

City of Ottawa

Technology Roadmap

2012-2015

November, 2011
Information Technology Services

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Message from the CIO

The City of Ottawa Technology Roadmap responds to the challenge of transforming the way municipal government operates and helping the organization deliver on Council's commitment to Service Excellence. The Roadmap aligns to the Term of Council Vision of "Over the next four years, the City of Ottawa will increase the public's confidence in city government and improve resident, enterprise, and visitor satisfaction with City services". This represents a business driven road map tightly aligned with the City strategy map and term of council vision. With the tabling of the 2011 budget, Mayor Watson announced the "Service Ottawa" Program, a major business transformation initiative which included technology investments over 5 years in a new Citizen Service Management system (CSM), improved integration of existing business systems, new tools and systems for front-line staff, service delivery and knowledge workers to optimize their productivity and respond more effectively to citizen needs.

The Roadmap recognizes that systems deployed during amalgamation are quickly reaching their "end-of-life", meaning that replacement of the City's fleet of servers, desktop/laptop computers, and network infrastructure must be modernized to support the City's business transformation initiatives and directions and provide a sustainable future technology platform.

Sponsored by the IT Sub-Committee of the Finance and Economic Development Committee (FEDCO), the Roadmap is a living document that is refreshed annually to remain relevant in response to economic, social and technological influences, to inform annual budget deliberations, and to communicate the City's technology priorities and directions.

Technology investment over the coming years is being driven by 3 primary factors:

- Service improvements and efficiencies
- Increasing regulatory compliance and risk management
- Infrastructure modernization

This plan describes large-scale Strategic Technology Investments that support the vision of Citizen Centricity and Governance, and stresses technology as the key to maximizing efficiencies and service delivery. These investments are planned in accordance with the affordability envelope, aligned with the 4 year financial time frame, to maximize benefits to the transformation activities.

Guy Michaud

Director IT Services & Chief Information Officer

November 2011

Executive Summary

The ITS Technology roadmap outlines planned key strategic investments and foundation building blocks that position the City of Ottawa to respond to business needs and citizen expectations. With a focus on exploiting the Internet and improving interaction with citizens and access to services via broadening the channel options, the City is expecting that this approach to eGovernment will result in improved operational performance, citizen satisfaction and achieve a higher level of confidence and trust in the City as a public institution.

In order to implement full technology solutions, realize savings, and continue to deliver services, investment is required in 3 key areas:

- Specific technologies that enables key Service Excellence initiatives (Service Ottawa);
- Initiatives designed to improve operational performance, reduce the complexity of the IT environment, and support the day-to-day business of the City (IT Operations);
- Reduce the risk of service interruption by modernizing an aging infrastructure and deploying foundational technology that supports Service Ottawa and City services (IT Asset Renewal).

The Roadmap includes the following priorities:

- eGovernment/Service Ottawa building on phase 1 accomplishments;
- Foundation Technology;
- IT Efficiency Projects, and
- Operations and Lifecycle Renewal.

ITS will continue to support Service Ottawa initiatives to achieve their \$40M annual savings when fully deployed and enable the City to fund growth and services through these efficiencies. This Service Ottawa program investment is \$79M between 2010 and 2014.

The cost to implement the technology investments identified in the Roadmap is projected to be \$46.2M for Foundation and Modernization initiatives and \$3.2M for Roadmap Strategic Initiatives over the next 4 years. The 2012 capital requirements are \$11.435M for foundation and \$1.38M for the Roadmap Strategic elements.

1. Introduction - Service Ottawa

The concept of eGovernment is not new, having emerged over the past 10 years as an opportunity to exploit the Internet with the objective to “reinvent government” and move to a more citizen-centric business model.

This business model is characterized by:

- Balancing cost containment with innovation;
- Doing more but differently in terms of productivity through a more effective workforce;
- Greater interaction with citizens and access to services via broadening the channel options;
- IT-enabling more services, and
- Demonstrating “best value” for the tax dollar.

The City’s Strategic Plan identifies service delivery and sustainability as key priorities.

Citizens have come to expect eServices as part of daily living and businesses expect e-Interactions to remain competitive. The City, in response, launched its Service Excellence program which links employee engagement and improved operational performance to citizen satisfaction, thereby achieving a higher level of confidence and trust in the City as a public institution.

Under the Service Excellence umbrella, investment in technology was identified as a primary means to deliver consistent, predictable, high-quality information and services to residents while generating significant savings for the organization. “Service Ottawa” is the flagship of Service Excellence – a Citizen Focused, Efficiency Driven program developed with the mandate to fundamentally transform how citizens communicate with, and receive services from the city. This program contains initiatives that achieve service improvements, boost efficiency savings through technology-enabled innovation, and contribute to the City’s sustainability agenda, as represented in Figure 1.

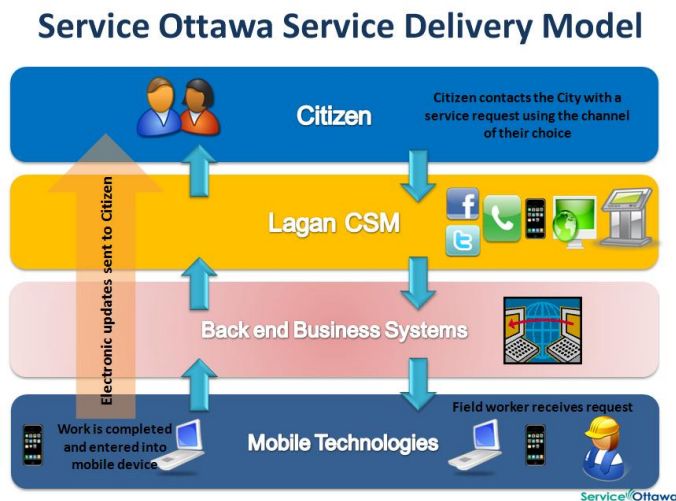


Figure 1

The elements of the Service Ottawa program are provided in the following sections.

2. Service Ottawa

Service Ottawa is the City's flagship program of Service Excellence and eGovernment and is a major focus for the IT Services department. As a strategic priority for the City of Ottawa, the Service Ottawa initiatives consume the majority of the available IT resource capacity who are not dedicated to maintaining the existing IT operations. While other eGovernment opportunities are possible, the capacity of the IT department to accommodate other major change initiatives is constrained until 2014. When completed in 2014, the Service Ottawa program will result in the deployment of new citizen-centric business processes and technology including:

- a Citizen Service Management (CSM) system to support 3-1-1 with citizens' service and information requests. It will be integrated with the City's major financial, administrative, and work management systems;
- conversion of eleven (11) call centers required for the CSM solution to include Computerized Telephony Integration (CTI), leveraging the Telecommunications Renewal initiative, Voice over Internet Protocol (VoIP);
- enhanced ottawa.ca website including a new look & feel, a new Information Architecture as well as significant hardware/software upgrades to improve the usability and performance of the website;
- equipping the City's community and field-based workforce with mobile devices and tools so that they can deliver a broad range of services on-site, report on the progress of these services as they are being delivered, and to connect and collaborate regardless of physical location; and
- on-line and real-time search, viewing and booking of City recreational facilities such as banquet halls, and the addition of full search, book and pay capability for last minute ice-time.

In addition, integration and enhancement of existing business systems will generate operational performance improvements and efficiency savings through other initiatives including:

- Human Resources Management - a suite of technology and process improvements including eRecruitment, Learning Administration Automation, employee/management self serve enhancements, and Case Management/Data Load Tools;
- Business Intelligence – advanced reporting and analytics in support of CSM, human resource management, financial management and new operational information and management reporting;
- Work Management – refinement of existing work management business processes and reconfiguration of SAP and other back-end systems to support the new processes;
- Fleet Management – upgrade and re-configure the M5 Fleet Management system to transform the stores inventory processes and improve integration with the SAP Financial system;
- Smart Energy - implementation of an Integrated Building Management System (IBMS) and Monitoring and Targeting (M&T) solution; and

- Business Transformation – a process of identifying duplicate and/or inefficient business processes and defining new 'To-Be-Operating' models that lead to fewer and more streamlined business processes that allow services to be delivered more effectively and efficiently.

The overall investment on Service Ottawa is \$79 million between 2010 and 2014 and the City is on track to realise annualized efficiency savings of \$40 million by the end of 2014. The Service Ottawa Program is comprised nine (9) projects, of which there are three (3) Enterprise projects:

- Citizen Centric Services
- Business System Integration
- Mobile Workforce Solutions

The following section summarizes these three enterprise projects and the progress made to date.

2.1 Citizen Centric Services

The Service Ottawa Citizen Centric Services initiative adopts a citizen-centric approach, which will improve how the City engages, interacts with and provides services and information to citizens, businesses and clients. It will automate end-to-end processes and streamline workflows to capture, monitor and report-on service and information requests from the citizen access points to the service department.

In 2011, the City of Ottawa purchased the software and hardware to implement a **Citizen Service Management (CSM)** solution to help manage and automate the workflows associated with information and service requests. The CSM solution will create more efficient and effective call and inquiry handling. The knowledge base for the CSM system will provide a source of consistent accurate information. This new centralized knowledge database of information will now direct 3-1-1 Call Agents and Customer Service Representatives to the correct information based on answers to common questions received by the City of Ottawa. It will ensure consistent, accurate and quality information is given to clients and represents over 2, 000 reference documents. The original information was previously decentralized and managed by various departments across the City. Release two of the CSM solution will involve additional workflow automation and integration with backend operational systems.

To improve the phone communication channel, the City of Ottawa purchased and installed a telephony product called **Interactive Voice Response (IVR)**. The IVR technology allows citizens who call the City to navigate quickly and efficiently through a series of menus of popular topics using the buttons on their phone or spoken commands. Citizens will be able to find answers to their questions and access City services more effectively through the self-serve functions. As part of this purchase, the City also acquired a text-to-voice messaging solution, which will be linked with the IVR technology to support proactive messaging about unforeseen events or emerging situations to residents calling 3-1-1. Release One (1) of the IVR solution has been implemented within the IT Help Desk and 3-1-1 Call Centre.

To improve the web communication channel, a complete revamp of the ottawa.ca website was conducted over 2011. Based on citizen feedback, a new information architecture has been developed to redesign the website with a new look and feel and eight (8) easy to access informational gateways:

- Roads and Transportation
- Water and Environment

- Garbage and Recycling
- Recreation and Culture
- Health and Safety
- Licences and Permits
- Social and Community Services
- City Hall

To help citizens find the information they are looking on the website quickly and easily, over 26,000 web pages of information were reviewed and consolidated to approximately 10,000 of the most requested information. To assist clients in finding information, the City of Ottawa implemented a Google Search Engine to enhance the overall search performance. In addition, citizens and businesses will be able to access all the self-service web e-forms in a central location on the website. A total of 145 service request transactions will be available online through a self service option. The launch of the new website is schedule for the end of this year.

As part of the Parks, Recreation & Cultural Services departmental Service Ottawa initiative, citizens are now be able to search online the availability of rental halls, meetings rooms, gyms, ice rinks and pools, view facility information and be able to place a request to book a City facility online. In 2012, virtual tours will be added to provide additional information about the rental facilities. In addition, the ability to search, book and pay for last minute ice-time has been developed.

2.2 Business System Integration

The Service Ottawa Business Systems Integration (BSI) project will provide City Departments with a variety of enabling technologies and tools to improve service delivery to external and internal clients. It is leveraging existing technology investments in the City's enterprise systems to develop and implement "closed loop" processes and reporting to the Citizen Service Management (CSM) system and the citizen; transforming Human Resources service delivery to employees and managers; and transforming the way City departments leverage their operational data for improved decision making and performance analysis. The BSI project is comprised of three (3) initiatives:

- Human Resource Management
- Business Intelligence
- Public Works Integration

The **Human Resource Management** initiative is improving how the City strategically recruits personnel, enables learning and career development and enhances self-service options available to managers and employees. The e-Recruitment module and licenses are being leveraged to allow potential candidates, internal and external, to build their profile online, search and apply for jobs at the City and they are provided automated notifications on the status of their job application. In additional, the Training and Events module is being used to track training and development activities of City staff. SAP will be further utilized in 2012 to automate the registration and scheduling process of courses offered through the internal Learning Centre and will expand on the existing employee and manager self service options.

The **Business Intelligence (BI)** initiative will allow the City to better track and report on how it manages human, financial and material resources. It will provide the mechanism to integrate independent reporting tools and practices across all City departments, making it easier to meet the reporting

demands and the growing public demands for transparency and accountability. The City of Ottawa has purchased and installed BI and Analytics licenses and will leverage the investment in this platform to analyze human resource, financial, customer and operational information extracted from SAP. Computer-based training licenses and technical training for the project team has also been purchased. In 2012, these technologies will be leveraged to automate the existing HR Talent Scorecard and Financial reports from SAP.

The **Public Works Integration** initiative is expanding the use and capabilities of the Maintenance Management System to improve internal business workflows and the availability of operational information and reporting by automating the entire work management process. This automation will involve integrating with other systems to provide a unified and rich data source for operational and management reporting within the Public Works department. These technologies will allow for closed-looped service request tracking and reporting against service standards. They will also streamline the process by taking advantage of mobile technologies and minimizing the amount of paper documentation. In 2011, these technologies were piloted within the Forestry unit (Inspectors, Zone Supervisors and Crew Leaders) to receive work orders remotely and have the ability to notify the new CSM system on the status of service requests, which in turn provides an update to the citizen or client who made the request. These technologies will be further expanded to other groups in Public Works in 2012.

2.3 Mobile Workforce Solutions

The Mobile Workforce Solutions project is equipping employees with mobile technology that will eliminate the constraint of geographical locations by providing an office environment anywhere employees may be required to perform their work. Following the successful pilot with By-Law Officers, this project will significantly improve the service delivery processes for both field and office workers. The project is comprised of two (2) distinct initiatives:

- Field-Based Automation
- Office-Based Collaboration

The **Field-Based Automation** initiative will create a virtual office environment in the field resulting in reduced trips to the office to initiate work assignments and complete field work follow-up and closure activities. The initiative will improve productivity by allowing increased service delivery time by reducing work management cycles. In addition, it will reduce travel time and carbon. In 2011, the Forestry unit (Inspectors, Zone Supervisors and Crew Leaders) began to pilot some of the field-based automation technologies. In 2012, the program will expand to Transit Supervisors, IT Site Support Analysts, Solid Waste Inspectors, Paramedic Superintendent, Fire Prevention and Sector Chiefs, Building Inspectors and Public Health Inspectors. The initiative is also looking at expanding the mobile drop-off and pick-up points from the current two (City Hall & 100 Constellation) to locations across the City to reduce the amount of travel time required to drop off defective devices and pick up replacements.

The **Office-Based Collaboration** initiative is enabling staff to work collaboratively with internal and/or external colleagues, members of Council, businesses, contractors and the public by eliminating the need for traditional meeting places. Shifting from a traditional workspace to a mobile workforce increases the time spent delivering services and improves employee work/life balance. Additional benefits include increased productivity through reduced travel, as well as saving on parking and mileage.

As part of this initiative, boardrooms are being enabled with technology to modernize the City's current meeting spaces, allowing meetings to be organized and run in a more effective and efficient manner and provide remote meeting access capabilities. In 2011, nine (9) boardrooms have been enabled at City Hall, 100 Constellation and Ben Franklin Place with projectors, audio equipment, conference phones, wireless connectivity and table top inputs. By the end of 2011, up to an additional six (6) boardrooms will be enabled. As well, the City of Ottawa has purchased an interim Virtual Meeting solution to bridge the gap until the full Voice over Internet Protocol (VoIP) solution is in place. The web-based solution allows people to conduct meetings, share documents and presentations collaboratively from different locations.

In addition, ITS has established a dedicated mobile device deployment lab to handle the high volume of mobile office and field devices being deployed now and over the coming years to enable the City's mobile workforce.

In 2011, the City of Ottawa purchased three (3) mobile foundation technologies:-

The first solution creates a robust and reliable mobile Virtual Private Network (VPN) connection. This solution allows users to maintain session persistence, no need to re-connect if the connection is temporary lost and seamlessly roam from network to network (cell, Wi-Fi, LAN) in a secure manner. The production environment implemented includes multiple servers for load balancing as well as a database and reporting server. Final testing on client laptops is currently underway.

The second solution allows for the custom development of mobile applications that can be deployed on a variety of mobile devices (smart phones, tablets, & laptops). As part of this procurement there is a pre-built integration to SAP Work Management Application that will be utilized as part of the Forestry unit mobile pilot and further deployed to other areas of the City.

Finally, the third solution was related to the expansion of the City's wireless network in office buildings and garages.

The success of the Service Ottawa initiatives is tightly coupled to the technology foundation on which the improvements and new solutions are built; ensuring that the underlying infrastructure (networks, servers, devices, and operations) is capable of supporting the transformation initiatives is paramount. For example, Citizen Service Management (CSM) system to support 3-1-1 and citizen service requests require a solid IT foundation (VoIP, call centre conversion etc) to deliver quality services.

3 Introduction - Technology Roadmap

The corporate Technology Roadmap was initiated in 2010 as a planning tool to describe and communicate the direction and plans for information technology at the City of Ottawa, including the key initiatives and building blocks that are needed to align IT programs and investments with the City's Strategic Plan priorities.

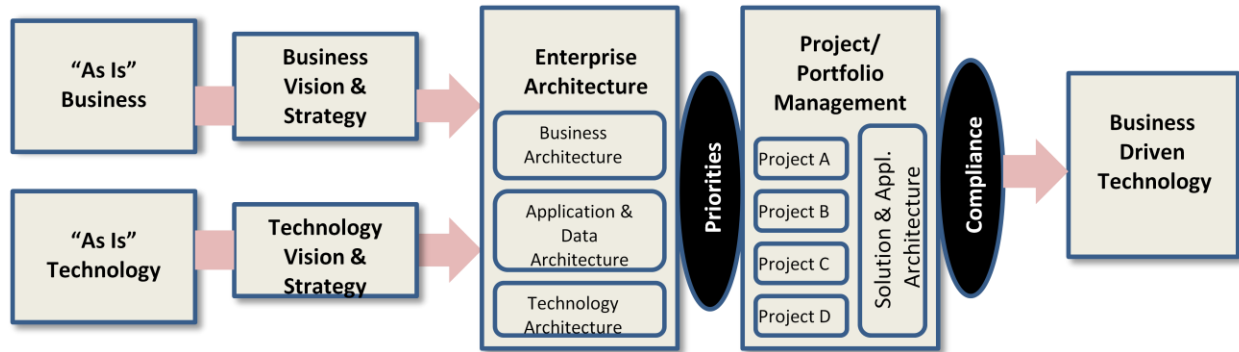


Fig.2

A "Technology Roadmap" reflects a future state business and technology architecture, and establishes the transition plan for the organization. It must be coupled with the right processes and people with the right skills.

The Technology roadmap helps achieve the City's mission through optimal performance of its business processes and models within an efficient information technology (IT) environment, by:

- Implementing technology solutions that support Service Ottawa Initiatives;
- Modernizing the network and telecommunications infrastructure and computing environment by implementing new technologies such as virtualized servers and desktop infrastructure, and voice-over Internet Protocol (VoIP) capabilities;
- Establishing a secure mobile technology platform and infrastructure for those City services that are in the field and require access to information assets;
- Implementing efficiency measures to reduce costs and lower energy consumption;
- Keeping the technology base current, permitting expanded opportunities for the City to capitalize on advanced technologies and new business models; and
- Identifying and assessing emerging trends and technologies such as "Cloud Computing", Web 2.0 and social media to reduce cost and be more responsive to citizen needs.

The technology roadmap is a living document. Progress against plan is reviewed and a new plan produced annually to reflect changing business priorities, emerging technology, and fiscal constraints. Affordability and sustainability will always be reflected in the roadmap priorities.

The Roadmap positions the technology initiatives to include and support the following priorities:

Service Ottawa: targeted investments in new technologies that improve the way citizens access services from the City and simultaneously improve City operations.

eGovernment: other investments in new and/or emerging technologies that ultimately provide citizens with greater choice, convenience and flexibility in service delivery modes.

Foundation Technology: building blocks on which Service Ottawa and future eGovernment initiatives are dependent and that need to be in place in order for ITS to effectively and rapidly deploy and support the new technologies.

IT Efficiency Projects: investments in new technology or best practices that result in operational savings or deferral of capital expenditures.

Operations and Lifecycle Renewal: ongoing capital spending to maintain/upgrade/replace existing technology, to ensure the City's technology infrastructure and assets continue to support day-to-day operations.

In terms of categorization, the roadmap categorizes these investments in two streams:

1. **Foundation and Modernization Technologies:** This category addresses the building blocks on which Service Ottawa and future eGovernment initiatives are dependent and that need to be in place in order for ITS to effectively and rapidly deploy and support the new technologies. In addition, it represents an ongoing capital spend to maintain/upgrade/replace existing technology infrastructure and assets to continue to support day-to-day operations.
2. **Strategic Initiatives:** Continued investment in new technology or best practices will result in improved citizen-centred experience, operational performance, annualized savings and/or deferral of capital expenditures. A series of initiatives are planned to continue to move the ITS environment forward to a more efficient, effective operational future state.

Figure 3 represents these individual initiatives and the following sections briefly describe the large-scale Investments that support Citizen Centricity and Governance and provide a responsive technology foundation.

The summary of these initiatives and respective timelines can be represented as follows:

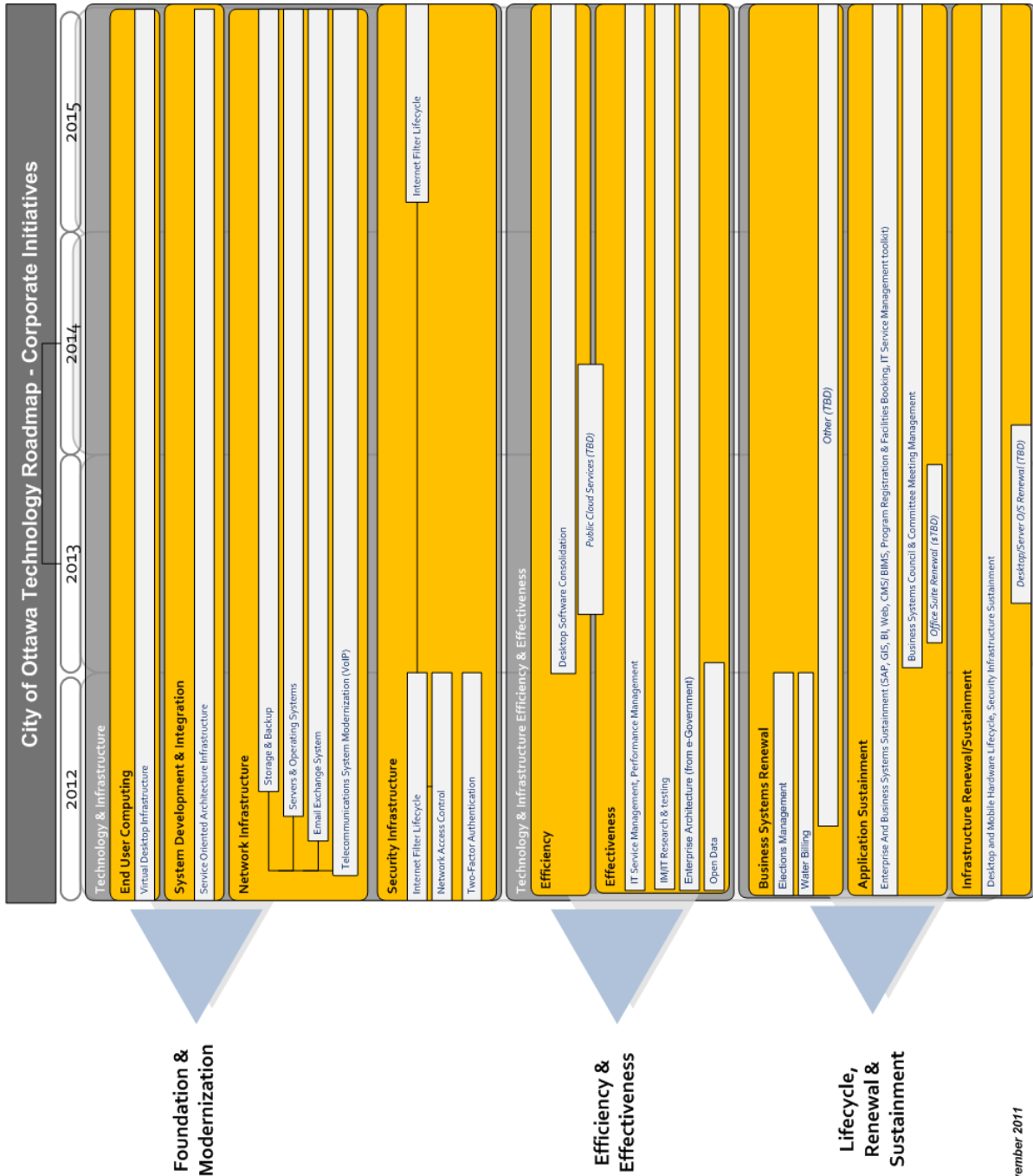


Fig. 3

V1.1 November 2011

4 Foundation and Modernization Technologies

A modern and robust technical infrastructure, including voice/data networks, servers, security services, application and database platforms, end-user computing devices, services-oriented architectures (SOA), and supporting operational processes such as configuration and change management are essential investments and building blocks for rapid and effective deployment of new technologies. Significant progress was made in 2011 in many of these categories.

The progress during the 2011 period is addressed within the respective initiatives in the following sections with planned target activities for the 2012 period.

4.1 Business Systems: Renewal Program

This program provides for the overhaul of legacy applications that have reached their end of viable life and are still in use for city service delivery. Legacy applications are applications that no longer support the needs of the business:

- by adding increased risk to operations;
- by being unable to adapt to changing business process; or
- inability to integrate with new initiatives such as Service Ottawa.

This program transitions legacy applications to new technology solutions with the objectives to

1. Maintain current service delivery levels.
2. Position the business areas to be more responsive in their provision of services.
3. Reduce support costs
4. Rationalize & consolidate application portfolio

Currently, ITS supports approximately 59 business suites (groups of applications/tools that together meet a business requirement or function), and 235 independent applications, all providing capabilities for staff to access information and enable the City to transact business with its citizens and partners. Over 90 of these applications have reached 'end of technical life' with additional applications reaching end of life each year. This end of life condition implies technologies in which they are written are greater than 8 years old and have no vendor support; there are decreasing numbers of internal resources to support; very limited, very expensive external resources available to provide support; and increased risk that they will not function with newer versions of software and hardware. Additionally, improvements and enhancements to the applications cannot be made, and feasibility of the systems to meet ongoing demand and capabilities is limited.

The year 2011 yielded

- The completion and deployment of three renewed applications, (two for Revenue Services (Cash Operations and Overpayment Recovery), and Needle Exchange solution for Public Health).
- A Facility Allocations solution is underway and in final test for Parks and Recreation and Traffic Operations (which will replace a number of legacy applications).
- Analysis, RFI and commencement of in-house developed solution for Water and Sewer billing is underway.
- Identity Management software installation with associated licensing to support deployment.

This initiative will continue to address the renewal of critical applications, plus further develop integration opportunities with both existing and new applications. It will also apply an increased focus on the use of Service Oriented Architecture (SOA) technologies in addition to alternative software delivery methods (such as Software-as-a-Service) to enhance the potential of e-government capabilities and accelerate roll out of new services. Funding in 2012 will provide for resources to manage the program and secure resources to assist in conversion activities associated with client legacy applications. Primary target applications will be Aquacis (Water and Sewer Billing) and Elections.

Results expected from the continuing focus on renewal are:

- Reduced risk of unplanned failures and downtime for these applications.
- Allows for enhancement and changes to applications to meet current and future business needs.
- Eliminates risk that these applications will not function with newer hardware and software upgrades.
- Implementation of formal Application Portfolio Management methodology to manage and forecast future lifecycle and renewal efforts
- Reduced complexity and tighter integration with current business needs.

4.2 Enterprise Systems: Information Management

The Enterprise Content Management System for City Information Management is an infrastructure element that requires ongoing upgrade and sustainment activities to remain current and ensure ongoing compliance with legislation. Year 2011 realized the upgrade planning to the relational data base management infrastructure in addition to an Enhanced Security Model.

The year 2012 will continue to build on the work done since 2005. Work is required to upgrade Relational Data Base Management infrastructure and achieve compatibility between the current Physical Records management tools for retrieval and control of physical files, as this will be inoperable without work efforts. In addition, work efforts will continue to focus on the elimination and conversion of shared and local drives to the Business Information Management (BIMS) application, ensuring that all City information is properly lifecycle managed. This will also greatly facilitate the searching, retrieval, information re-use, MFIPPA requests, litigation holds, etc. in a secure environment.

4.3 Network Infrastructure

The network infrastructure program is focussed on lifecycle replacement and growth of the City's computer network and telecommunications infrastructure. The network is comprised of specialized hardware, storage and software, which is used to securely store and transport voice and data traffic for City systems such as the City's telephone network, SAP, GIS, Program Registration & Facilities Booking, email, security video cameras, Internet access and OTTAWA.CA. This infrastructure is the electronic highway backbone at the City and provides access to systems for 11,099 network users, in over 300 facilities, in support of their day-to-day activities, business decision support and public inquiry. The lifecycle activities include the replacement/upgrade of hardware and software such as servers, data and voice communications equipment, storage and backups, email system, and server operating systems. In some years it will also include data centre facility equipment such as Uninterruptible Power Supply (UPS), racks and air conditioning.

Each year investments must be made to replace aging infrastructure to ensure continuous vendor support and availability of security patches, and upgrade network capacity to accommodate increasing use of technology in City operations.

This investment achieved many milestones in 2011 which can be represented as follows:

- Server Virtualization: On target to achieve 3 year goals.
- Modernization of Telecommunications Systems: Transition to the Voice over Internet Protocol (VoIP) realized the installation of basic call processing at the City Hall and Constellation sites and migrated the ITS service desk to new technology.
- Data Storage Strategy: This strategy is underway with report expected by yearend which will guide the future investment directions for data storage technologies.
- Consolidating Data Centers: Some of the technology equipment has been moved from the Transit facility with the footprint in its final engineering design stages.
- Core infrastructure City e-mail system was upgraded to the most current version, MS-Exchange 2010.
- Intrusion Prevention and Security information Management system project completed.
- Installation of replacement UPS at 100 Constellation.
- Implemented new storage switch and load balancing fabric in support of additional demand for storage arising from growth, new projects and Service Ottawa initiatives.
- Implemented additional WiFi access points arising from the Service Ottawa Boardroom enablement initiative.

In 2012, major funding elements will go towards server end-of-life replacements, storage capacity improvements, voice and data equipment end-of-life replacements and upgrade of the thin-client server operating system.

The realization of continuing efforts in infrastructure will:

- Ensure continuous vendor support for installed systems and solutions, particularly to access security patches, to ensure the protection of the City's information assets and resources from unauthorized use, viruses and other potential security threats and risks.
- Provides robust network infrastructure as a foundation to realize operational efficiencies from the deployment of newer technologies such as virtualization, voice-over IP, etc. Without the renewal legacy technologies which, if left in place, can restrict the implementation of new client business requirements.
- Protects and secures the City's information assets and resources from unauthorized use, disasters, viruses and other potential risks.

4.4 Enterprise Systems: Content Management

The implementation of the Enterprise Content Management (ECM) strategy led to the implementation of Web Content Management (WCM) for automated distributed Ottawa.ca web publishing, the intranet (OZONE) web publishing, new electronics records management, an integrated electronic document management/records management system and the City Clerk's legislative report management application. The Ottawa.ca web site now runs directly on the Relational Data Base Management system Universal Content Management (UCM) platform, and is planned to be the knowledge repository for the CSM tool in 2012.

This capital fund ensures that the ECM servers are appropriately life cycled and software versions are upgraded and kept current for vendor support.

In 2011 this program realized the following:

- Successful release and integration of the City Clerk's legislative report management solution.
- Upgrade of the Business Information Management (BIMS) Relational Data Base Management infrastructure.
- The release of a new Ottawa.ca web site with anew publishing model, new security model and new workflow.

The 2012 focus will be on improving search capability on Ozone, upgrading Ozone to SiteStudio 11g, hardware upgrades and replacements, security model realignment, and working with Service Ottawa to provide high availability for the Ottawa.ca web site and move the CSM knowledge base into the Relational Data Base Management infrastructure.

This program will focus on the following objectives:

- Support the Service Ottawa plans for extensions to Ottawa.ca, and the team's ability to support the new platform.
- Enables improved search capability on Ozone.
- Roll out of BIMS across the corporation with the revised security model will accelerate adoption.

- Additional client and/or application rollouts without delay due to addition of new functionality, increased system performance and system recovery capabilities.

4.5 Desktop Computers and Laptops

This lifecycle and renewal program funds the lifecycle upgrades and replacements of desktop computers and laptops that are common to all City departments. This includes more than 7,460 desktop and 2,900 laptop computers. These are used by 11,099 internal clients to access the City's computer network infrastructure. Continuous investments need to be made to continue to avoid obsolescence and maintain the resiliency of computers to ensure continuous vendor support; remain current with technology, ensure new business requirements from client departments can be met; and ensure the City information assets and resources are secure and protected from unauthorized use, disasters, viruses and other potential risks.

The results and objectives of this program are expected to yield the following:

- Reduced probability of system outages/downtime caused by computer failures.
- Ability to realize operational efficiencies from newer technology such as virtualization.
- Reductions in security vulnerabilities and risk as systems will receive vendor generated patches in an automated and scheduled manner.
- Corporate initiative expectations, such as Service Ottawa's Mobile Workforce, are fully operable using current devices.

The year 2011 realized the following:

- Replaced approximately 350 CRT monitors with LCD monitors.
- Replaced approximately 1750 PCs and 500 laptops.
- Established Loaner Toolkit with latest vendor offerings in mobile technologies.
- Commenced the upgrade process for the SMS 2003 upgrade.

Investments in 2012 will fund a continuing replacement of assets (laptops or desktops), support to manage the program, and training for new technology versions.

4.6 Enterprise Systems: Database Management & BI

The City operates with close to 300 databases containing data and information processed by over 225 software applications. There is a growing need for the City to be able to analyze this data and information to predict trends, report on costs and provide better management information about its businesses (e.g. Service Ottawa Business Intelligence (BI) initiative). The BI technology has been used in several business areas including the 24-hour call centre, and the resulting information has proved to be vital to the City's performance measurement program and its overall decision-making process.

This sustainment investment is focused on ensuring that databases and BI servers are life cycled and software versions are upgraded for vendor support. The objectives and results from this program will:

- Fully support the implementation of major new projects such as the Service Ottawa program, Automated Water Meter Reading, and others.
- Reduce the risk of failures on major platforms.

The year 2011 yielded the following:

- Consolidation and life cycling of databases
- Purchase and installation of Security modules to secure confidential database management material.
- Installation of BI solution on servers.
- Professional services to support current BI environments and augment existing staff supporting the Service Ottawa initiatives.

In 2012, ITS will replace 5 selected development and QA servers and acquire associated professional services to provide expertise and technical resources to augment current staff levels, and also support internal staff through adoption of new toolsets. Training will also be purchased to augment existing skill sets to learn new toolsets.

4.7 Enterprise Systems: Web Services

This investment is sustaining the web based services technology in addition to the City's public website Ottawa.ca, the City's theatre web sites and the employee intranet portal, Ozone. This provides the primary support infrastructure for eServices applications and web publishing. Continued efforts in this infrastructure are necessary to meet the following objectives:

- Support additional project management, testing, and development/configuration consulting services to maintain the shared web server infrastructure, Ottawa.ca web site, the theatre web sites, and the SOA and IDM web infrastructures across the organization.
- Reduced risk of failures on major platforms.

Year 2011 accomplishments in this program included:

- Deployment of four PCI compliant applications.
- Replacement of failing webcast equipment for Council webcasts, improving mobile capabilities.
- Introduction of functional testing tool for PCI applications to improve application testing efficiency for patching.
- Deployment of infrastructure for Service Ottawa initiatives including new Ottawa.ca web site, and facility rental form.
- Installation and securing of more social media applications for Communications use on the intranet and Ottawa.ca.

The 2012 investment will focus on funding additional QA, project management and technical resources for major eServices applications and enhancements (such as social media applications), repairing applications that are causing frequent problems, and providing web infrastructure support services in

addition to purchase of third party lab facilities for multiple device/browser testing. Additionally, software tools are necessary to improve the productivity and efficiency of developers and allow software such as search engines to be life cycled and maintained. Transaction growth also requires upgrades to meet increased transaction demand in addition to growth for new initiatives.

4.8 Enterprise Systems: Security Services

The process of transforming the IM/IT Security function at the City from a primarily reactive, threat-focused organization into one which is more cost-effectively managed, risk-based, integrated with the City's overall business risk management framework, and supported by metrics linked to the City's strategic objectives is necessary. This program is expected to achieve:

- Reduced risks to citizen and corporate information through unauthorized access to City assets.
- Reduced risk of service reductions caused by denial-of-service attacks or network intrusions/viruses, and the resulting unavailability of mission-critical and citizen-centric services.

A security strategy was developed in 2009, with full implementation being phased in.

The year 2011 realized the following activities:

- Creation of a corporate Information Security Policy.
- The commencement of the development of a supporting framework to ensure security controls are commensurate with the level of business risk.

The 2012 focus will be on continuing the integration of the corporate risk framework with industry recognized business risk measures, and transitioning the information security and technology security unit to this new model. This will include the mentoring of staff, identifying existing mature security processes that can be moved to other operational support groups, and ensuring day-to-day processes can be properly measured to reflect their effectiveness and business value to the City. Years 2013-2015 will complete the transition and initiate new risk-focused initiatives with the business units. It is also expected that the IM/IT Security function will become more aligned with the Enterprise Architecture program through combined efforts and initiatives within the Service Ottawa program.

4.9 Enterprise Systems: SAP

SAP is the City's integrated software solution used to manage an extensive range of business processes including financials, material management, procurement, sales distribution, real estate management, plant maintenance, training and events, as well as human resources and payroll. Incremental pressures and load for growth of SAP users, data and functionality in addition to new initiatives are significant on this major enterprise application suite. There are over 1,800 users of the core SAP solution and over 8,000 users of Employee Self Service (ESS) via the City's Intranet, OZONE.

A series of sustainment activities are required to support Service Ottawa Public Works MMS, BI, and e-recruitment projects as they deliver new functionality. This program provides for professional services

assistance to support the required sustainment and integration workload, in addition to patch and upgrade activities for all SAP components to achieve the following: Support the incremental growth of SAP users, data, and functionality as the result of new initiatives (Service Ottawa) and/or Enterprise functionality.

The year 2011 accomplished the following activities:

- Upgrade of SAP to the latest enhancement package.
- Implementation of the final automated Time and Leave functionality on Ozone.
- Implementation of AP Invoice Automation solution replacing a significant part of manual invoice processing across the City.

The 2012 program will be used for the following sustainment activities:

- Professional services to support the Service Ottawa initiatives (PW MMS project go live program across affected branches)
- Continued production support of existing Public Works MMS solutions and the HR Service Ottawa e-recruitment project.
- Implementation and support of the Service Ottawa BI project.
- Professional services to continue support and maintenance of HR/payroll, patches and upgrades of all SAP components and creation of a fail-over system landscape directory.
- Procurement of infrastructure upgrades to address storage to host Development and Test, and address the growth and on-going performance and stability.

4.10 Enterprise Systems: GIS

The Enterprise GIS program supports a suite of business focussed desktop and web solutions that are utilized by over 3,000 staff. The eMAP component is consistently within the top five to ten areas accessed by the public and building sectors via Ottawa.ca. This Enterprise GIS architecture is at 'end of life'. This includes the VISION (GIS services for MAP), Mapguide (eMAP), and MAP applications. These technologies will be replaced with ESRI GIS technology and a number of business focused applications replacing the functions of MAP for all existing application implementations. The objectives of this sustainment program will yield:

- Software in production fully supported by the vendor, preserving the service life of additional applications built on this technology and ensuring future stability as underlying operating systems and database technologies evolve.
- Investments in existing/new related applications will be more cost-effective to integrate into existing enterprise GIS technology and will have a longer service life.
- Two key pillars of the Service Ottawa agenda, Enhanced Citizen Centric Services and Mobile Workforce, are depending on current day, vendor supported GIS technology as a foundation for success. This investment is key to its success.

In 2011 the accomplishments within this program yielded the following:

- Business requirements for a renewed GIS Architecture.

- A GIS Architecture design.
- Implementation/configuration of the GIS servers required for the new architecture.
- Implementation of renewed, centralized GIS data repository.

The 2012 efforts will focus on completion of the acquisition and implementation of hardware and software to evolve the City GIS architecture (core enterprise spatial (GIS) services (VISION) with vendor supported products (ESRI technologies)) in accordance with the renewal plans, and further development of the MAP replacement plans. Currently MAP is no longer supported by the vendor and with VISION it is near end of life and not receiving major investments in the form of enhancements or upgrades by the vendor. To maintain a viable vendor supported solution for the many critical applications, the technologies need to be renewed. As part of the Service Ottawa program, MAP/GIS is a foundational technology with an important support role in many of the City's various business lines. These technologies must be renewed to allow for services such as enhanced e-Service applications, mobile workforce and IIMS renewal to be achieved in an affordable and sustainable way.

4.11 Enterprise Systems: IT Service Management

IT Service Management (ITSM) is a continuous improvement function which seeks to continually improve the effectiveness and efficiency of IT services and processes. This investment supports the objective of maintaining and improving the quality of IT service provision and customer satisfaction by managing all changes to production systems in a disciplined manner. This enables the business to absorb change effectively and efficiently, and also to minimize any potential disruptions. It applies a number of recognized Information Technology Infrastructure Library (ITIL) - based best practice disciplines including Change Management, Service Level Management, and Configuration Management. This implementation includes the development of processes, people and tools to achieve its objectives.

This initiative will deliver a range of benefits including:

- Improved Service Desk response by reducing the number of incidents occurring through Problem Management (root cause analysis) and Change Management.
- Provide clients with an improved and more modern Online Self Serve Request portal.
- Align ITS with industry best practice and modern service support standards.
- Make asset tracking possible and efficient by leveraging processes and the IT Service Management toolset.
- Introduce benefits for clients and ITS including clear expectations of turnaround times for clients and automated escalations within ITS to action client requests.

The 2011 accomplishments seen completion of the following:

- Implementation of PCI compliant Change Management process for production components.
- Implementation of a continuous service improvement team which has delivered service desk client satisfaction surveys and associated trending/analysis.
- Established a Change Advisory Board to ensure sound implementation plans for changes.

The 2012 investment will focus on professional services support for implementation of an online Service Catalogue with integrated client self-serve portal, establish ITSM governance for Change, Problem and Incident Management, design scope, strategy and implementation of ITIL problem management across ITS. An upgrade to the IT Service Management Toolkit technology is also planned to move from a desktop client to a web based solution.

4.12 Enterprise Systems: IT Performance Management

Performance management and establishing the appropriate measures for technology delivery services is an ongoing focus for the IT organization. IT currently uses the Gartner Total Cost of Ownership (TCO) best practise methodology as a formal indicator of ITS operational and financial performance. Annually, functions are selected and benchmarked in terms of their processes, human, and financial resources to provision technology services with ITS organizations of similar size and complexity. This benchmark uses a neutral third party with the necessary current world-wide data to achieve a comparable benchmark. These benchmarks also highlight areas of potential improvements and opportunity for greater efficiencies.

Over time, the benchmarking process provides a valuable input on the position of City IT service delivery functions with groups of similar size. It establishes a baseline for improvements and a measure over time on the total cost impacts of improvements across the technology functional areas.

The focus area in 2012 will consider the Data Center operational function and provide a view of performance, gains for some major technology changes from a previous benchmark (2008), and obtain recommendations for areas of improvements in process, technology or human factors. The ITS organization will also be participating in the Corporate Balanced Scorecard Measures and Targets in 2012.

4.13 Business Systems: Program Registration & Facilities Booking

The Program Registration & Facilities Booking solution is a third party application and is the City's software solution used to manage recreational programming, recreational facilities booking and CPR/First Aid Training. It is used by over 1500 users in Parks, Recreation and Culture, Ottawa Paramedic Service, Client Service Centres and Financial Services Units. This software is proprietary, and consulting services are required whenever there is a major upgrade, to assist with complex configurations, problem diagnosis/resolution. The year 2011 has seen expanded use of the application for intake of registrations, as well as additional Community Centre locations, Museums, and Archives. This growth in application use, coupled with the support for the Service Ottawa initiative – Optimizing Recreational Facilities (self-serve online facility availability) – will drive the build of the Program Registration & Facilities Booking infrastructure to meet and support the growing demand. Significant effort was spent in 2011 to ensure the Program Registration & Facilities Booking application and infrastructure is positioned for compliance with the Payment Card Industry Data Security Standards (PCI-DSS).

The 2012 investment will see the upgrade of the Program Registration & Facilities Booking solution to a fully PCI-DSS compliant version. An architectural review will be conducted to assess increasing infrastructure capacity requirements. For example, the conversion of the paper Recreational Guide to on-line format only at Ottawa.ca in 2011 resulted in a significant increase in traffic on Ottawa.ca. Additional reconfiguration to establish direct links to program registration will further increase this load. Investment is required to establish a sound and stable infrastructure to meet future growth and replace aging equipment.

4.14 Internet Filter Lifecycle

The City has been using an Internet Filtering product and service for several years as its core security control. This technology product has repeatedly shown itself to be a market leader in the Internet Filtering and Internet Security space. However, the most recent upgrade in 2011 identified a key deficiency in the product. The architecture of the product does not support a high availability configuration that would ensure the City network and systems are protected to the greatest extent possible whenever connecting to the Internet.

The criticality of this gap in the current product line has driven the City to consider an alternative or additional product to fulfill this requirement. Solutions that engage citizens and business partners via the Internet channel are a growing business direction and a comprehensive Internet security solution is vital to ensure the City is fully protected through this critical business delivery channel. This investment will review the marketplace for this capability, select and purchase a Product/Service to cover a 3-year replacement cycle for the most appropriate solution. In addition, this project will include the investigation of managed service providers who can implement and support the Internet Filtering infrastructure on the City's behalf.

4.15 Business Systems: IT Service Management Toolkit

The IT Service Management Toolkit is the 3rd party COTS product currently used to support IT Service Management processes including creating and managing ITS support cases, providing audit trail information for the SAP Support Centre Activity, and tracking the progress and status of support calls (incidents). It is the primary front-line tool used by the ITS Service Desk.

This capital investment program will realize the upgrade to a newer version of software, lifecycle existing hardware, procure professional services to support the implementation in client groups, and support the implementation of Problem Management, and Change Management functionality.

4.16 Service Oriented Architecture Infrastructure

A Service-Oriented Architecture is a software architecture that is based on key concepts of an application frontend, service, service repository, and service bus. SOA technology promotes the provision of applications through the use of discrete, purpose-built services which provide functionality or capabilities that can be connected to each other and provide composite applications, making a more

easily reusable application environment. It is expected the use of the SOA infrastructure will increase substantially as more applications are architected using this software in 2012 and availability and performance will become more essential.

Through its Application Renewal Program, ITS has previously invested in the Oracle SOA suite of technologies, which is currently implemented on one server and used in a limited fashion. This infrastructure requires expansion. SOA technology is currently seen to become the hub of transactions for major City applications within Service Ottawa such as CSM, as well as PCI, GIS, SERVIS, etc. The year 2011 realized the operationalization of the SOA Suite on one server with investment in 2012 to be used for licensing a second clustered server, the hardware, licenses, consulting and training services to ensure ongoing performance and reliability of this infrastructure component. This effort will also include the completion of a maturity assessment, including overall SOA vision, strategy and roadmap to support adoption of SOA technologies and design principles on an enterprise-wide basis.

4.17 New: Business Systems: Council & Committee Meeting Management

Automation of the legislative process related to Council and Committee Meetings including agenda creation, meeting management, vote management and paperless meeting capability drives the need for a new solution set. Investigations were conducted in 2011 and continuing in 2012 with the issuance of an RFP and supplier selection. The year 2013 will see the continuation of the build of the Council & Committee Meeting Management infrastructure to accommodate and support demand and additional users beyond the City Clerks office and elected officials.

The solution selected provides support for the automation of the legislative process. This solution does however, introduce a new complex system that must be maintained and supported by ITS. The establishment of the skills, methods and processes necessary to support the infrastructure is essential for sustainment. This capital account provides the capability in 2013 to continue to build the necessary infrastructure to accommodate growing demand for the solution.

5 Strategic Initiatives

The Technology roadmap encompasses a series of strategic initiatives to move the City to an effective and efficient operating environment, capable of meeting the fast paced demands of technology and business evolution. The year 2011 saw closure on some initiatives and significant progress on others. In addition, new items have evolved to meet business objectives.

Some of the 2011 milestones achieved include:

- Data storage strategy established;
- Supplier selected and Proof of Solution underway for desktop virtualization with OPL;
- Supplier selected and implementation underway for consolidation of output devices (print, fax, copy);
- Framework, processes, and initial governance to support Enterprise Architecture program established, and
- Successful Apps4Ottawa Open Data contest.

Work efforts will continue on some of these initiatives in addition to new initiatives as described in the following sections:

5.1 Open Data

The City has joined other government organizations in Canada and around the world by providing public access to its data. The program has now shifted its focus to further engage the development community to address specific City business needs, continue multi-jurisdictional collaboration on standards related to data sets and licensing, expand and automate the City of Ottawa data catalogue, and sustain the program. This will facilitate transparency, economic development, and community engagement.

In order to be a sustainable program, Open Data (also referred to as Open Data Ottawa) must become embedded into the business processes of City departments. Building on the launch of the Open Data program in 2010, and the success of the Apps4Ottawa contest in 2011, investments are required in supporting infrastructure such as dedicated servers to provide Open Data to the public, together with financial support for the next Apps4Ottawa contest in 2012. In 2012, the focus will be on the expansion and automation of the open data catalogue to include high-value dynamic data sets from OC Transpo, 311, Ottawa Public Library, and Parks & Recreation, in addition to data that further demonstrates the City's commitment to Accountability and Transparency. Continued community outreach, including collaboration with the application development community, will be vital to meeting the objectives of open data, as will continuing multi-jurisdictional collaboration efforts on issues such as standards and licensing.

Strategic Initiative	2012	2013	2014	2015
Open Data				
Implementation				
Capital	\$150	\$0	\$0	\$0

5.2 Virtual Desktop Infrastructure (VDI)

The VDI infrastructure is the current recommended future state of the corporate PC (where applicable) and the preferred method for tailoring desktop solutions for a varied client base. The City encompasses multiple lines of business with a variety of desktop images to support client specific requirements.

The management and support of testing, deployment, lifecycle replacement and ongoing patch and upgrading of the approx. 7500 desktops and 2900 laptops is a time consuming process. The VDI solution permits an optimization of the process and is viewed to achieve the following benefits:

- Centralized management – Create/Manage the Windows desktops/builds from one central location, thus eliminating the need to visit physical machines to install or update software or change configurations. VDI technology allows flexibility and agility for various client image requirements.
- Support is improved by shadowing sessions and watching the user’s steps by allowing the use of Remote Desktop Protocol (RDP) tools or the server console to follow a user providing effective support remotely, or take control of machine.
- Easy recovery and replacement of machines is a capability that permits the simple deletion of the virtual machine and replacement in minutes rather than hours. This also eliminates the need to physically collect machines for trouble resolution. This remote management ability will also assist with mobility deployment troubleshooting.
- Centralized control, shutdown or restart of machines for user changes in department or profile can be achieved remotely.
- Management of a pool of machines for addition or removal of individual virtual machines is achieved in a few minutes, eliminating the need to wait for hardware to arrive when staff changes occur.
- Lower power usage is achieved by the reduction of CPU/hard drive requirements at user sites.
- Extended the life of older PC’s and low cost thin clients can be achieved as the processing is done at the server and not on the client device. This also achieves lower deployment and support costs.

The initial investment will realize the implementation of a pilot of public facing workstations at library site to establish proof of solution. This pilot will establish viability and any lessons learned and establish the usability/applicability across corporate and public workstations.

Strategic Initiative	2012	2013	2014	2015
Virtual Desktop Infrastructure				
Implementation	→			
Capital	\$340	\$320	\$110	\$220

5.3 Desktop Software Consolidation

Currently the City supports over 700 desktop solutions/work tools, with that number steadily increasing each year. Industry best practice demands the ongoing, cyclical measurement and assessment of packaged software solutions to ensure they continue to meet business needs at the optimum cost.

The goal of this initiative and program is to consolidate and reduce the total number of legacy packaged software solutions supported by ITS, allowing staff to focus and stay current with only newer, fully supported versions. The initial phase will determine the current state of desktop solutions and establish recommendations, processes, and financial requirements that provide a plan to allow ITS to transition to newer vendor supported versions of software.

Strategic Initiative	2012	2013	2014	2015
Desktop Software Consolidation				
Implementation	→			
Capital		\$190	\$160	\$90

5.4 New - Enterprise Architecture (from e-Government)

The City of Ottawa is continuing development and implementation of an Enterprise Architecture program to support the Service Ottawa program and other large scale transformational projects. Enterprise Architecture (EA) is a holistic approach to Enterprise service delivery, and considers the concerns of all stakeholders responsible for the delivery of business services, including business and technology.

The City's EA program formalizes and defines the Enterprise Architecture approach for the City, and helps drive operational efficiencies, cost savings, and better alignment of resources responsible for the delivery of City services. An effective EA program directly supports the Service Ottawa program, and is an essential component to the development of an EA Framework for all corporate initiatives

In addition to EA program development, tactical activities address immediate Service Ottawa project requirements and are not specifically enterprise-wide by nature. This tactical work will contribute to the enterprise wide approaches where possible. Key foundational activities such as policies, processes, methodologies, procedures and capabilities that are generally required to support an effective delivery of information technology services and enterprise architecture will form part of the EA program delivery elements. The benefits and value of EA are viewed to be as follows:

- Provides a clear view of how the business and technology resources will support and achieve an organizations business goals and initiatives
- Provides a centralized repository and single dynamic and connected living blueprint of the enterprise.
- Provides the environment for collaborative planning.
- Identifies redundancies and inefficiencies in business and technology assets.
- Reduces project risks in terms of elapsed time, cost, meeting requirements and support to the mandate of the Enterprise.
- Supports the ranking and selection of business and technology investments.
- Improves the operation and efficiency of business service delivery.

Investment in this program to date has realized the adoption of The Open Group Architecture Framework (TOGAF) to drive the development and serve as the foundation upon which projects will build to ensure all aspects of the City align in meeting business objectives of the programs. This framework has been adapted to the City environment in the development of governance and EA artefacts. The next steps will be the rollout of the program and tools for wider usage across the City, so all projects and stakeholders can begin to harvest the value of information technology and business assets and program development work completed by the City. This investment will also be used to work with other municipalities (MISA) in development of common terminologies, descriptions and tools to achieve common objectives.

In 2012, focus will be on establishing internal resources to operationalize the EA program within ITS and business departments. This will involve the definition of roles and responsibilities, where some job titles and descriptions may need to be re-evaluated.

Strategic Initiative	2012	2013	2014	2015
Enterprise Architecture (from e-Government) Implementation				
Capital	\$330	\$280	\$110	\$0

5.5 New – IM/IT Research & Testing

Software test tools and resources are essential to assist development and assist staff in their investigation of software errors, verify functionality, and ensure both the reliability and security of the software we develop and purchase from our vendors. This initiative will allow the efficient detection of functional, performance, and security issues and permit consistency in testing procedures with automated test tools and resources resulting in increased software quality, product lifecycle management processes, and improvements in deployment time to the desktop. Currently ITS manually conducts most of its testing using various methodologies. This is a laborious and time consuming process in addition to not being totally effective in finding certain classes of defects. The automation of this process will allow the delivery of error-free systems to client groups, and enable staff to focus on priority projects reducing the support and maintenance efforts.

Consultation has taken place with key individuals within ITS to determine feasibility and requirements for a robust test team with the necessary tools to effectively provide test services for ITS in the maintenance and development activities for their client groups. Year 2012 will see the finalization of the strategic direction, policy, procedure, design and development of the test services, in addition to selection and implementation of test tools and establishment of analysts to provide support. Automation is often the most cost effective method for software products that have a long maintenance life, as even minor patches over the lifetime of the application can cause features to break which were working at an earlier point in time.

Alternative approaches such as Public cloud computing will be investigated for development test beds for non-sensitive applications and as an alternative service delivery vehicle. Public cloud computing is one of the biggest trends which promises pay-as-you-go economics and the capability for agile delivery of infrastructure, new tools and applications. The public cloud model is characterized by outsourcing specific components of the City’s technology environment to reduce capital investment and pay for computing services on an “as required” basis via the Internet (the “Cloud”). There are several variations on this model which have applicability for the City, including:

- Modernization of legacy and generic applications to turnkey Software-as-a Service solutions with minimal customization;
- Quickly activating new applications to improve efficiencies or service delivery;

- Use of Cloud applications for peak capacity/seasonal demand;
- Improve resiliency and disaster recovery.

While the benefits may be many and significant, the capability is new and service level agreements, pricing and interoperability varies widely. In addition, there are risks that need to be considered in terms of privacy legislation, performance, data repatriation, escrow and data recovery, and usage and access privileges.

Strategic Initiative	2012	2013	2014	2015
IM/IT Research & Testing				
Implementation				
Capital	\$160	\$120	\$70	\$140

5.6 New – Network Access Control

Network access control technologies enable the secure use of publically-accessible network access points, and can provide secure and flexible access to the City network for volunteers, community groups and business partners. This also extends to business partners who remotely access the City network to support City programs, as well as City staff working remotely. This strategic initiative will select and implement a suite of technologies to support the provisioning of this internet access without introducing risk to the City network from potentially compromised, dangerous, or malicious non-City devices.

The 2012 funding will focus on selecting and implementing a suite of “Network Access Control” technologies to enable the secure use of publically-accessible network access points from City managed devices, in addition to access by non-City assets/devices. This solution will focus on minimizing risk to the City network and applications from potentially being compromised.

Strategic Initiative	2012	2013	2014	2015
Network Access Control				
Implementation				
Capital	\$285	\$0	\$0	\$0

5.7 New – Two-Factor Authentication (expand to Corporate Security)

The use of a ‘second factor’ authentication methodology, in addition to the use of username and password to provide access to highly sensitive City computers, information systems, buildings, and areas within buildings is necessary. Provincial health legislation such as PHIPA, Health Orders HO-004 and HO-007, as well as the PCI compliance program in support of credit card payments and controls, all demand a higher level of security to assure identity and rights. Two-factor authentication has become the normal practice for staff working remotely in order to assure the City of their identity before permitting access to sensitive City systems and data.

The 2012 year will focus on confirming the feasibility of using the corporate ID badge as a low cost ‘second factor’ authentication and mechanism for access to City sites, systems and data. Business and technical requirements will be identified, validation of feasibility of approach, identify issues and concerns for a full-scale implementation and selection of a high-value pilot group for implementation of a unified authentication/access solution for City staff.

Strategic Initiative	2012	2013	2014	2015
Two-Factor Authentication (expand to Corp Security)				
Implementation	←————→			
Capital	\$115	\$0	\$0	\$0

6 Financial Summary

The summary of all ITS strategic initiatives in terms of their financials are represented in the following table.

Table 1 – Strategic Initiatives

Platform/Project List			Funding Requirement (\$000)			
Budget Reference	Project Name	Roadmap Reference	2012	2013	2014	2015
Strategic Initiative						
906549	Open Data	Council Priority	\$150			
905732	IT Roadmap Strategic Initiatives					
905732-2	Virtual Desktop Infrastructure (VDI)	Client Services Platform	\$340	\$320	\$110	\$220
905732-4	Desktop Software Consolidation	Client Services Platform	\$0	\$190	\$160	\$90
new	Enterprise Architecture (from e-Government)	Planning & Architecture	\$330	\$280	\$110	
new	IM/IT Research & Testing	Planning & Architecture	\$160	\$120	\$70	\$140
new	Network Access Control	Security Platform	\$285			
new	Two-Factor Authentication (expand to Corp Sec)	Security Platform	\$115			
SUB-TOTAL Strategic Initiatives			\$1,380	\$910	\$450	\$450

APPENDIX 1 – ITS GUIDING PRINCIPLES

The Information Technology Services Department is guided by a set of principles that inform the outlook and approach to the deployment of IT resources and how the Department achieves its business goals (Appendix 1). While operational planning may be dynamic, the following guiding principles remain relatively constant and are the basis for key decisions:

- Focus technology investments on large-scale initiatives capitalizing on existing investments wherever possible, thus yielding the largest return on investment and transforming the way the City's business is done.
- Prioritize IT investments across the enterprise based on alignment with corporate business strategies and plans.
- Continuously improve and optimize the network, application and hardware infrastructure, within the financial framework, to achieve a fast, flexible, cost effective and sustainable computing environment that meets the client's needs, and to reduce risk of disruptions to City services and impacts on citizens.
- Provide IT services and capabilities where the workers are, including at the office, in the field, or on the move.
- Provide access to information in a secure manner and protect personal information.
- Evolve a standards based technology architecture that is integrated with City businesses, enabling cost-effective evolution of services and infrastructure and connectivity with City residents and business partners.
- Reduce the complexity of the City's IT environment through an information systems architecture that promotes standardization and reusability.
- Leverage strategic sourcing to respond to fluctuations in workload and/or reduce support costs/dependencies, lower TCO, improve IT responsiveness and flexibility, and manage risk;
- Leverage and capitalize on existing investments in enterprise applications (SAP, MAP/GIS, e-Services, PROGRAM REGISTRATION & FACILITIES BOOKING, etc.) as a means to manage complexity;
- Emphasize data integration and sharing as a primary strategy for supporting business objectives and containing costs.
- Emphasize greater use of electronic information to conduct day-to-day business and reduce the City's dependency on natural resources.

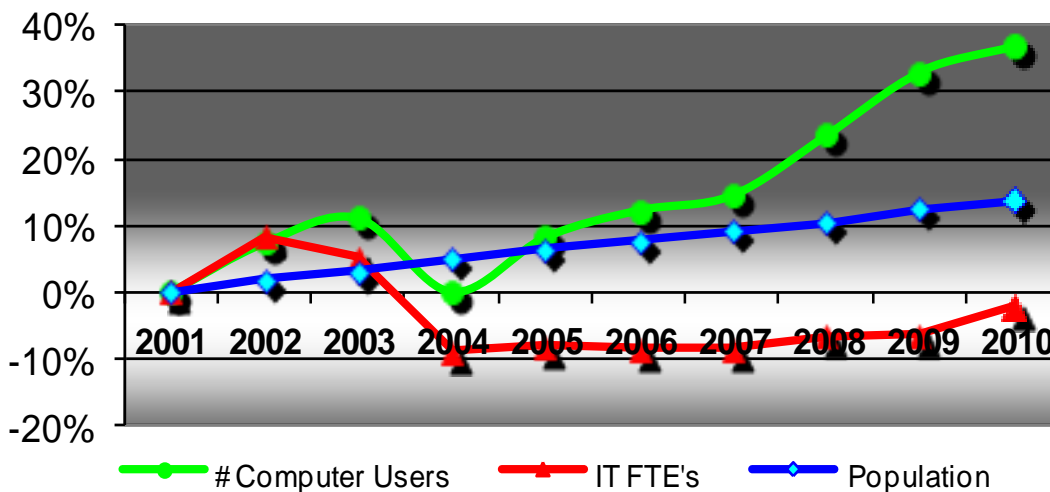
APPENDIX 2 – KEY PERFORMANCE INDICATORS (2011)

1. Cost of Operations

ITS uses benchmark data from industry analyst Gartner Inc. supplemented with periodic detailed analysis of specific IT functions. Results indicate:

- IT has been able to apply process and technology efficiencies to its own operation, while City FTEs and the number of computer users have continued to grow. The number of staff required to support this growth has declined overall and remained relatively stable since 2004.

ITS	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
# FTE	362	392	381	330	333	331	331	338	339	354



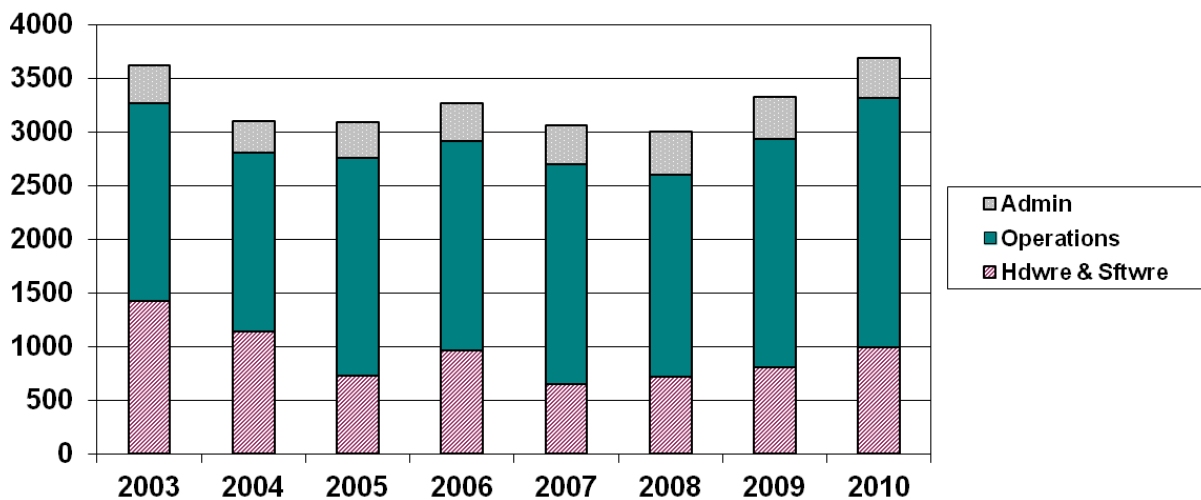
- City of Ottawa IT staff supports nearly twice as many clients as their peers. The department’s current full time employee count for traditional IT functions reflects a 1:37 IT/client support ratio, as compared to a 1:20 ratio for peer IT organizations (state/provincial/local governments, source Gartner).

2. Technology Investment and Total Cost of Ownership

Since 2004, technology investment at the City has been characterized by conservative spending on lifecycle replacement and accommodation for growth in the number of locations and users.

As a result, major investments in the hardware and software were not achieved at a level that satisfied the lifecycle of the various technologies. Years 2009 and 2010 show some increase in the investment level for the asset base. It does also represent an increasing operational cost to support the aging technologies with an overall increasing TCO for maintenance and support in these years. Focus will continue to be placed on major improvements to realize service delivery enhancements and efficiencies. These are represented in this technology roadmap foundation and strategic investment initiatives. It is important to note, however, that the cost per user of \$3,682 in 2010 remains well below peer averages of around \$7,400 to \$8,000 per user in the 2009 time frame.

TOTAL COST OF OWNERSHIP



The annual increase for TCO in 2009 and 2010 remains at a level of approx. 11% per year for City maintenance and support of technology. During the same period the number of network users grew at a rate of 7.7% in 2009 and another 3% in 2010. A very high growth was also experienced in the number of laptop devices which need a higher level of support effort to maintain. These devices grew by 95% in 2009 and 37% in 2010. Number of City sites connected to the infrastructure also grew at a rate of 4% in 2010 to 329 sites.

3. City of Ottawa Client and Server Infrastructure

The year end 2010 position in terms of client devices and infrastructure elements can be represented as follows:

