified at the design stage. |
| 12. | Output of health indicators shall be provided in print in both Slovak and English languages according to exactly specified requirements. | SP, PON | | |
| 13. | Output of health indicators shall be provided as the export of data files of defined structure based on dynamically defined interfaces.<br>Required data formats are xls, XML, HTML, CSV.<br>Output through query (select) which is further used for data selection (in MS Access environment by using ODBC) shall be also provided. | SP, PON | | |
| 14. | Output of health indicators shall be provided by displaying indicators on workstations for user purposes of IHIS and SR-MH staff. | SP, PON | | |
| 15. | User connection to ISHI shall contain user connection elements to determine and prepare necessary inputs and outputs. It must be implemented in Slovak language. | SP | | |
| 16. | ISHI shall be installed at both SR-MH and IHIS recipients and shall allow appropriate database replications between both institutions to increase data availability and security. | SP, PON | | |
| 17. | ISHI system shall be protected from unauthorized access and malicious software shall be prevented from entering the system. | SP, PON | | Protection will be specified at the design stage. |
| 18. | ISHI system shall take requirements of system availability, backups in case of breakdowns, system and network security into account. | SP, PON | | |
| 19. | Initial system filling by data. Defining indicators of the verification set. | PON | | |
| 20. | Initial system filling by data. Defining dimensions according to which indicators of the verification set will be organized. | PON | | |
| 21. | Initial system filling by data. Defining input forms to be used for input of data for the verification set of indicators. | PON | | |
| 22. | Initial system filling by data. Defining data warehouse and multidimensional cubes for analytical processing of verification set of indicators. | PON | | |

| Requirement ID | Requirement text | Source | Ref. | Note |
|---|---|---|---|---|
| 23. | ISHI application provides output outside ISHI, which will be manually processed into print form (DTP workplace). | Z1 | 12 | |
| 24. | ISHI system shall be able to define checks for input data. | Z1 | | |
| 25. | ISHI system shall be able to describe communication with IU by metadata (e.g. through printed report, file with predefined interface, directly through report download by the web application). | Z2 | | |
| 26. | Softec helps IHIS to install Oracle on their HW platform at the stage of implementation and testing. For the purpose of further Oracle database operation, IHIS is supposed to appoint database administrator. | Z2 | | |
| 27. | In case of input of reports, main batch interface in XML format will be used for data files input. If necessary a web form can be used. | Z3 | | |
| 28. | Filled form in the ISHI system shall contain information on filled form state, e.g. contact to IU sent, filled form saved free of errors, filled form returned on error etc. | Z3 | | |
| 29. | Metamodel of defining calculation of indicators shall be as simple and intuitive as possible and shall cover maximum number of indicators. For remaining non-standard indicators (from other data than those of reports – e.g. CRPZS data), they can be calculated by SQL expressions. | Z5 | 7 | |
| 30. | In case of import of inputs, standard data interfaces for XML, XLS, CSV formats will be defined. | Z5 | 8 | |
| 31. | Import in XML format. Based on metadata structure of ISHI system, XML describing input structure of forms and report cheme will be defined. ISHI system will accept only XML inputs complying with this scheme, or those XML inputs which can be through XSLT transformation converted into compatible format. | Z5, Z6 | 8, 30 | |
| 32. | Input in Excel format. ISHI system will accept XLS format which corresponds with current Excel format of forms. | Z5 | 8, 30 | |
| 33. | Input in CSV format. Structure of acceptable formats will be defined by project solvers in the course of system design. Such inputs will be imported after conversion into XML. | Z5 | 8, 30 | |

| Requirement ID | Requirement text | Source | Ref. | Note |
|---|---|---|---|---|
| 34. | Input of external statistical data (from SO SR, UDZS, Institute of TB, Respiratory Diseases and Thoracal Vyšné Hágy, Social Insurance Agency and other statistical necessary data), i.e. data different from those of report forms acquired directly at IHIS, will be solved by acquisition through virtual forms. | Z5 | | |
| 35. | The EXE company is solving for IHIS the issue of system of report forms input through Universal system. Data collected through Universal are ISHI-compatible and can be imported in ISHI. | Z6 | | |
| 36. | Prior to XML batch import in ISHI, mutual checks between various reports will be realized. | Z6 | | |
| 37. | CRHCP and CRMS registers will be solved and implemented only to such extent to allow creating IU collection for the respective gathering. They will be implemented by thick client technology. | Z6 | | |
| 38. | Description of metadata forms and indicators shall be also in the form of a client-server application (thick client). | Z6 | | |
| 39. | Within ISHI project, only interactive input in CRHCP and CRMS registers and basic browsing of their contents will be provided. | Z6 | | |
| 40. | In the ISHI system design to solve the issue of multiple login into various applications. | PrAPv1 | | |
| 41. | At the ISHI design stage to elaborate state diagram of filled forms / reports. Depending on the filled form / report state, authorization to modify will be given. | PrAPv1 | | |
| 42. | In case of the query output, SOFTEC prepares selected reports of L1 forms and statistics of in-patients with fixed graphic structure and manual book containing instructions of creation such outputs. | PrAPv1 | | |
| 43. | During calculation of summary data, to allow rounding up and down, in addition to standard rounding. | PrAPv1 | | |
| 44. | Final version of data model of the ISHI application will be elaborated, discussed and approved at the stage of ISHI design. | PrAPv1 | | |

# 2003-004-995-03-06
# Strengthening Statistics Health Information System and Its Harmonization with EU Requirements

## Meeting with representatives of the SOFTEC company
## Contract No. 200300499503-0601-0003

## 1 Minutes of the Meeting

**Meeting place:** Ministry of Health of the SR, PCU conference room
**Date:** 1. December 2005
**Participants:** Mária Ambrošová, SOFTEC
Ján Faltus, Ministry of Health of the SR (SR-MH), Department of Informatics
Slavomír Gnip, SOFTEC
Anton Scheber, SOFTEC
Ján Slovík, Institute of Health Information and Statistics (IHIS)
Zuzana Škublová, SR-MH, International Aid Project Unit (IAPU)
Ľubomír Vlčák, IHIS
Linda Winklerová, SR-MH, IAPU

The meeting was opened by Mr. Vlčák. He informed that the contract on software delivery for the Institute of Health Information and Statistics between SOFTEC and Central Financial and Coordination Unit of the MF SR (CFCU) had been signed. He also informed that the purpose of the meeting was to settle formal and organizational structures which shall be created and how they shall be staffed.

After introduction of individual meeting participants, Mrs. Škublová informed that the developed software should be result of the Twinning light project, also realized within the project 2003-004-995-03-06 Strengthening statistics health information system and its harmonization with EU requirements.

Mrs. Škublová also emphasized, it is important to define competencies of individual project members within the present meeting. She informed that project consists of two parts – objective and administrative part. Under term administrative part, takeover of elaborated reports, protocols, acceptance lists etc., their verification and forwarding to the MF SR, especially CFCU, shall be assumed. Verification would be possible upon the delivery of opinion and approval of the output by objectively/professionally competent person.

Mr. Scheber said that, based on his experience from foregoing projects, there are usually two positions: project manager and project leader. Project manager takes responsibility for administrative part of the project and does not directly affect the objective project part. Project leader is directly responsible for the technological part of the project. Mr. Scheber also

nominated Mr. Gnip as the project manager and Mrs. Ambrošová as the project leader for the SOFTEC company.

For IHIS and SR-MH, Mr. Vlčák nominated Mrs. Škublová as the project manager and Mr. Slovík as the project leader. If necessary, project outcomes/documents should be submitted also to Mr. Faltus for evaluation.

Mr. Scheber would welcome signing services provided just by single person. All participants agreed to that opinion.

Mrs. Škublová mentioned it is necessary to elaborate inception report, a report upon closing each project stage, and the final report. It was agreed that, having agreed the reports, SOFTEC shall submit them in four signed copies to IAPU which shall distribute them to recipients.

Mrs. Ambrošová said, a date of submission of reports upon closing individual project stages is missing in the contract. It was agreed these dates should be specified within the inception report.

Mr. Scheber pointed out that, according to the contract, the inception report should have been elaborated within a month since the contract completion as at 21.11.2005. With respect to the fact that this was the firs meeting of SOFTEC, IHIS and SR-MH representatives, it is not possible to submit inception report within the first month since the contract completion. A final date of 9. January 2006 for the inception report submission was settled. SR-MH and IHIS shall deliver their opinion on the inception report until 12. January 2006.

Initial meetings of SOFTEC representatives with SR-MH and IHIS staff represented another discussed issue. SOFTEC representatives required meeting dates as soon and frequent as possible. Following preliminary meeting dates were agreed:
7.12. 2005, 8:30 at IHIS
9.12. 2005, 8:30 at IHIS
14.12. 2005, 9:00 at IHIS
16. 12. 2005, 8:30 at IHIS

Mr. Vlčák promised to provide SOFTEC representatives with analysis being outcome of another project (funded by the World Bank).

It was agreed that in the case of date-related issues (also in case of submission of the initial report) participating parties shall have the right to postpone terms upon mutual agreement.

Mrs. Škublová raised the question of bank guarantee to be realized for the benefit of recipients. Mr. Scheber responded that this issue should be solved at the time of final payment.

Mr. Gnip asked for information related to advance payment. Mrs. Škublová informed that supplier should be eligible for advance payment. However, he must apply in writing.

**Conclusions:**

1. Project managers: Mr. Gnip and Mrs. Škublová.

2. Project leaders: Mrs. Ambrošová and Mr. Slovík.
3. All reports shall be submitted to IAPU in four copies, for further distribution.
4. Dates of submission of partial reports after closing each project stage shall be regulated in the inception report.
5. Final date for the inception report submission is 9. January 2006. IAPU shall deliver its opinion on the report until 12. January 2006.
6. Mr. Vlčák provides analysis which was outcome of a World Bank-funded project to: Mr. Scheber, Mrs. Ambrošová, Mr. Gnip and Mr. Faltus.
7. Workshops at IHIS shall take place on the following dates:
   - 7.12. 2005, 8:30 at IHIS
   - 9.12. 2005, 8:30 at IHIS
   - 14.12. 2005, 9:00 at IHIS
   - 16. 12. 2005, 8:30 at IHIS
8. IAPU shall forward the copy of the contract on software delivery to IHIS signed between CFCU and SOFTEC to Mr. Faltus.
9. SOFTEC shall apply at CFCU in writing for advance payment.

Recorded: Winklerová, IAPU
On: 2.12.2005