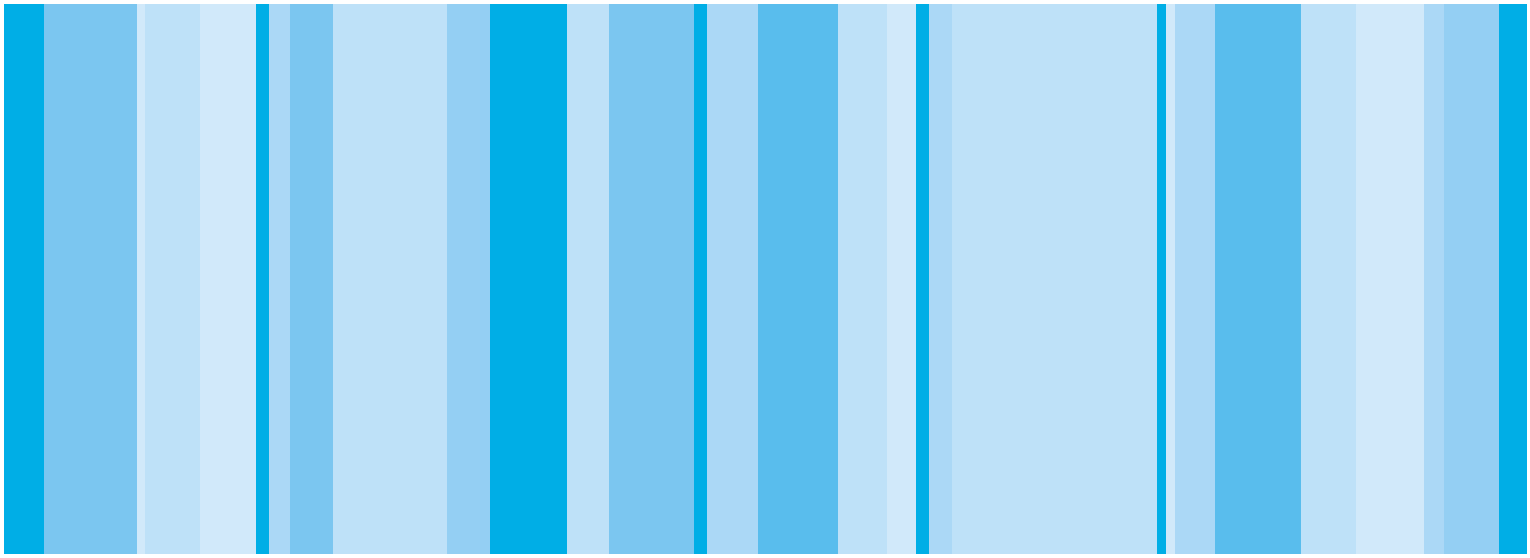

Vendor questionnaire

Technical evaluation of Health Care Software Products for APOTTI, Finland

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1 About this questionnaire

The participating vendors are asked to answer to the questions in this questionnaire as part of the technical evaluation process.

The answers will be used by SIG to prepare for the site visit, as well as the technical validation sessions.

The answers to this questionnaire need to be uploaded via SIG's secure upload portal at:

https://portal.sig.eu

The answers need to be provided before 15 April 2015.

Chapter 2 contains the actual questionnaire. Chapter 3 contains background information on applicable standards and the SIG evaluation models for Maintainability, Reliability and Performance efficiency.

2 Questionnaire

This chapter contains the questionnaire that participating vendors need to answer by 10 April 2015.

The goal of the questionnaire is to ease and streamline information gathering during the evaluation process and to make the discussion during the sessions between the vendor and SIG more efficient. It is not intended to provide a complete description of everything SIG would like to discuss. SIG would like to use answers to certain questions as findings in the evaluation process, but not before they have been discussed in the technical session and/or validation session.

2.1 Guidelines for answering the questions

The questionnaire contains questions related to the solution architecture and implementation, the non-functional aspects of particular interest to the client, and the process for development and quality assurance.

In this questionnaire, the following terminology is used:

- The term ***product*** refers to the unimplemented (standard) software health care product from the vendor that will form the basis for the solution for the client;
- The term ***solution*** refers to the complete future software solution that has been configured, customized, integrated and implemented for the client;
- The term ***vendor*** refers to a party that is proposing a product and implementation program to arrive at a working solution for the client.

When answering this questionnaire, please note the following guidelines:

- In case a diagram or answer to a question can be found in a supplied document, please indicate the document title, section and page;
- Please provide all documents that you would like to submit in either Microsoft Office or PDF format;
- If it is not possible to provide precise numbers for a certain question, it is ok to provide an estimate, if indicated as such;
- When needed, please the answers based on a best practice configuration given the scale and size required for APOTTI in Finland;
- If you cannot answer a question at all, please provide the reason for this.

Any information shared as answer to this questionnaire, including the answers to the questionnaire itself, fall under the NDA between SIG and the vendor. The answers provided will be discussed in the technical and validation sessions before they are used in reporting towards the client. After discussion of the answers with the vendor during the technical session and after vendor's consent, the answers (or parts of these) will be provided to APOTTI.

If there are any answers that cannot be shared with APOTTI, the vendor is asked to indicate, so those can be removed from the material that is provided to APOTTI at later stage.

Please read all questions carefully. They are based on a standard SIG questionnaire, but it has been customized given APOTTI's particular needs.

2.2 Questions to be answered

2.2.1 System architecture

1. Please provide a concise (max. 12 pages) introduction to the (solution) architecture of the product. Discuss in this introduction:
    a. The components (logical parts) distinguished in the product, their functionality, if and how these components communicate;
    b. Logical, process and a typical deployment view of the product (provide three diagrams);
    c. The technology stack (major programming languages, major frameworks, middleware, libraries, OS) used and their versions;
    d. Compatibility with existing technologies for clients, in particular virtualization technologies (such as Citrix), older versions of MS Windows and older Internet browsers.
    e. The rationale for the architecture and any major design decisions which characterize your product.

2. Please describe the top 10 technologies used in the product (languages, frameworks or third-party components), describe their function and location in the solution architecture. A language is considered major if the amount of source code in the solution exceeds more than 100,000 lines of code, a framework if it exceeds more than 50,000 lines of code.

TECHNOLOGY (LANGUAGE, FRAMEWORK)	FUNCTION AND LOCATION IN THE SOLUTION ARCHITECTURE

   For example: “Java language | A core technology used throughout both the front-end and the back-end of the solution”.

3. Please explain how and where in the architecture the product will be extended, customized or integrated to meet the ***Social care*** and ***Dental care*** requirements of the client, as well as integrate in the client’s application landscape (1-2 pages).

2.2.2 Specific non-functional quality aspects

The client has indicated that specific non-functional requirements are of particular interest. This section is divided into four parts, using the ISO/IEC 25010 standard terminology, related to the specific non-functional concerns of APOTTI.

ISO/IEC 25010 Maintainability

4. Describe the top 5 most important or influential measures (technical, procedural, organizational) to ensure a high maintainability of your solution. Examples may include training, peer review, quality monitoring/measurements, etc. (1-2 page).

ISO/IEC 25010 Reliability

5. Please describe your approach to ensuring high reliability and highlight relevant aspects of the architecture, standards and quality assurance process (2 pages).

6. What is the typical availability for installations similar size and nature as APOTTI?

7. Describe the overall approach to fault isolation across functional components (max. 1 page). If necessary, add technology-specific aspects.
8. Describe how transactions are handled and propagated between components, based on the example of entering blood test lab results in the system. Describe to which extent application state and data can be rolled back.

9. Is there a way to run the system in a degraded setting? Could you please elaborate how this works and which functionalities are given priority?

10. Describe the deployment process, its level of automation and min/mean/max duration for a solution similar in size and nature to APOTTI. Can a deployment be rolled back? Discuss in which situation a deployment can no longer rolled back.

11. How many hours of operational maintenance from a system administrator does an installation of the size of APOTTI require typically per month. Please provide examples of the kind of maintenance, including backup and restore processes.

12. Please describe the quality assurance process for reliability and failover testing with concrete examples. In particular, how often are these tests performed?

ISO/IEC 25010 Performance efficiency

13. Elaborating on the response to questions 1, please provide a high-level overview of a deployment architecture of the product, if possible the one that would be proposed for APOTTI. If no typical overview is available, please provide an overview for the largest installation of the product. The overview should show at least:
    a. Which categories of machines involved in running the product/solution (e.g. web server, application server, database server, terminals, etc.);
    b. Which logical part(s) of the product are executed on which machines;
    c. Which machines communicate with each other, and via which protocols;
    d. Indicate how many machines are deployed for each category and the manner in which they are redundant.

(VIRTUAL) MACHINE	CATEGORY	EXECUTES PARTS	COMMUNICATES WTH	# DEPLOYED/REDUNDANT

14. Describe in which way communication with Social care and Dental care functionalities will impact performance (max. 1 page).

15. For three installations of your product comparable in size and nature to APOTTI, please provide the following numbers:
    a. Number of physical sites where the product is deployed (hospitals, clinics, etc.);
    b. Number of users (doctors, medical personnel, etc.);
    c. Number of patients (active) in the product;
    d. Number of <X> transactions per day (of different types);
    e. Average and maximum number of concurrent transactions per day for the past year;
    f. Average and maximum CPU load during for all categories of machines (see previous question).

Provide answers in tabular format as follows.

# PHYSICAL SITES	# USERS (MEDICAL STAFF)	# PATIENTS	# TRANSACTIONS / DAY	AVERAGE/MAX CPU LOAD

Add additional columns if necessary.

16. For the proposed installation for APOTTI, please indicate:
    a. Which important functions (if any) are handled by centralized servers (as opposed to servers specific to a site), and how?
    b. What important data (if any) is replicated between sites, and how?
    c. Explain which measures have been taken to guarantee that resource-consuming non-primary functions such as reporting do not interfere with the primary functionality of the system.

17. How in your development process do you guarantee that the reliability, performance and scalability demands for APOTTI are met? Please indicate:
    a. Name the most important measures taken to guarantee and observe/measure that these requirements will be met ***during implementation*** and ***in production***?
    b. Up to how many users and transactions the product has been tested in your most recent representative internal performance test.
    c. What the primary bottlenecks are for adding more users, data and transactions for the configuration mentioned under question 15.
    d. Which mechanisms are available for scaling the product to more users and more transactions, for the configuration as mentioned in question 15.

2.2.3 Development, test and quality assurance process

18. Please briefly describe your development and maintenance methodology/process (max. 1 page).

19. For the largest installation and customization of your product, please provide the following figures:
    a. The number of man-months spent on solution implementation (integration, configuration and customization).
    b. The minimum and maximum size of the implementation team in FTE;
    c. The percentage of FTE located on-site at your customer, the number of FTE at an offshore location, if applicable;
    d. The duration of the implementation project.

20. Regarding the development and maintenance of your solution, how many developers (FTE) are responsible for the components that represent the functional scope of the evaluation, as defined by APOTTI. Please describe how the development groups are organized and where they are located.

21. Please describe your overall approach to quality assurance, including relevant processes, standards and KPIs tracked by development leadership (1-2 pages).

3 Applicable standards

This appendix contains a brief introduction to applicable standards. For more information, see: https://www.sig.eu/en/about-sig/sig-lab.

3.1 ISO/IEC 17025 Certified evaluation laboratory

SIG operates a software evaluation laboratory governed by the Quality Management System as required by the ISO/IEC 17025 international standard for testing laboratories. The general requirements for the competence of testing and calibration laboratories can be found on the website of the International Organization for Standardization.

3.2 ISO/IEC 25010

The international standard for evaluation of software quality (ISO 25010) is used as a basis to evaluate vendor's solutions with respect to APOTTI's key concerns. The following characteristics of ISO 25010 are recognized as key concern areas:

- **Maintainability:** The degree of effectiveness and efficiency with which a product or system can be modified by the intended maintainers;
- **Reliability:** The degree to which a system, product or component performs specified functions under specified conditions for a specified period of time;
- **Performance Efficiency:** Performance relative to the amount of resources used under stated conditions.

Figure 1: ISO 25010 software quality characteristics

3.3 Maintainability model SIG/TÜViT

For evaluating ISO 25010 Maintainability, the SIG/TÜViT evaluation model will be used as a basis. A refinement will be made to do justice to the size of the systems under evaluation. The final version of the evaluation model will be communicated before the site visits commence.

	Volume	Duplication	Unit size	Unit complexity	Unit interfacing	Module coupling	Component balance	Component independence
Analysability	X	X	X				X	
Modifiability		X		X		X		
Testability	X			X				X
Modularity						X	X	X
Reusability			X		X			

More detail about this model can be found in the SIG/TÜViT Evaluation Criteria documentation on SIG's website.

3.4 Reliability model SIG

For evaluating ISO 25010 Reliability, the following SIG evaluation model will be used.

	Fault isolation	Transaction handling	Redundancy	Deployment automation	System autonomy	Reliability testing	Failover	Uptime
Availability								X
Maturity	X				X	X		
Fault Tolerance	X	X	X					
Recoverability		X		X	X		X	

Relevant aspects of the model will be explained during the site visit.

3.5 Performance efficiency model SIG

For evaluating ISO 25010 Performance efficiency, the SIG evaluation model will be used.

	Internal communication	External communication	Single transaction optimization	Transaction scalability	Data scalability	Isolation	Resource elasticity	Observability
Time behavior	X	X	X					X
Capacity				X	X	X		X
Resource utilization			X				X	X

Relevant aspects of the model will be explained during the site visit.