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Topic (v): Year 2000 problem

THE TRANSITION OF STATISTICAL TECHNOLOGY TOWARDS THE YEAR 2000: PROBLEMS ENCOUNTERED AND ANTICIPATED

Submitted by Statistics Canada[1]

INVITED PAPER

I.   INTRODUCTION

1. The Year 2000 problem is real and if not addressed could affect all industries, all sectors and all countries. Ensuring that our statistical programs continue to operate without disruption in the period leading up to and through the Year 2000 continues to be one of Statistics Canada's highest priorities. To resolve the Year 2000 date problems, Statistics Canada is working on three main fronts:

- To ensure that systems are properly adapted and tested so that Statistics Canada can continue to supply the information required by its clients before, through and after the year 2000;
- To alert data suppliers and partners to the issue and negotiate arrangements that will ensure that data exchanges will continue to

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function through the year 2000;
- To take readings of the state of preparedness of Canadian businesses.

This paper will describe key elements of Statistics Canada's activities on these three fronts. The approach used, the issues faced and the lessons learned will be discussed.

II. PREPARING STATISTICS CANADA'S SYSTEMS

Organization and Awareness Building

2. A key distinguishing characteristic of Statistics Canada's approach to the Year 2000 issue has been the recognition from the outset that this is a business continuity problem and not just an informatics technology problem. The agency's senior management has stated that each program manager is responsible for ensuring that their program operates without interruption through the year 2000. Existing planning, budgeting, resourcing and reporting mechanisms have been used for Year 2000 projects. This has avoided time and dollar costs since new management processes did not have to be developed and reduced the burden on program managers to adapt to and use new processes.

3. The Informatics Committee approved the appointment of a departmental Year 2000 Coordinator in May 1996 in order to make an early start on building awareness of the problem across the agency and to co-ordinate our response and the preparation of concrete plans by the program areas.

4. The Informatics Committee also approved the formation of a Statistics Canada **Year 2000 Working Group,** composed of representatives from each major client area and from the two divisions of the Informatics Branch, in December 1996. The Terms of Reference for the Working Group are:
- To develop and maintain an information network extending to the division level.
- To identify, evaluate, recommend and promote the use of common approaches and software tools to assist in the Year 2000 conversion effort.
- To monitor contracts for application conversions in order to identify the most cost-effective methods and to avoid duplication and overlap.
- To monitor conversion efforts (both contracted and internal) to ensure orderly and successful implementation and to avoid inter-system incompatibilities.
- To provide advice and recommendations to the Year 2000 compliance testing teams on testing strategies, methodologies, facilities and timetables.
- To suggest changes to procedures or services that would benefit STC's efforts to ensure its systems function correctly in the period leading up to and through the year 2000.

5. In April 1997, the Corporate Planning Committee established a **Year 2000 Steering Committee** composed of Directors-General (DG's) from all areas and chaired by the DG, Informatics Branch in order to give broad management attention to the Year 2000 issue. The Steering Committee's Terms of Reference are:
- To ensure plans are developed and commitments are met for each program activity affected by the Year 2000.
- To suggest changes to policies, procedures or services that would benefit STC's efforts to ensure its systems function correctly in the

period leading up to and through the year 2000.
- To be the Steering Committee for the STC Year 2000 Working Group including review of project plans and progress at relevant milestones, resolution of conflicts, establishment of priorities among competing interests for resources, etc.
- To ensure that the plans of STC's data sharing partners (i.e., other federal government departments, provincial governments and private sector business partners) and STC's plans are synchronized to remove Year 2000 problems.
- To report regularly to the Corporate Planning Committee (senior management).

Overall Project Approach and Plan

6. Statistics Canada has structured its Year 2000 project plan into five (5) phases:
- Assessment
- Strategy & Planning
- Conversion/Replacement
- Testing
- Implementation

7. The successful completion of the Assessment phase relied upon three inventories, one of STC-developed application software (the Applications Software Register), one of purchased and STC-developed generalized software (the Software Toolbox) and one of hardware and network components (the Integrated Inventory System). As checklists, these inventories fulfilled dual functions, ensuring that no items were missed and that all items were assessed.

Statistics Canada Developed Software

8. An inventory of STC-developed software applications, the Applications Software Register (ASR), was built to maintain meta-data regarding each application, such as: its Year 2000 metrics (e.g., lines of code, number of modules, number of files, complexity, development language, etc.) and its Year 2000 planning data (e.g., planned start date of conversion, actual start date of conversion, planned completion date, and actual completion date). Each project leader is responsible to regularly update the information describing their applications.

9. By December 1996, each program area had largely completed the Assessment and Strategy & Planning phases (including milestones and timetables) of the hardware and software systems that contributed to their statistical program and had determined whether they would have problems coping with the Year 2000. As well, several pilot projects were carried out during 1996/97 to help identify the sorts of problems likely to be faced and to better estimate the resources required to fix them. Through the regular annual Long Term Planning (LTP) Process, program managers identified what additional resources they required for their Year 2000 projects, and the resources were allocated as requested starting with fiscal year 1997/98.

10. With the funding secured, work began in earnest in April 1997 on a wide number of fronts across all areas of the agency. There was some concentration on those applications where it was suspected the most problems would lie

(older legacy applications for example) but there were also some pragmatic decisions to proceed with review and repair of applications which were relatively easier to contract out.

11.Through the summer and early fall of 1997, it was decided to concentrate efforts on the applications which were judged to be most important to have ready early in the Year 2000, essentially key monthly and quarterly economic indicators. These **departmental "mission critical" applications** were given an accelerated set of milestones to allow for the timely resolution of problems and for full end-to-end testing.

12.A completion target date for the conversion of mission critical applications was set for September 1998 and their testing was to be completed by the end of December 1998. Due to interdependencies between several mission critical applications and the sequencing of testing, final testing for a small number of applications will not be completed until the first quarter of 1999. Our most recent "report card" from the area responsible for government-wide Year 2000 monitoring has put our progress on our mission critical applications at 88% completed.

13.Other applications which are not mission critical have a target date for conversion of mid 1999 and for testing of late 1999, but in many cases it has been practical to already convert and, in some cases, test these applications as well.

14. Thus, overall progress has been fairly good. Only about 10% of our applications remain to be converted and up to another 30%, which are believed to be compliant based on a review of their code, remain to be tested. Likely, we will not succeed in testing all of these by the time the Year 2000 arrives but we do not feel that we are running a great risk if we do not test them all.

15.Testing is the most costly phase of a Year 2000 project, possibly consuming 50% or more of a Year 2000 project's budget. The major cause of this high cost is that tests must be repeated for each of the key dates. After each test, the clean pre-test environment must be re-created and the data and transactions aged to synchronize with the next test date. This process must be repeated for each test date. The complexity is increased when distributed client-server architectures are involved.

16.In October 1998, the "Government of Canada Date Test Standard for Year 2000 Compliance" was issued. It contains a list of twelve (12) mandatory test dates to be used throughout the Canadian government as a baseline to obtain consistency of approach.

17.In addition to the mandatory dates, most applications will require other dates to be tested for Year 2000 compliance, depending upon the functionality of the application. Examples of such application specific dates would be: the start of new fiscal years for government budgetary transactions, the definition of the reference period for a statistical data collection or dates used in particular editing routines.

Inventory of Commercial Software (Software Toolbox)

18.The Software Toolbox identifies STC-developed generalized software and commercial software products in mainstream use at Statistics Canada. It also identifies the Support Centres that have taken responsibility for providing

in-house support. Each Software Toolbox entry includes the product's level of Year 2000 compliance. Each Support Centre is responsible for keeping their product information current, for preparing plans for upgrades or replacement of products that are non-compliant and for informing users of non-compliant versions of the risk they are taking.

19.As well, the Government of Canada, through the department responsible for procurement, has contacted all vendors of hardware and software to ascertain the Year 2000 status of their products. They have compiled information about each product as to which versions will be certified as "Year 2000 compliant" and when those versions will be available if they are not already available. The information is posted on that department's Web site and is regularly mirrored on our Intranet.

Inventory of Hardware (Integrated Inventory System)

20.Statistics Canada has a very diverse computing environment including a mainframe, a variety of UNIX and NT-based servers, and workstations. Depending upon the security of the data handled, workstations can connect to an internal confidential network (Network A) or a separate non-confidential network, which also has connections to the Internet (Network B).

21.The Integrated Inventory System maintains information on each item of computing hardware such as the acquisition date, purchase or lease information, costs, source, serial number, warranty dates, physical location and the internal "owner". Managers of shared centrally-managed infrastructure such as the mainframe, the networks and some multi-purpose servers are responsible for ensuring that infrastructure is Year 2000 compliant.

22. Divisions are responsible for ensuring that their local computing environments (individual servers and workstations) are Year 2000 compliant. Since many server configurations are fairly unique, the Server Support Section has established specific bilateral support agreements for services beyond the basic level, and so will be supporting divisions according to those agreements. For all users, including those receiving only the basic level of support, the Section is preparing a clear statement of the status of vendor Year 2000 compliance of the hardware and software used.

23.For workstations, a systematic program of testing the hardware, BIOS, and operating system of each machine and affixing a sticker indicating the Year 2000 compliance status of the machine has just begun. Each LAN Administrator is being provided with testing software, procedures, and stickers for this purpose and is being trained to carry of this review.

24.In some program areas where heavy use has been made of workstation software in statistical programs, testing has also extended to the applications (spreadsheets, word processing macros and personal data management systems) used in these survey processes especially for those that contribute to mission critical programs. It has been our experience that there is a real danger of overlooking these individually developed applications if one is not rigorous in considering all components of the survey process, from start to finish.

Non-Statistical Technological Infrastructure

25.The Administrative Support Services Division (ASSD) of Statistics Canada provides a wide variety of physical infrastructure services at Headquarters

and the Regional Offices. ASSD is responsible for ensuring that any support systems for these services will be Year 2000 compliant. More specifically, ASSD is the area responsible for liaison with our primary landlord, Public Works and Government Services Canada, and with other commercial landlords to ensure that they are taking the proper steps to have fully functioning climate controls, water services and elevator services, to name a few. Other issues being addressed by ASSD are: automated office design services, internal automated premises maintenance or security systems, photocopy and fax equipment, automated systems for contracts and materiel services, communications services and equipment, document management services, distribution services for internal and external mail and publication distribution.

III. DATA INTERFACES

26. The objective of Statistics Canada's work on this front is to alert data suppliers and partners to the Year 2000 issue and negotiate arrangements that will ensure that data exchanges will continue to function through the year 2000.

27. Statistics Canada plans to concentrate its efforts on the sub-annual survey business respondents. Beginning in January 1999, every envelope leaving Statistics Canada will carry a message reminding the respondent of the Year 2000 issue and directing them to contact Statistics Canada for more information either on our Internet web site or by telephone. The plan is also to add questions, particularly in telephone surveys or follow-up, over the next several months asking respondents whether they will have difficulty responding to our data requests because of the Year 2000 issue. Our Key Provider Managers will raise the issue with their clients (the largest enterprises). Finally, our staff will be encouraged to raise the issue at all upcoming meetings that they attend of industry associations.

28. Statistics Canada has fully mapped out all the data dependencies inherent in the System of National Accounts and has established bilateral understandings with the key data suppliers and contingency plans in case of missing data. Similarly, we are in the process of discussing mutual preparedness with other government departments, at all levels, on whom we depend for a wide variety of data inputs.

IV. PREPAREDNESS OF CANADIAN BUSINESSES

29. The third front on which Statistics Canada is addressing the Year 2000 issue is to assess and report on the level of preparedness of Canadian businesses.

30. In November 1997, Statistics Canada conducted a first survey on Preparedness of Canadian Business for the Year 2000 to assess Canadian businesses understanding of the Year 2000. This survey helped raise awareness of the issue and provided the federal government with key benchmarking information. Results were published in the December 8, 1997 issue of *The Daily*.

31. In May 1998, Statistics Canada conducted a follow-up survey to assess what progress businesses had made against the Year 2000 computer problem. The follow-up indicated that virtually all firms (99%) reported being aware of the so-called "millennium bug" and about 70% said they had taken steps to prepare their systems for it. The survey identified as risks: the fact that

significant portions of businesses did not expect to achieve Year 2000 readiness until after June 1999, the potential for legal challenges resulting from Year 2000 problems and the potential for interruptions in the delivery of the externally-provided goods and services that firms require to operate. Results of Survey 2 were published in the July 6, 1998 issue of *The Daily.*

32. Statistics Canada is carrying out a third survey for release in early 1999. It will also probe the preparedness of suppliers of key inputs and infrastructure to businesses.

V.   COMMUNICATIONS STRATEGY

33. In mid 1997, Statistics Canada started to prepare its communications strategy. The strategy has evolved as the focus of concern has since changed. The initial strategy concentrated on identifying the key players, their roles and responsibilities and developing a consistent message and its delivery.

34. By mid 1998, the communications activity was focussed on inquiries about the general status of the agency's Year 2000 preparedness. The number of requests increased steadily, from 30 in the first six months of 1998 to about 5 per week as 1998 draws to a close. The nature of the questions shifted to be almost exclusively about the compliance of <u>specific</u> Statistics Canada products.

35. Statistics Canada's policy is not to certify or warrant that a product is "Year 2000 compliant". Instead, Statistics Canada reports on the actions it has taken to address the Year 2000, any information we have about the compliance of vendor-supplied underlying hardware and software and the results of any Year 2000 tests that have been conducted.

36. In a message to all Statistics Canada employees at the beginning of 1999, the Chief Statistician reported on the progress to date and assured them that if the effort continues unabated and baring unforeseen circumstances, Statistics Canada should be able to meet its commitments and publishing dates up to, through and after the Year 2000. His message also included information sheets and the address of Internet and Intranet web pages with information to assist employees in answering general inquiries and advice on the procedures for referring inquiries on specific products and media requests to the official departmental spokesperson, who is the Director-General, Informatics Branch.

37. In the January to April 1999 timeframe, over 400,000 pieces of mail leaving Statistics Canada will carry an awareness message on the envelope and provide a phone number and Internet web site address where more information is available. As well, inserts with a more detailed message will be included in mailings where possible.

38. As the communications strategy evolves, we are keeping it synchronized with overall Government of Canada messages which aim:
- to continue to raise awareness of all Canadians
- to clearly communicate the progress and status of preparedness of departments and agencies
- to ensure remedial action is initiated by businesses and other partners
- to ensure that contingency planning is taken seriously but that panic is not created.

VI.   LESSONS LEARNED AND CONCLUSIONS

39.Statistics Canada has adopted a decentralized approach that has relied as much as possible on existing management processes. This has allowed the focus to remain on the task to be completed. It required that the entire organization become engaged in addressing the challenge and that the program areas take responsibility for this as a critical business continuity issue. Organizational momentum was initially a little slow to build but once the most senior management realized the magnitude and seriousness of the problem, progress has been impressive.

40.The estimate in late 1996 for our Year 2000 projects was in the range of $14 million Canadian, including the cost of a few selected program redesigns which would simultaneously resolve the Year 2000 problem. Since then, the estimate has increased to $20 million Canadian, primarily due to the discovery of additional systems that needed fixing, more extensive testing requirements and unforeseen problems. As well, as the Year 2000 became the organization's highest priority, discretionary projects were delayed and resources were shifted to Year 2000 projects. In 1996, Statistics Canada established multi-year contracts that fixed consultant rates and gave some guarantee of supply. To date, these efforts have mitigated the effects of any IT skills shortage.

41.The completion of the Assessment Phase resulted in up-to-date inventories of hardware, third-party commercial software and custom software developed internally. These databases are accessible by all project leaders and have proven useful for other planning efforts. The value of having a registry of production applications is now widely recognized. There is a growing impetus to develop an expanded registry and explore the use of source code control libraries supporting multiple hardware platforms. If there is a silver lining to the Year 2000, it lies in the far more extensive knowledge of exactly what systems we have, the precise programs they support and the interdependancies of our various programs. It also lies in being able to "take off the books" some 300 old applications that in some cases were not even being used in current production.

42.The Testing Phase is not completed and there remain some open issues. The isolated test environments are difficult and costly to build, yet necessary in many cases in order to mirror the decentralized nature of the actual survey processes. It has been and will continue to be difficult to engage subject matter staff in the testing process when they are preoccupied with the production of the on-going statistical program. Our focus is just now turning to the testing of products (data files & CD-ROMS that bundle software with data).

43.Although most of our "mission critical" systems have been converted and tested, there is still considerable work ahead to address the non-mission critical systems and to prepare for contingencies.