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Topic (i): Web technology in statistical information systems

SAVING TIME AND MONEY: WEB QUESTIONNAIRES FROM THE "ASSEMBLY LINE"

Invited Paper

Submitted by Statistics Austria[1]

Summary

I. INTRODUCTION

1. In October 2002, the results of the *Survey on the availability of electronic public services on the Internet*, carried out for the third time by Cap Gemini Ernst & Young, were published. This study – commissioned by the European Commission and the General Directorate "Information Society" within the framework of the eEurope programme – measured the availability of public services on the Internet and the level of online sophistication of the delivery process. The objective of the benchmark was to enable participating countries to analyse progress in the field of eGovernment and to compare performance. As one of 20 basic public services, the study defined "Submission of Data to the Statistical Office". Austria and eight other European Union States were rated as reaching online availability of 100% for this service.

2. At first glance, this result may appear extremely satisfactory. We must, however, not overlook the fact that the definitions underlying the study will already result in a rating of 100% when a publicly accessible website offers the possibility to submit at least one statistical questionnaire.

II. THE PROBLEM: THE MULTITUDE OF STATISTICAL SURVEYS

3. National Statistical Institutes (NSIs) carry out a multitude of surveys for which the Internet would afford a convenient reporting medium suitable to lessen the burden on respondents. From the citizens' and the statistical institutes' point of view, 100% availability can thus only be confirmed when every respondent affected by a survey with paper questionnaires also has the option of transmitting his or her data electronically.

4. Such a goal, however, cannot be attained in the traditional way – by "hand-crafting" Internet applications – when we bear in mind that statistical surveys are just as affected by ever shorter production

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cycles and shrinking budgets as most other projects are. Apart from the high costs of software development, which accrue to each survey in addition to the paper questionnaire production costs, the provision of a timely electronic alternative to each new or modified survey presents an almost insurmountable barrier. The NSI may carry out software development in-house, thus eliminating the time periods inherent in a tender procedure and shortening the whole process. Even so, developing a user-friendly, safe and adequately tested Internet questionnaire application for a survey takes much longer than the traditional production process for paper questionnaires.

5. In mid-2002, Statistics Austria (ST.AT) carried out a feasibility study on this subject and developed an approach under the motto "Expensive software experts should only be used where they are really necessary". This method, which will allow us to manufacture Web questionnaires quickly, flexibly and – last but not least – extremely cost-effectively, is outlined in the following.

III. THE ST.AT SOLUTION: "AUTOMATISING SOFTWARE PRODUCTION"

6. The solution proposed in the study starts with the subject matter statistician, who uses a comfortable PC program, the so-called "e-Quest Metadata Manager", to specify the metainformation relevant to a survey. With this tool, the required questionnaires can be specified and designed. The specification is exported as metadata in XML format and is input into software production tools or generators which can produce – "at the push of a button" – a complete web-service-based Internet questionnaire application. Essential building blocks of the solution are – apart from the metadata already described – standardization, regulation and re-use of all components needed for the standard Internet application "Statistics Austria Web Questionnaires".

7. To define and standardize this Internet application type was of course the first step on which the targeted solution was founded. Its structure, construction rules, behaviour, security mechanisms, etc. had to be formulated clearly. We reduced the logical flow of a Web application for raw data collection to a general schema, implying that general components and interfaces could be extracted. Rules and regulations were formulated that determine and when necessary restrict function and appearance of the common tasks and elements of Web forms.

8. For the questionnaire itself, we defined standard patterns, not only for its appearance but also for its contents and behaviour, even including the technical objects required for implementation. Whenever possible, we referred to existing standards or adapted them.

9. A generally recognized principle for increased productivity and quality of any type of application is re-use of components that have already been developed and tested. We have tried to see the re-use principle in a wider context, which not only includes program components but also existing information and prerequisite patterns. One important aspect is the re-use of structural information, which has already been captured.

10. Based on the results of our Web study, we launched our current project in February 2003. We had previously become acquainted with the software product Web Services Accelerator (WSA) from the companies Software AG and CFC GmbH. This product already contains a generator which – given an UML model of the data which is converted to XML – creates appropriate Web services. It proved feasible to adapt the WSA generator to accept the e-Quest Metadata Manager XML format and to extend it to include not only the data content but also layout information and additional functionality. Thus we could start with concepts and components which have already proved themselves in actual use. In consequence, considerable project time and expense could be saved.

11. At present (January 2004) the complete production line is being tested and will be finalized shortly.

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