



# AUDITOR GENERAL'S REPORT ACTION REQUIRED

## Electronic Data – Standardizing Data Formats Across City Information Systems

<b>Date:</b>	January 9, 2012
<b>To:</b>	Audit Committee
<b>From:</b>	Auditor General
<b>Wards:</b>	All
<b>Reference Number:</b>	

### **SUMMARY**

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The City stores large amounts of data electronically in many different information systems. Often created independently of each other, data is stored in different formats making the sharing of data across systems very difficult. Having different data formats obstructs the ability of the City divisions, agencies and corporations to perform consistent reporting and analysis required for making operating decisions.

Establishing uniform data standards at the City, its agencies and corporations would reduce conflicting data formats, improve the efficiency and effectiveness of data analysis and reporting, and possibly reduce the number of data stores containing the same data.

### **RECOMMENDATIONS**

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**The Auditor General recommends that:**

1. City Council request the Chief Information Officer and the City Clerk to review current data standards and, in consultation with City divisions, develop a plan for implementing uniform data standards across the City.
2. City Council request the Chief Information Officer and the City Clerk to recommend the data standards to City agencies and corporations for adoption.

## **Financial Impact**

Establishing uniform data standards will require some initial staff effort leading to future efficiencies. The net impact on staff resources and the future efficiencies cannot be determined at this time.

## **COMMENTS**

The City, like virtually all organizations today, records, stores, analyzes and reports on significant volumes of data. Of necessity, data is maintained in numerous different information systems used by City divisions, agencies and corporations. Increasingly, this information is being shared between systems for various operating and reporting purposes.

For the most part, information systems are developed to meet specific operational needs. This has led to similar data being stored in different formats, complicating subsequent communications between systems. Resolving the conflicts in commonly used data between different systems often requires significant programming and analytical effort. Establishing uniform data standards throughout the City and its agencies and corporations, although requiring significant initial work, would reduce future programming and analytical efforts and streamline City operations.

The City also shares data with major partners such as the Province of Ontario. Any uniform data standard adopted should consider the need to efficiently communicate with systems of major third-party partners where such communication requirements are extensive.

## **Examples of Common Data**

Examples of data common to various systems across the City include names, addresses, birth dates, contact numbers, etc. The different formatting possibilities for a specific date are indicative of the potential for conflicts in sharing information between systems. For example, the following are just a few formats for recording the date August 31, 2012:

8/31/12  
8/31/2012  
31/8/12  
31/08/12  
Aug 31 2012  
Aug 31, 2012  
August 31, 2012

Likewise, there are many different formats of the name John Smith, for example:

John Smith  
Smith, John  
Mr. Smith  
Mr. John Smith  
Mr. J. Smith  
J. Smith

A full list of possibilities is significantly longer but the lists above provide an indication of the potential for different ways of recording something as simple as a date and a name. Similar differences exist for addresses, telephone numbers and a wide range of other data.

## **Why Uniform Data Standards Are Needed**

In reviewing the different ways for recording August 31, 2012 noted above, an individual can easily determine what is meant by each of the different formats. This is not so straightforward in different computerized systems that have each been programmed to recognize a date in a specific format. These differences create problems that require intervention by programmers, data analysis staff or operational staff when information is being shared, imported, compared or analyzed between systems. The increasingly recognized solution to these problems is to establish uniform data standards throughout and, where appropriate, between entities.

This problem is not unique to the City of Toronto. The need for uniform data standards has been recognized for some time and many organizations have done significant work to establish and implement the concept. National and international organizations such as the National Institute of Standards and Technology, the U.S. based Centers for Disease Control and Prevention and the International Standards Organization have very detailed documentation on data standards. Within the City's own partners, the Province of Ontario has developed its own uniform data standards. The availability of this existing body of work will reduce the efforts required by City staff to advance towards the goal of implementing uniform data standards.

We do note that this issue is being addressed to a certain extent at the City. We have been advised that the City Clerk's Office is currently developing a common data elements standard for City business forms, and is working with the Information Technology Division to implement this standard in pilot divisions as part of the electronic forms capital project. Also in progress at the City is the Data Inventory. The Data Inventory identifies all of the data stores located at the City. The purpose of this exercise is to discover where different data resides, identify duplicate and not standard data formats and use as a tool to assign data stewardship. While this is a good start, significant additional effort is required to achieve full uniform data standards. It is understood that immediate implementation of uniform data standards would be costly and disruptive. To mitigate this, it is expected that the standards would first be developed and then implemented on a phased basis to ensure the project is manageable and cost-effective.

Management's response to our recommendations is attached as Appendix 1 to this report.

## **CONCLUSION**

Development of uniform data standards for common data elements will improve operational efficiency and reduce costs for data integration and analytics. It will create an open and standard information technology environment that will promote data integrity and consistency in information management and technology.

## **CONTACT**

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## **SIGNATURE**

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Jeff Griffiths, Auditor General

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## **ATTACHMENT**

Appendix 1: Management's Response to the Auditor General's Review of Electronic Data – Standardizing Data Formats Across City Information Systems