

## 8

### SERVER BASED COMPUTING (SBC)

**The Finance and Administration Committee recommends the adoption of the recommendations contained in the following report, April 13, 2004, from the Commissioner of Finance:**

#### 1. RECOMMENDATIONS

It is recommended that Finance and Administration Committee and Council:

1. Endorse the option to provide, where appropriate, thin client desktop equipment and a server based computing facility instead of a new PC when existing PC equipment becomes due for replacement.
2. Authorize staff to negotiate with Infostream to acquire the thin client desktop equipment under the existing Infostream agreement.
3. Authorize staff to negotiate with Hewlett Packard Leasing, to lease the thin client desktop equipment from Hewlett Packard Leasing under the existing HP leasing agreement and to lease the thin client desktop equipment for a 72 month lease term.

#### 2. PURPOSE

The purpose of this report is to provide the results of implementing a pilot for Server Based Computing (SbC) at York Region; to request authorization for the server based computing initiative and to request authorization to acquire, lease and deploy thin client desktop devices with LCD monitors in support of the server based computing initiative.

#### 3. BACKGROUND

Regional Council, at the June 12<sup>th</sup>, 2003 meeting, referred back to staff the Server Based Computing report with the following amendment:

- “1. Staff be authorized to proceed with a small purchase of computer hardware to undertake a test project on Server Based Computing; and*
1. *Staff prepare a report for consideration by the Finance and Administration Committee, with the report to contain: an evaluation of the test project; an assessment of the technical issues surrounding the conversion to server-based computing; a full evaluation of the costs, including server upgrades, network, administration and conversion costs;*
  2. *A user survey be undertaken to evaluate staff reaction; and*

3. *Area municipalities such as Richmond Hill, Vaughan and Markham be asked for comments on this proposed conversion.”*

In response to Council’s direction, staff undertook a two part study to determine the appropriateness of the server based computing model. In part one, KPMG LLP, an independent consulting firm was retained to review this key IT direction. KPMG conducted a survey of Region staff to determine if server based computing is a feasible alternative for the Region’s computer users. In addition to recording the responses from 188 Region staff, KPMG ‘s report addressed the following:

1. Is it technically appropriate to implement server based computing at the Region?
2. Is server based computing a cost efficient approach?
3. Is server based computing a culturally feasible approach for the Region?

In part two; staff conducted a pilot implementation of server based computing involving fifty Region staff, beginning on November 1<sup>st</sup>, 2003 and ended March 31<sup>st</sup>, 2004. The pilot confirmed that server based computing is a feasible and cost saving approach for the Region. Section 4.5 of this report provides the details of the pilot.

### **3.1 Server Based Computing (SbC) model**

The Server Based Computing (SbC) model is technology that executes applications remotely on a server. Thin Client systems containing a display screen, mouse and keyboard, and little else (no hard drive) are used to access all applications. All the software and applications are stored on the server in a central location. Access to the server can be provided by numerous methods, including internal corporate networks, dialup access, and the Internet. Although, in many ways SbC resembles the mainframe-dumb terminal model utilized in years past, SbC is quite different. The average user of the old mainframe would access applications using a “dumb” terminal with a green screen and no graphics. This system was not very intuitive and many applications required the use of special function keys whose function had to be learned. SbC is something completely different. SbC uses computing technology allowing a user to take full advantage of the Windows operating environment, which gives them full access to the entire suite of Windows-based products and other applications. In many cases staff do not even know that they are using something different. They are using the same type keyboard and mouse and the same applications.

## **4. ANALYSIS**

### **4.1 Overview of KPMG Findings**

KPMG determined that most organizations are moving to some form of managed workstation environment. This is true whether they choose to implement server based computing or managed desktops. The industry experience is that the unmanaged desktop:

- has become too expensive from the point of view of support
- has resulted in lost productivity due to time required to resolve problems
- has the risk that unlicensed software may be installed on desktop devices
- has the disadvantage that data on desktop devices may not be protected from being lost
- has the potential that confidential data on desktop devices may be compromised

**Key Findings:**

1. KPMG believes there is a strong case to implement server based computing at the Region.
2. KPMG reviewed the technical merit of implementing server based computing at the Region. KPMG concluded that the Region computing systems are ready for implementing server based computing.
3. KPMG reviewed the proposed redundancy level for implementing server based computing. KPMG concluded that the Region computing systems have the appropriate redundancy for implementing server based computing, however, KPMG identified areas where redundancy can be improved. ITS will implement redundancy where appropriate to ensure maximum uptime for staff.
4. KPMG reviewed the cost associated with implementing server based computing at the Region. KPMG concluded that the “implementation cost [of server based computing] should be less than the ongoing refresh cost [of a traditional desktop PC]”. Section 5 of this report provides a detailed cost analysis using actual results concluded from the pilot.
5. KPMG reviewed the cultural feasibility of implementing server based computing at the Region. KPMG has concluded that implementing server based computing at the Region “will benefit the employee”.

**4.2 ITS Action Plan in Response to KPMG report**

ITS fundamentally agrees with the findings indicated in the KPMG report. Below are action items regarding some of the KPMG key points:

1. To better understand the needs of the client community ITS conducted a comprehensive pilot of server based computing. Section 4.5 of this report provides the results of the pilot.
2. The survey administered by KPMG concludes that staff are inappropriately installing software which may cause serious exposure for The Region due to unlicensed software installation. Implementing server based computing will eliminate this problem. ITS is responsible for ensuring that the correct levels of application licensing is in place and the Region could be found liable if unlicensed applications are

installed. The survey administered at the end of the pilot indicated that 94% of staff that participated on the pilot believe that server based computing using thin client devices is an appropriate alternative to the desktop PC.

3. Section 5 of this report analyses the total cost associated with implementing server based computing compared to the cost of implementing the equivalent desktop computers.
4. ITS plans on addressing the concerns raised by KPMG by implementing the recommended additional network redundancy. The Region is currently and has been dependant for years upon the Region's network to enable the efficient delivery of its existing services. This dependency is illustrated by the following list of applications utilized daily by Regional staff. If the network is down then these services will not be available. ITS believes that the Region's network is extremely reliable with a 98% availability. Implementing the enhancements indicated by KPMG will serve to create an even more reliable networking infrastructure.

| <b>Applications Dependent On the Region's Network</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Trapezes FX Transit Scheduling System</li> <li>• Transview Specialized Transit Scheduling System</li> <li>• PBSIV Fleet Management System</li> <li>• Geoware Solid Waste Management System</li> <li>• On-line Sign Permit Application and Payment System</li> <li>• Road Maintenance Management System</li> <li>• Traffic Data Management System</li> <li>• Telephone system supporting 9-1-1 call taking</li> <li>• Peoplesoft Payroll</li> <li>• Peoplesoft Financial Records and Reporting</li> <li>• Peoplesoft Budget Planning</li> <li>• Peoplesoft Human Resources</li> <li>• LTC, CTS Client Tracking System.</li> <li>• LTC, MAINBOSS Hospital-based Inventory/Asset Management System</li> <li>• LTC, GOLDCARE Patient Accounts Management System</li> <li>• Infectious Diseases Control, IRIS Immunization Record Information</li> </ul> | <ul style="list-style-type: none"> <li>• ISCIS Integrated Services for Children Information System</li> <li>• HEALTHYBABIES New-born Assessments, Referral and Treatment Tracking</li> <li>• Dental, CINOT Children in Need of Treatment</li> <li>• EMS, EMSLAN EMA Call Tracking</li> <li>• EMS, ARIS Ambulance Reporting Information System</li> <li>• Health Protection, HITS Health Information tracking System</li> <li>• EMS, ScheduleSoft Paramedic scheduling</li> <li>• Infectious Disease Control, SARS Database</li> <li>• EMS, AVL Automated Vehicle Locator</li> <li>• Social Assistance, SDMT Social Assistance Service Delivery Model Technology</li> <li>• Child &amp; Family Services, CCMS Child Care Management System</li> <li>• Housing, YARDI Property Management System</li> <li>• YORKLINK Online Directory of</li> </ul> |

|                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>System</p> <ul style="list-style-type: none"> <li>• Infectious Diseases Control, BIOS Biological Inventory System</li> <li>• Infectious Diseases Control, RDIS Reportable Diseases Information System</li> <li>• Health Protection, CISS Computerized Inspection Service System</li> </ul> | <p>Community Services</p> <ul style="list-style-type: none"> <li>• ICON Provincial Offences Court System</li> <li>• Online POA Fines Payments</li> <li>• Word-processing, Spreadsheets, E-mail and Calendaring</li> <li>• Hosting of the Region's Web Site</li> </ul> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### 4.3 Comments from Other Organizations

City of Vaughan – Comments provided on August 22<sup>nd</sup>, 2003

*“The intent of server-based computing environments is to enable access to applications from personal computing devices where such devices do not have the processing capacity to run the application, or where the network bandwidth does not allow for high volumes of data to be exchanged. The City of Vaughan does not have such contentions. The City's personal computer inventory is quite up-to-date, and its network environment supports high bandwidth applications in all its administrative and community centres facilities.*

*Server-based computing, in general, creates a risk for single point of failure on the server or shared components. Such systems environments are in conflict with the City of Vaughan's IT strategy to deploy and support highly reliable systems with minimum business interruption in case of failure.*

*Based on the fact that Vaughan has no need for server-based computing solutions, and that such solutions would be in conflict with the City's overall IT strategy, such solutions are not currently deployed.”*

IT Director – City of Vaughan

#### 4.3.2 Town of Markham – Comments provided on August 21<sup>st</sup>, 2003

*“The culture at the Town of Markham has been to allow clients to manage their own desktop. When a lock-down has been tried, it has not been readily accepted. The placement of applications on servers has some performance impact. Markham has defined server based computing to support remote users only. They do not see it as a strategy to replace desktop computers and/or reduce the cost of ownership. Functionality for e-mail and Microsoft Office would appear to be fine. Functionality of other applications requires more study. This has resulted in the potential for limited implementation of server based computing at this time. They are not considering wide implementation because of possible performance issues. They had considered implementing server based computing for support of the Town's call centre, which*

*involves about 15 staff, however, based on performance issues, decided against it. At the present time, the impact of a wider implementation on internal resources, which would take away from other priorities, is not contemplated.”*

IT Director – Town of Markham

#### **4.3.3 Town of Richmond Hill – Comments provided on August 26<sup>th</sup>, 2003**

*“The Town of Richmond Hill has been using a server based computing solution for remote users. Fifty users are able to access e-mail, the Lotus SmartSuite and Town's financial system though the usage is not frequent. The Town of Richmond Hill is using dial-up technology to access remote servers. Bandwidth has been an issue.”*

IT Director – Town of Richmond Hill

#### **4.3.4 City of Toronto – Comments provided on March 30<sup>th</sup>, 2004**

*“Staff at the City of Toronto expect to implement thin client devices to 1000 users in 2004/2005. Thin Client devices will replace desktop computers in a phased approach once desktop computers are due to be replaced. Departments will have an option to select a desktop computer or the lower cost thin client alternative during the budget cycle. City of Toronto has been using thin client devices in the Parks and Recreation Department for a number of years with great success. Tests have concluded that applications perform better in the server based computing environment compared to the current inventory of desktop computers.”*

Manager – Infrastructure & Operations – City of Toronto

#### **4.3.5 Government of Alberta – Response provided on August 22<sup>nd</sup>, 2003**

The Government of Alberta (GOA) is in the process of implementing a government-wide integrated server-based computing platform. The GOA and the Region of York have similar high level requirements. The major difference is the GOA requires server based computing environment to support 20,000+ devices whereas the Region of York may require an environment supporting only 1132 devices. GOA requirements include:

1. A high level of security - the GOA requires that levels of security and authentication to enterprise applications are equivalent to that which is provided at local workstations and can be extended over the Internet without compromise.
2. Remote access functionality and performance - the GOA requires a full-featured remote access (functionally equivalent to local workstations) to any application quickly and without compromise over the Internet.
3. A mobile workforce must have the ability to connect to the GOA enterprise from any location with consistent security and performance.

4. Centralized administration - Corporate data must stay in a centralized location protected from loss. The server-based model must provide a centralized, end-to-end manageability of systems, data, and users that can accommodate rapid deployment of applications, including the ability to web-enable applications without rewrites.
5. Enterprise scalability - the GOA requires a solution that could potentially scale across a network of 20,000+ devices.
6. Business continuity - the GOA also requires a business continuity solution that can provide duplicate, synchronized services that will ensure uninterrupted access to enterprise applications and data in the event of planned or unplanned systems outage.

#### **4.5 Results of the Server Based Computing Evaluation Pilot**

The server based computing evaluation pilot had the following three main objectives:

1. Determine if a server based computing environment using thin client devices is appropriate for the Region of York.
2. Determine the staff that can benefit from using SbC (Target Audience.)
3. Establish the total cost of ownership (TCO) of thin client devices versus the desktop PC's at the Region of York. Section 5 of this report provides a financial analysis.

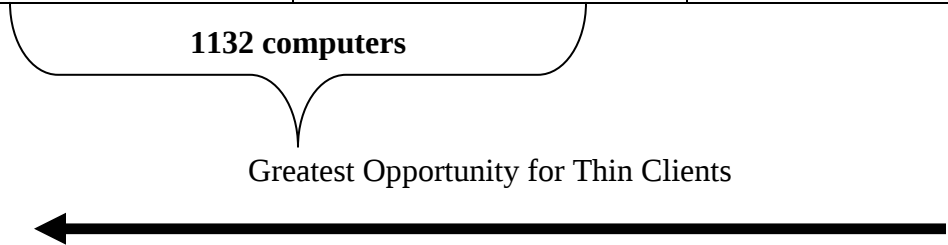
Fifty staff representing Health, Community Services and Housing, Transportation and Works, Finance, and the Corporate Services departments had their desktop PC replaced with a thin client device. Between November 1, 2003 and March 31<sup>st</sup>, 2004 staff used a thin client device to access all their applications. Fifteen additional staff used the server based computing environment to work from home or from other office locations using a desktop computer. An additional seventeen staff in Transportation and Works access "RIMS" a geospatial application using their desktop computer.

ITS administered a survey to staff involved in the pilot to determine their experience). The following is a brief summary of the results of the survey:

- 94% acceptance of the server based computing environment among pilot participants
- Changing the desktop background or the screen saver is not significant to staff and this does not impact staff in performing their day to day duties. Staff will accept this with reservation.
- Storing data to a local hard drive or floppy is not significant to staff. Staff realize that storing their data to the network is more secure and reliable.
- Performance during the pilot was acceptable to staff. Performance of the "RIMS" application significantly improved using the server based computing environment.
- Applications operated as expected.

- The flexibility offered by the system is important to staff. Nurses, Child Care Workers, Early Child Intervention Workers, Managers and other staff feel that the ability to access all their applications from any location is a feature that is very important to them.
- Staff believe that server based computing using thin client devices is an appropriate alternative to the desktop computer.
- Analysis of network usage concluded that staff using thin client devices required 18% less network capacity than desktop computer users.
- During the pilot the server based computing environment had a 100% uptime. Load balancing across a server farm ensure this result.

The chart below provides a profile of staff that can benefit from using a server based computing environment with thin client devices. It is not recommended to deploy thin client devices enterprise wide. Deploying judiciously throughout the enterprise is the best practice. The experience from the pilot combined with an analysis of the refresh cycle of desktop computers at the Region concludes that 1132 computers can be replaced with thin client devices over the next 4 years. 89 Thin Clients can be implemented in September 2004 (additional to the 50 in the pilot), 181 in 2005, 680 in 2006, and 182 in 2007.

| <b><i>User Profiles for Thin Client Devices</i></b>                                                                                                                                                                   |                            |                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------------------------------|
| <b>Task and Structured Workers</b>                                                                                                                                                                                    | <b>Knowledge Workers</b>   | <b>Workers that require a PC</b>   |
| Administrative Clerks                                                                                                                                                                                                 | Analysts                   | Lawyer                             |
| Customer Service Representative                                                                                                                                                                                       | Administrative Assistant   | Paralegal                          |
| Registered Nurse                                                                                                                                                                                                      | Consultant                 | Programmer                         |
| Long Term Care Staff                                                                                                                                                                                                  | Director                   | GIS Developer                      |
| Early Interventionist                                                                                                                                                                                                 | Manager/Supervisor         | Web Developer                      |
| Child Services Representative                                                                                                                                                                                         | Technical Writer           | Engineers                          |
| Resource/Kiosk                                                                                                                                                                                                        | Planner                    | Financial Analyst                  |
| Switchboard/Receptionist                                                                                                                                                                                              | Research Assistant         | Communication Specialist           |
| Social Assistance Worker                                                                                                                                                                                              | Educator                   | Document Specialist                |
| Facilities Planner                                                                                                                                                                                                    | HR representatives         | Design Technologist                |
| Tenant Services Coordinator                                                                                                                                                                                           | Eligibility Review Officer | Infrastructure and Operation Staff |
| <p style="text-align: center;"><b>1132 computers</b></p> <p style="text-align: center;">Greatest Opportunity for Thin Clients</p>  |                            |                                    |

## 5. FINANCIAL IMPLICATIONS

Server Based computing could realize savings of \$5,795,937 over a four year period. This is attributable primarily to the thin client desktop equipment having a lifespan of 6-years compared to the PC with a life span of 3-years. The servers which the Region uses today to support PC's have a 5-year life cycle. The servers which the Region will require to support server based computing will also have a 5 year life cycle.

Staff completed a detailed technical analysis of server based computing based on a 4 year rollout strategy (see Council attachment 1). The detailed analysis included a comprehensive list of assumptions based on staff's experience with both the traditional desk top environment and the experience gained from the pilot. The technical analysis also traced all costs for each of the four year's rollout. The table below provides a

summary which compares implementing a server based computing configuration of 1132 thin client devices versus implementing 1132 conventional PC desktop devices.

| <b>Cost/Benefit Summary</b><br><b>Total Cost of Ownership</b><br>(hardware, software and operational cost)<br><b>Server Based Computing</b><br>vs.<br><b>Desktop PC</b> |                   |                                   |                             |                               |                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------------------------|-----------------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------|
| Year                                                                                                                                                                    | Number of Devices | Server Based Computing (SbC) Cost | Traditional Desktop PC Cost | Savings When Implementing SbC |                                                                                                           |
| 2004                                                                                                                                                                    | 89                | \$1,108,420                       | \$ 1,133,749                | \$ 25,329                     |                                                                                                           |
| 2005                                                                                                                                                                    | 107               | \$ 839,717                        | \$ 1,363,047                | \$ 523,330                    |                                                                                                           |
| <b>Break Even Point (in 2005 at 196 devices)</b>                                                                                                                        | <b>196</b>        | <b>\$1,948,137</b>                | <b>\$ 2,496,796</b>         | <b>\$ 548,659</b>             | <b>&lt;-break even point (pilot investment of \$546,034 – Council Attachment 2 provides cost details)</b> |
| 2005                                                                                                                                                                    | 74                | \$ 512,790                        | \$ 942,668                  | \$ 429,878                    |                                                                                                           |
| 2006                                                                                                                                                                    | 680               | \$4,804,933                       | \$ 8,662,356                | \$3,857,422                   |                                                                                                           |
| 2007                                                                                                                                                                    | 182               | \$1,358,476                       | \$ 2,318,454                | \$ 959,978                    |                                                                                                           |
| <b>Total</b>                                                                                                                                                            | <b>1132</b>       | <b>\$8,624,336</b>                | <b>\$14,420,274</b>         | <b>\$5,795,937</b>            |                                                                                                           |

## 6. ADMINISTRATIVE IMPLICATIONS

There are both positive and down side implications for the recommended server based computing option as delineated throughout this report. These are summarized below.

### Benefits:

- Server Based computing is a lower cost alternative to the desktop PC.
- Server Based Computing supports the goals of corporate records management.
- Server based computing facilitates ease of access for staff working from home. (The Region is currently investigating a tele-work (work from home) policy. Server based computing will be essential to provide “work-from-home” employees with the same experience as being in the office.)

- Server based computing encourages the employee to use technology for business purposes. (Staff will not be able to load unstable software, screen savers, or change the desktop background. These activities usually cause an increase in help desk calls and increase in staff downtime. Server based computing resolves this concern.)

**Down Sides:**

- Not everyone can use Server Based computing. Some staff will still need a desktop PC.
- Staff will not be able to use the system if the network or server goes down.
- Information Technology Services requires server based computing expertise to manage the new environment.
- Staff cannot customize their electronic desktop.

**7. LOCAL MUNICIPAL IMPACT**

There are no local municipal impacts associated with this report.

**8. CONCLUSION**

Staff that participated in the server based computing evaluation pilot believe that server based computing using thin client devices is an appropriate alternative to the desktop computer. Survey of the participants indicated a 94% acceptance for server based computing using thin client devices.

KPMG LLP believes there is a case to implement server based computing at the Region. The planned phased implementation approach will ensure quality and provide for the confirmation of assumptions.

The Regional Municipality of York can realize substantial cost savings of **\$5,795,937** over four years by implementing a Server Based Computing system alternative to the Desktop PC. The Regional Municipality of York currently employs the managed desktop model. However, to fulfill corporate objectives for fiscal prudence while providing a high level of customer service, the Region should implement a sever based computing Model where appropriate.

The Senior Management Group has reviewed this report.

*(A copy of the attachment referred to in the foregoing is included with this report and is also on file in the Office of the Regional Clerk.)*