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SISTER CITY WHITE PAPER
TECHNOLOGY INITIATIVES IN NEW YORK CITY
JUNE, 2004

Introduction

One of the hallmarks of Mayor Michael Bloomberg's administration has been its focus on utilizing business strategies and related technology tools to make government more accessible, responsive and accountable to its citizens. Technology has become a key factor in enabling agencies to become more effective, gather more data to apply it in new ways, and communicate with their constituents more frequently and through multiple user-friendly channels.

Role of DoITT

The Department of Information Technology and Telecommunications (DoITT) is the technology services agency for the City of New York. DoITT works closely with City agencies to manage information systems that support City operations and public access to City services. DoITT also focuses on helping the City act as a single-enterprise where appropriate. This means finding ways to implement technology and telecommunications solutions across agencies, so that the highest benefit at the lowest cost is achieved for the City as a whole. Not only does this help to contain costs, it also ensures the implementation of consistent, secure practices and tools for technology management.

DoITT operates the City's 3-1-1 Citizen Service Center, a non-emergency call center which provides the public with information and services relating to over 300 City agencies and organizations. DoITT also manages and supports the City's official website (NYC.gov), the City's data center, data network, telephone systems, radio network, and the City's cable television network, NYC TV. In addition, DoITT administers the City's franchises for cable television and public pay telephones on City streets, and monitors the City's high-capacity telecommunications service agreements.

Citywide IT Initiatives

To optimize New York City's use of information technology (IT) and telecommunications resources, four key initiatives have been established. They are:

1. **Enhancing Access to Government Services**. Enabling the City's constituents and stakeholders to more easily interact with their City.
2. **Reducing the Costs of Technology Ownership.** Maximizing the City's purchasing power and operational effectiveness through an enterprise approach to technology procurement and attracting and retaining qualified IT staff.
3. **Leveraging the City's Strategic Technology Infrastructure and Investments.** Ensuring high availability, resiliency, and the secure, efficient use of resources.
4. **Strategic Partnering**. Working with public agencies and others to develop technical solutions and services that benefit the City and its constituents.

There are many projects underway for each of these initiatives:

1. **Enhancing Access to Government Services**: Increasing access to government information has been a cornerstone of the Bloomberg administration. The City's goal is to facilitate the ways that New Yorkers gain access to government by utilizing all the media channels at its disposal. No citizen should be information deficient. Employing a multi-modal approach means that phones (calling 3-1-1), computers (logging on to NYC.gov), and television (NYC TV) each play an integral part in keeping New Yorkers connected.

    - **3-1-1 Citizen Service Center**. The 3-1-1 Citizen Service Center provides New Yorkers with one easy-to-remember phone number to access non-emergency City government services. All calls to 3-1-1 are answered by a live operator, 24 hours a day, seven days a week. Services are provided in over 170 languages. Fifteen agency call centers have been consolidated into 3-1-1.

      Service levels during this first year have been excellent and DoITT is working to ensure that it remains high even as volume increases. The average time it takes a caller to be connected to a live operator is nine seconds, and 94% of calls are answered within 30 seconds. On average 311 receives 30,000 calls per day. Over seven million calls have been handled since 3-1-1's inception.

      Future plans for 3-1-1 include making 3-1-1 functionality available on the NYC.gov website, and increasing the 3-1-1 information database so that an expanded array of questions can be answered by call center representatives. For example, callers will soon be able to receive information based on proximity to the caller's home (or any location requested) about City facilities, such as pools, parks, health clinics, libraries and neighborhood payment centers. Also, 3-1-1 and the City's website will soon have an

events calendar containing information on events hosted by City agencies and 3-1-1 operators will be able to email documents immediately to those who request them.

- **NYC.gov**. The City's official website provides 24/7 online access to City services and information through the Internet. Receiving approximately 160 million hits a year, over 390 forms can now be submitted electronically. DoITT continues to make NYC.gov feature-rich and easy to use:

  - NYC.gov is partnering with a variety of agencies to create online applications to assist New Yorkers in their interactions with the City,

  A new search engine is being implemented that will allow natural-language searches and improved results, and- New tools are being added that will allow City agencies to implement and manage targeted email communications to interested subscribers.

- **NYC TV**. Mayor Bloomberg launched NYC TV in June of 2003. The New York Times has called Emmy award-winning NYC TV "a civic-minded MTV," reflecting the network's efforts to reinvigorate municipal television. Programming on the flagship channel (NYC TV 74) highlights the breadth and depth of government services in addition to providing coverage of important City Hall events. NYC TV reaches over 1.8 million households in the five boroughs and has an array of syndication and distribution agreements in place both nationally and internationally. Its programming initiatives are geared towards stimulating economic development, supporting tourism, and cultivating a general interest in the City of New York. Moreover, NYC TV is playing an important role in offsetting many agencies' marketing costs by producing public service announcements. NYC TV has also begun to take some important steps to create new revenue streams for the City. For instance, viewers who wish to purchase never-before-seen images housed at the Municipal Archives, featured on a NYC TV program, are directed to the City's website where they can execute the sale. Additionally, time is being leased to international programmers generating more than $500,000 per year.

- Examples of the many original programs on NYC TV include:

  - **$9.99**: Viewers visit parks, museums, restaurants, galleries and a whole host of interesting attractions that cost little or no money. Each show reveals eight to ten adventures with a combined cost that never tops *$9.99*.

  - **Blueprint | New York City**: A 30-minute, fast-paced tour through some of the City's most treasured landmarks that remain in use today.

  - **Paradetown USA**: This program celebrates the City's diverse culture by covering a variety of local parades that take place on the streets of New York, such as *Brazil Day*, *African-American Day*, and others.

  NYC TV is now available in real-time anywhere in the world on-line at NYC.gov.

2. **Reducing the Costs of Technology Ownership.** Streamlining the process of implementing technology has been another key goal of the Bloomberg administration. The City seeks ways to become more agile in this fast-paced technology environment by taking a citywide approach and working towards improvements in contracting and hiring.

   - **Citywide IT Services Contracts.** DoITT has established a set of enterprise contracts for use by City agencies when launching technology projects. These contracts leverage the City's buying power and significantly reduce the timeline for implementing agency technology initiatives. Contracts in place include Project Monitoring and Quality Assurance Services, Requirements Definition Services, Systems Integration Services and Handheld Computers and Services.

     Additional IT services in development include Standby Enterprise-wide IT Consulting Services to enable agencies to quickly fill short-term consulting needs; Emergency IT and Telecommunications Services for coordinating and initiating timely restoration of services in the event of a critical incident (such as declared emergency or natural disaster); Citywide Radio Network to install new radio systems for both public safety and other agency communication needs; Citywide Mobile Wireless Network to construct a citywide wireless network sufficiently robust to support the demanding requirements of the public safety agencies; and Citywide Voice and Data Services for local and long-distance voice and data telecommunications.

   - **IT Civil Service Titles**. As a means to attract and retain IT professionals with the skills needed to manage the City's increasingly complex technology environment, DoITT, the Department of Citywide Administrative Services (DCAS) and the Office of Labor Relations (OLR) have established an updated set of information technology Civil Service titles. These new titles require professional or vendor certifications in the areas of application development, database administration, and local/wide area network administration. This enables the City to efficiently strengthen its IT workforce, and, as appropriate, decrease dependence on external consultants.

3. **Leveraging the City's Strategic Technology Infrastructure and Investments.** A key goal for all agencies is to do more with less. The City has therefore worked to leverage, and where appropriate, consolidate, its IT infrastructure to contain costs, avoid duplication of effort, and implement consistent, secure practices and tools for technology management.

   - **DoITT Data Center**. The DoITT Data Center represents a highly secure, fully redundant environment supporting mainframe, midrange and WINTEL (Windows on INTEL processor) infrastructure. Currently, the Data Center houses systems from the Department of Finance, New York City Housing Authority, the Law Department and DCAS, and is moving forward to assist the Department of Transportation. A major

initiative over the next year is to consolidate the Department of Education's data center.

- **I-NET**. New York City's Institutional Network is commonly referred to as "I-NET". I-NET is a municipally dedicated high capacity private network, which can transmit voice, data, video and a variety of advanced telecommunications services to help address the City's communication needs. I-NET is composed entirely of high capacity fiber optic cable. I-NET was established through the use of funds, fiber and accessories provided to the City by the City's cable and high capacity franchises over the last fifteen years. I-NET projects include:
  - **The Technology for Education** project provides distance learning between City public high schools, CUNY senior colleges, CUNY junior colleges and cultural institutions.
  - **The Criminal Justice System** project started as a pilot program to test the feasibility of using interactive video conferencing with inmates at Riker's Island for interviews with probation officers, pre-trial conferences, and remote Supreme Court appearances. The pilot was such a success that the New York State Office of Court Administration has taken the role of implementing this technology Citywide.
  - **The Citywide Training Network** project is operated by DCAS and is used for business meetings and to provide training to City personnel.
  - **The Citynet Network** provides data connectivity between core sites utilizing ATM over SONET to provide all City agencies with access to several legacy mainframe centers, the City's Financial Management System, payroll system, and Intranet applications at various locations within the City.
  - Also in place is a multi-pronged plan for delivering enhanced communications services to City agencies using I-NET, focused on enhancing the City's public safety response, communications continuity and recovery capabilities. The **Police and Fire Departments** are working to improve performance by using I-NET. In the past, NYPD data communications was centered at 1 Police Plaza. DoITT is using I-NET to assist in implementing a more distributed network. This will assure complete, reliable communications even if there is a major failure at any one site. With the Fire Department, DoITT is tying together the Fire Borough Commands and a small number of other significant locations in a ring topology over I-NET.
- **Telecommunications**. The City has also been working to improve telecommunications services to ensure that the best possible pricing and services are secured from its telecom carriers. The immediate goal is to ensure that the City is treated as a large single-enterprise. These efforts have resulted in better service as

well as pricing. Based on a new pricing model, it is anticipated that the City will save over $8 million annually in local voice services.

- **Provide IT Services to City Agencies**. Agencies are being provided with a variety of centrally managed tools and services to streamline investments and ensure uniform implementations from a technology, security, and financial perspective. Rollouts in this area include:
  - **3-1-1 Services.** Agencies are encouraged to use 3-1-1 for managing customer service inquiries. The Citizen Service Center offers both sophisticated technologies and highly trained customer-service call-takers, enabling agencies to quickly implement, track and manage customer service outreach initiatives.

    The knowledge and customer relationship management system used by the 3-1-1 Citizen Service Center can be used by agencies to generate statistics and reports to manage their performance in ways not possible before. The use of this system is expanding to service other sources of queries to City agencies, such as at walk-in customer service centers.
  - **Email, calendaring and task management.** A centralized environment for hosting email services for City agencies ensures greater security, lowers costs and relieves agencies of the need to maintain their own email environments. DoITT currently supports more than twelve agencies with over 4,000 users. In the first half of Fiscal Year 2005, that number is expected to more than double. Additional services provided by DoITT include secure remote web access to email and applications.
  - **Franchise Fiber.** DoITT is responsible for granting franchises and contracts for telecommunications companies doing business in New York City, including cable television, telecommunications, open video systems, and public pay telephones.

    DoITT is bringing franchise fiber to City agency locations to provide high-speed networking at reduced cost. These connections improve Internet connectivity, access to centralized City applications, and inter- and intra-agency communications. Wireless connections are used to provide for disaster recovery, back-up and difficult last-mile access.
- **Emergency Communications (911) Transformation Project**. The City has launched an important initiative to streamline and unify emergency communications for Police, Fire and Emergency Medical call-taking and dispatch into two unified Public Safety Answering Centers. Led by DoITT, a task force to govern the program has been established and is composed of key representatives from all stakeholder agencies.

- **Mitigate Technology Risks**. The City is vigilant in continuing to seek ways to decrease Citywide exposure to technical risks, including virus threats as well as the risks associated with managing large, complex IT projects.
    - **Emergency Response Portal**. DoITT coordinates Citywide prevention and response to computer virus attacks. Emergency response procedures have been developed for both localized and widespread attacks. These include the establishment of an Intranet based Emergency Response Information Portal where critical information and software patches can be downloaded by agencies. The system also conducts personal outreach to agency IT personnel at the time of a threat or actual attack. During an emergency, a 24-hour helpline and onsite assistance is available.
    - **Project Monitoring**. Large and complex IT projects need to be carefully managed to ensure that they are delivered on-time and within budget. The City's project monitoring contract is being used to provide objective, independent monitoring of key projects, enabling agencies to better mitigate risks early in a project's life cycle.
    - **Disaster Recovery**. The City continues to develop improved disaster preparedness and recovery plans. Recently, a successful "proof of concept" disaster recovery test was performed using the Financial Information Services Agency (FISA) data center to restore and recover DoITT's mainframe applications. By using a City location as a mainframe recovery center, the City will save approximately $250,000 per year in disaster recovery contracts. In addition, significant enhancements will reduce the recovery time from 48-hours with one week old data to one hour with up-to-date data.

4. **Strategic Partnering**. The City strives to build relationships among entities to develop technical solutions and services that will benefit the City and its constituents. Examples include relationships between City agencies, other government agencies, the academic, non-profit and private-sectors.
    - **Geographic Information Systems (GIS)**. The Citywide GIS Utility is a repository of accurate digital maps and geography-referenced data that allows City agencies to perform analyses and conduct operations in ways never possible before. The Utility consists of a geo-coded "basemap" (NYCMAP) with overlays of data layers such as streets, buildings, x/y coordinates, bodies of water, train stations, census tracts, utilities, etc. Applications using this data include mapping crime, dealing with emergencies, managing construction activities, planning for provision of social services and tracking complaints received by the 3-1-1 Citizen Service Center. The Citywide GIS Unit develops and maintains NYCMAP and coordinates GIS activities with the City agencies, as well as with private utilities, neighboring governments, and Federal agencies. A central web service is being created to facilitate the sharing of

GIS data among agencies. The unit is also developing strategic infrastructure initiatives, including mapping subway stations and building the capacity for 3_D modeling.

- **Academic Internships**: DoITT has partnered with the City University of New York's (CUNY) Institute for Software Design and Development to create the Citywide Information Technology Internship (CITY) program. This program provides City agencies with high-quality information technology interns, and provides CUNY Computer Science majors with valuable work experience.
- **Media Partnering**. NYC TV has engaged in partnerships with a variety of media organizations to bring additional content to the network and promote local events. A sampling of these partners include *E! Entertainment, The Style Network, TV Globo,* the *Association For A Better NY,* the *Tribeca Film Festival, WNET / Thirteen* and *The New York Historical Society*. An example of partnering among agencies can be found in the program *City Drive Live*, on NYC TV 74. This is a joint venture between DoITT and the Department of Transportation (DOT) in which NYC TV created programming by leveraging DOT's traffic cameras that were already in place to monitor road conditions.
- **Franchise Relationships**. DoITT's franchise contracts enable the City to generate municipal revenue while also encouraging infrastructure improvements. Examples include:
  - Increasing accessibility to high-speed broadband Internet access throughout the City, including for Community Boards, public schools, senior centers and fire houses,
  - Ensuring that cable providers use state-of-the-art technology to provide their services,
  - Reducing the cost of building technology infrastructure for private companies by encouraging telecommunications buildouts through cost-sharing among multiple carriers, and
  - Overseeing public pay telephone companies to ensure they meet all site criteria, cleanliness and operating standards, and working with communities to resolve issues and complaints.

City Agency IT Projects

With an established and secure infrastructure, architecture and shared delivery foundation in place, the City's agencies are proceeding to implement innovative IT applications at an unprecedented rate. Following are highlights of just a few of the significant IT projects underway across New York City:

Department of Buildings
BISWEB

The Department of Buildings (DOB) created BISWEB to web-enable its mainframe system and turned it into an Internet application. The application leverages over 70% of the existing legacy code, and provides 24/7 online access to millions of pieces of information on buildings in New York City. Previously, building developers, architects, contractors and the public had to subscribe to a service to review information about their buildings, such as permits, violations, complaints, applications and inspection information. Now there are no user fees, and the online query system enables anyone with Internet access to search for current information on over 900,000 structures in New York City at any time and from anywhere.

Plumbing Inspection Portable Entry System (PIPES)

The Plumbing Inspection Portable Entry System (PIPES) was developed by DOB to support the process of scheduling and performing plumbing inspections. PIPES provides automated support for scheduling, geographic routing, field inspections, results tracking, and job sign-off. It is integrated with the department's work processes and legacy Building Information System (BIS). The system uses a web-based interface in the office, and a handheld-based application for field inspections.

PIPES provides a number of process automation benefits that have dramatically increased the Department's ability to effectively manage plumbing inspections. The use of handhelds has increased the accuracy of plumbing inspections, reduced the time for inspection results to be posted on the Web, and provided a comprehensive, structured view of inspection history. PIPES has enabled DOB to achieve its goals of safety, service and integrity for the City's residents and the building industry.

Department of Design and Construction
ACCOFlow

ACCOs are Agency Chief Contracting Officers responsible for steering the procurement process of their individual agencies. The Department of Design and Construction (DDC) procures approximately $1 billion annually in construction and consulting services to design and build city-owned buildings and infrastructure. Because of the complexity of City rules and regulations regarding procurement, entering into these contracts is a lengthy and difficult process to manage. ACCOFlow was developed to help streamline and automate these critical agency procedures. Specifically, DDC hoped to improve the management of the procurement process and reduce processing times - thereby ultimately speeding the delivery of completed projects to the City of New York.

Department of Finance

Automated City Register Information System (ACRIS)

ACRIS is a project to digitize the City's public recording services and involves state-of-the-art electronic imaging, automated workflow and digital archive and retrieval technologies. The importance of the public service provided by the City Register's office of the Department of Finance is revealed by the number of documents recorded by the office and the money paid by the public for this service. In Fiscal Year 2003, the City Register received, examined and recorded nearly 600,000 deeds, mortgages, liens, and other legal instruments. Over $1.3 billion was collected to pay for these services. Prior to ACRIS, the process of making such documents part of the ever-growing public record was entirely manual and resulted in massive amounts of paper and microfilmed records. This was stored in vast archives that were accessible to the public only during business hours. With ACRIS, the public record is maintained in digital form, and access to it is provided via *NYC.gov*, viewable anytime, from anywhere.

Department of Health/Mental Hygiene

Mobile Food Service Inspections

The Food Service Inspection Program is one of the Department of Mental Health/Mental Hygiene's (DOH/MH's) successful deployments utilizing mobile technologies. Approximately 20,000 food service establishments are visited annually by inspectors using handheld computers for the entire process, from scheduling through the issuance of violations. This was one of the first mobile food inspection programs in the country, and is currently among the largest deployments of technology for this purpose. The violations observed during these inspections are available through a website, http://nyc.gov/html/doh/html/rii/index.html, where the public can view inspection data to make safer dining choices. This application was accepted into the permanent collection of the Smithsonian Institution in 2000, and has received wide local and national acclaim.

Syndromic Surveillance

DOH/MH has implemented an unprecedented data mining operation, receiving data daily from over 40 disparate hospital-based systems, major pharmacy chains, major NYC employers, and the City's 911 call center in order to provide early detection of potential disease clusters in New York City. This system, by design, also serves as a critical early warning system for terrorism events involving biological, chemical, or radiological agents. This application is considered one of the first of its kind in the world. Traditional disease and illness surveillance depends upon visits to doctor's offices and confirmed laboratory tests, which can take days to weeks before a pattern can be detected. This application successfully identified the onset of the flu season in New York several weeks before traditional methods. It also identified a general increase in rotavirus-like syndrome in New York, prior to the first cruise ship incident. These examples provide insight into how early detection allows DOH/MH to rapidly increase public and medical community notification.

Health and Hospitals Corporation
Tele-Health, Health and Homecare

The Tele-Health Program was designed by HHC's Health and Home Care Agency to improve medication compliance in the HIV patient population. Through telehealth units and peripherals in the patient's home, the patient is linked by ordinary telephone lines to a central monitoring station staffed by a nurse who can see and talk to the patient and obtain their vital signs. This "live" audio and video link allows the patient and the nurse to communicate naturally and seamlessly. The patient's care plan combines telehealth visits with traditional home visits to increase access to care and improve outcomes while maximizing the use of Health and Home Care's trained clinical staff. The patients benefit from improved health outcomes, fewer hospitalizations and active participation in their care.

New York City Housing Authority
Project BEST

The "Business Enterprise Transformation System,", referred to as Project BEST, is the New York City Housing Authority's (NYCHA's) multi-year initiative to replace and improve its core business systems. Project BEST began 18 months ago with a first phase, a finance and materials management initiative. Previously, NYCHA had not allocated budgets to a programmatic level, so there was no way to plan for revenue collection and expenses by programmatic function. This complicated financial analyses and hindered NYCHA's ability to hold managers accountable for their areas of responsibility. The new system has enabled budgeting at the programmatic level, and allows program directors to react to emerging financial needs by modifying their budgets without cost revisions. In turn, this avails managers the opportunity to more quickly address the needs of their clients.

Hudson River Park Trust
Achieving Breakthrough Improvements in Productivity, Schedule and Risk Management on Complex Design and Construction Projects

Hudson River Park Trust (HRPT) is a city/state partnership charged with the design, construction and operation of the Hudson River Park. The Park stretches from the Battery in lower Manhattan to 59th Street along the Hudson River. This 550-acre park is the largest open-space development in Manhattan since the completion of Central Park. The development includes 13 public piers, a marine estuary and upland parks. The multi-year $400 million program consists of 120 separate contracts to date, and includes collaboration with 100 different architects, engineers, and contractors. The tactical challenge is managing and coordinating this very complex project. HRPT decided to use Constructware, a project planning and management application, as the prime tool for this effort. This approach was very successful, and HRPT received national recognition within the construction industry for its innovative use of Constructware.

Department of Probation
Kiosk Implementation

The Department of Probation uses kiosks for low risk probationers who can now check-in electronically instead of visiting in-person with a probation officer. The original cost per kiosk was $25,000 and represented a proprietary solution. A Probation employee seized the initiative to design and build kiosks using off-the-shelf parts, bringing the cost down to $7,000 per kiosk. This enabled Probation to move 25,000 low risk Probationers to electronic reporting at a time of budget reductions. The kiosk program has expanded and will soon be increased to 26 units. The result is that the kiosks have cost-effectively increased public safety and have become an even more important component of Probation's mission of supervising offenders in the community.

Queens Health Network
Smart Card

The Queens Health Network has developed an application utilizing Smart Card technology to provide patients with a portable summary of their essential medical information, and has provided the readers and software needed to view the information to Emergency Departments in hospitals across the City. A pilot program is being run in the Elmhurst Hospital Center's adult primary care service. Patients are being provided with a photo ID card that includes a 64K computer chip. Programs were developed to extract data from Elmhurst's electronic medical record (EMR) system and record the information onto the chip, including patient demographics, emergency contact information, list of health problems, allergies, active medications and recent lab results. The primary benefit of the application is that patients have ownership of a portable summary of their essential medical information that can be provided to emergency clinicians to assist in the provision of care.

Taxi and Limousine Commission
Customer Service Improvements

New York City's Taxi and Limousine Commission (TLC) is planning to install equipment in existing yellow/medallion taxis that would enable the TLC to receive and collect trip data electronically. In addition, each taxi will be required to be capable of accepting major credit and debit cards, and will be equipped with a device to enable drivers to receive text messages. There will also be a screen-display map that will convey route and trip location information to passengers.

Conclusion

As these projects demonstrate, New York City is experiencing significant growth in applications that meet agency business needs and that better serve the public. Enabling technologies allow the development of innovative applications that are reshaping how New York City provides services,

ranging from providing 24/7 online and telephone access, to identifying neighborhood based services through the use of mapping technology.