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**EUROPEAN COMMISSION
STATISTICAL OFFICE OF THE
EUROPEAN COMMUNITIES (EUROSTAT)**

**ORGANISATION FOR ECONOMIC
COOPERATION AND DEVELOPMENT (OECD)
STATISTICS DIRECTORATE**

Joint ECE/Eurostat/OECD meeting on the management of statistical information systems
(Geneva, 17-19 February 2003)

Topic I: Measures for the improvement of quality at the IT management level

SOFTWARE QUALITY FRAMEWORK

Invited paper

Submitted by Statistics Canada¹

Summary

1. As Canada's National Statistical Office, Statistics Canada has the responsibility for providing statistics of the highest quality to its clients. In order to ensure confidence in the quality of the information it produces, Statistics Canada has many policies and guidelines to help employees achieve this goal. The use of high quality Information Technology (IT) solutions is an important component of this effort.

2. Data quality has had much work done to describe its characteristics, but not much has been done in describing software quality. This paper provides an overview of software quality in Statistics Canada by presenting a general definition of software quality. It demonstrates the importance of quality characteristics and their dependencies. In addition, the paper describes the various perspectives of the stakeholders in software quality. It also shows how cost, schedule and product features impact the compromises made to software quality. We also consider techniques for improving the quality of the software developed and maintained at Statistics Canada. In addition, the paper describes other influences on software quality such as the following:

- data (the descriptive, spatial, numeric or logical values in the system);
- metadata (data that describes other data in the system);
- documentation (plans, procedures, manuals to help make use of the information);
- people (the persons that perform tasks associated with the system);
- hardware (the technology for processing and storing the information);
- software (the information that instructs the hardware how to perform particular tasks).

¹ Prepared by Matt Edgar, Mel J. Turner (Mel.Turner@statcan.ca) et al.

3. The quality of all aspects of an information system is crucial for our survival. To provide high quality information, Statistics Canada makes use of substantial investments in information technology (hardware and software). We spend significant portions of our budget each year on the development and maintenance of software. Therefore, a clear understanding of what defines software quality is critical to effectively delivering quality software solutions. However, software quality is not an absolute. It means different things in different situations. Regardless, we should strive to achieve high software quality.

4. Section II of this paper defines software quality in general terms to set the foundation for further discussion. A summary of software quality characteristics and their relationship to the Quality Framework applied to statistical outputs, given in Section III, helps support this definition. There are many perspectives to software quality; Section IV describes several possible views and illustrates how these viewpoints relate to one another.

5. Software quality is subject to a variety of constraints:

- The *cost* of the software is important to an efficient and effective government department, like Statistics Canada.
- The nature of conducting surveys implies very *strict schedules and timeframes* for successful implementation.
- The *complexity* or degree of difficulty in developing software is inherent in the complexity of our problem domains and the ever-increasing demands for high-quality products that support rapidly evolving technologies for information gathering, transformation and dissemination.

6. The description of these constraints in Section V includes a discussion for the necessity of compromises and priorities when deciding on quality objectives.

7. Once a software project is underway, there are many influences on the resulting quality. Section VI details the influence of people, process, product and technology on the quality of the software delivered to the clients. Section VII describes a brief list of some of the techniques that are available to improve the software Statistics Canada develops and maintains.
