

Information Sharing and System Modernization in New York City

A report to the New York City Council in response to Local Law 75 (2018)



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Introduction

Digital technologies and the exponential increase in data that they generate are transforming the possibilities for how every sector operates. This new age of data presents great opportunities for government at every level, but also significant challenges. Governments can manage data to make their services more effective and more efficient, but if they handle data poorly, the service experience can be made more frustrating and there are possibilities for harm to residents' privacy. It is critical for government to have the right data policies and systems in place.

In New York City, one of the key data-related challenges is breaking down the silos in which many City human services agencies operate. City human services agencies provide essential benefits and services to support the well-being of its 8.6 million residents.¹ The City's system for providing these services is organized around the expertise and functions of domain-specific departments – the Human Resources Administration, the Department of Homeless Services, the Administration for Children's Services, the workforce division of the Department of Small Business Services, etc. – which concentrate their client support and funding within their respective areas. New York City residents, of course, are not themselves so neatly siloed. The challenges faced by residents are often complex and multi-faceted, cutting across the responsibilities of individual human services agencies and organizations. Providing quality services often requires strong inter-agency partnership and coordination.

Efforts to address this challenge are not new, but the broad advances in digital technologies mean that human services agencies can now collaborate in new ways. Smart phones, apps and the spread of broadband also give rise to new and appropriate expectations among residents who increasingly look for public human services agencies to deliver services with modern technology, and to offer online experiences similar to what they receive using digital tools and services in other spheres of their lives. Growing demands for seamless client service interactions and the prevalence of shared clients across social services agencies underscore the need for robust information-sharing capabilities in New York City.

Study Focus

Local Law 75 ("LL 75"),² introduced by Council Member Stephen T. Levin, recognizes the critical role that data sharing and data management can play in supporting more coordinated services and improved experiences and outcomes for clients. LL 75 instructs the Mayor's Office to produce a study on client information management systems used by City human services agencies. It defines "information management systems" as "any electronic software used to

¹ <https://www.census.gov/quickfacts/newyorkcitynewyork>

² Local Law 75 <https://legistar.council.nyc.gov/LegislationDetail.aspx?ID=3029958&GUID=F183F444-8406-423A-B87C-D358BFCD23AC&Options=ID%7CText%7C&Search=1577>

collect, record, or manage information about social services that individuals may apply for or receive,” and requires the following:

1. *Assessing Existing Efforts - an assessment of efforts to update and integrate client information management systems* of human services agencies that provide services to city residents;
2. *Information Sharing Strategies - strategies to help facilitate information sharing among* human services agencies so as to support improved inter-agency coordination of services to city residents in a manner consistent with applicable laws and city and agency policies concerning the protection of individually identifiable information;
3. *Use of Digital Tools - an examination of how human services agencies can increase the use of digital tools to interact with individuals served by such human services agencies,* including but not limited to applying for services, electronically uploading documents, reminders and updates by text message, and electronic notification regarding available services, and potential technology investments;
4. *Upgrades to Systems - recommendations of upgrades to client information management systems* operated by the City and other governmental units that interact with client information management systems serving city residents; and,
5. *Continued Monitoring - recommendations on how the City can continue to monitor and evaluate existing client information management systems and updates to such systems* in order to remain current in the use of technology to serve clients.

Study Lead

The Mayor’s Office of for Economic Opportunity (NYC Opportunity) led the research and produced the recommendations in this study. The Mayor’s Office of Operations (Ops), named in LL75 to direct the study, designated NYC Opportunity, a unit housed within Ops, to serve in this role.

The Mayor’s Office for Economic Opportunity uses tools of evidence and innovation to help the City reduce poverty and increase equity. Established as a distinct mayoral office in 2017, NYC Opportunity evolved from its origins in two separate but related units – the Center for Economic Opportunity (CEO), which began in 2006 with a primary focus to develop and test new anti-poverty programs and measure poverty in the city, and Health and Human Services Connect (HHS-Connect), which was created to use data and technology to enhance information-sharing among the City’s health and human services agencies. The current work of NYC Opportunity maintains and expands on these original functions. Of principal relevance to this study, NYC Opportunity facilitates the legally-permissible sharing of social service client data among City human services agencies, managing

technical, legal and governance tools and processes. More broadly, NYC Opportunity's multi-disciplinary team advances the use of research, data and design in the City's program and policy development, service delivery, and budget decisions.

The aim of this study and LL 75 – to identify how data sharing and integration can support more holistic services to clients– has long been a focus of NYC Opportunity's work, from the earliest HHS-Connect projects on to current activities. As part of its core mission, NYC Opportunity's data integration and digital product work helps policy leaders, case workers, and others better coordinate the delivery of resources to the right people at the right time. Its staff includes those with expertise in data management, technology development, data governance, privacy, and data science. A number of NYC Opportunity's digital tools and data integration initiatives, such as its Common Client Index, Application Programming Interfaces, and data governance frameworks, are described throughout the report and helped influence its recommendations.

Study Process

To meet the requirements of LL 75, NYC Opportunity engaged program, legal and technology leadership staff at the five human services agencies named in the law – HRA, DHS (now organized under the DSS), ACS, DOE, and HPD – as well as at the Department of Finance (DOF), Department of Youth and Community Development (DYCD) and Small Business Services (SBS). NYC Opportunity also received advisory support from the Department of Information Technology and Telecommunications (DOITT), the Center for Innovation through Data Intelligence (CIDI) within the office of the Deputy Mayor for Health and Human Services (DMHHS) and the Mayor's Office of Information Privacy (MOIP).

The engagement took a number of forms. Human services agencies provided information about their most highly used client information management systems, including their data integration and exchange practices as well as their current and planned efforts to modernize existing systems. Additionally, NYC Opportunity researched local and state efforts to share data; analyzed best practices and tools for facilitating information sharing; reviewed use cases and documented case studies on information sharing in the City and other jurisdictions; and held a workshop to generate ideas and validate recommendations with a representative group that included study participants and external thought partners.

This report synthesizes the ideas and contributions drawn from agency input, external research and NYC Opportunity's experience and current work. It presents an overview of agency led efforts to update and integrate client information management systems and recommends actionable strategies for sharing information in accordance with applicable laws and for incorporating modern digital tools to enhance New Yorkers' access to services.

Summary of Findings and Recommendations

This study is framed around two critical questions:

1. *What is the current landscape of systems and information sharing among human services agencies in New York City?*
2. *What opportunities exist to modernize the City's capabilities to share information so that vital social services can be easier to access and better coordinated?*

To engage study participants, NYC Opportunity conducted multiple interviews with a total of 88 individuals across eight human services agencies about the systems most widely used to manage individual and family participation in publicly funded benefits, services and programs.

Key Findings

Human services agencies expend a great deal of effort finding ways to execute data sharing in ways that are legally and technically feasible. Agencies are doing what is operationally necessary and legally allowable to support systems' ability to facilitate data sharing. Largely driven by business need, point-to-point exchanges are used within and across these agencies, to support varying use cases including client outreach, care coordination and enhanced benefits access. Because systems do not always support real-time integration, human services agencies often share information using secure technologies such as encrypted file transfer protocol (ftp).

Some of the largest client information management systems in the City's health and human services domain are managed, operated and controlled by New York State or the federal government. City human services agencies rely heavily on state and federally-owned systems to support mission-critical programs. Large state-owned systems are central to local business functions, are the system of record, and store the data relied upon by many City-owned ancillary systems. Technical and legal restrictions on these systems and protected client information limits local human services agencies' ability to make necessary changes to support essential functions and daily operations unique to the City.

New York State has several initiatives underway that will modernize the state Welfare Management System (WMS) and the child welfare system CONNECTIONS (CNNX). As a local social service district, New York City is a key stakeholder in these statewide efforts. These projects are complex and will require significant input and involvement from the City and the State is engaging City stakeholders in this effort.

Large systems require significant effort to adapt to modern approaches or capabilities. Many of the client information systems used by City human services agencies are fairly large and

complex. Human services agencies have made and continue to make significant investments to adapt and improve these systems. Several human services agencies reported that while new front-end web developments are feasible, they require extensive integration work to communicate with legacy systems on the back end. These systems include sensitive client information and complicated rules to manage eligibility and legal notifications and other detail-heavy transactions that must be considered in any project.

A human services agency may manage multiple client information management systems that, for operational, legal and/or technical operational reasons, may not be fully integrated with each other. Nearly all human services agencies within this study manage or rely on multiple client information systems and many have been, or are, investing in technology and data innovation to increase coordination across their own programs and programs at other agencies. These efforts are not without significant challenges especially when the agency manages many large programs where eligibility requirements vary, a complex array of privacy requirements exist, or where the program relies on client information systems owned and operated by state or federal entities. In such cases, human services agencies may face a number of challenges to integration that range from the lack of consistent data standards across heterogenous systems to ongoing concerns around data quality.

Within and across human services agencies, there may be differences in client information data standards or identifiers that support information sharing and interoperability. Most client information management systems support similar types of data. Where allowable and feasible, this data becomes critical to linking and integrating information that refers to the same program, the same service or the same individual in different systems. In several instances, program eligibility requirements have some effect on underlying data definitions and meanings. For example, federal SNAP programs define the concept of “household” differently than other City and state benefits programs.

Despite older, legacy system constraints, human services agencies are finding new ways to incorporate modern design principles in their IT systems and practices. In the past few years, more human services agencies have begun to adopt more human-centered design frameworks, which are rooted in research and observation about how people interact with technology interfaces and iterative methodologies, which propose developing technology applications in smaller increments to allow ongoing assessments, in their approach to technology. These efforts have demonstrated that light-weight approaches to changing the client and worker experience without a major overhaul of legacy systems can be an appropriate approach in some circumstances, including where offering some limited interoperability is possible even if full-scale integration would be too challenging.

Recommendations

As required by LL 75, NYC Opportunity offers several recommendations to facilitate information-sharing within and across human services agencies and deliver modern system capabilities. Many of these recommendations are offered as starting points for further exploration and discussion.

Recurring Themes Framing the Recommendations

Three themes emerged in the study that shape the scope of recommendations:

1. Collaborative strategies often support individual agency efforts to facilitate information sharing.

Information sharing often requires City agencies to navigate a complex legal and regulatory environment and overcome or mitigate the limitations of legacy technologies. City human services agencies often turn to collaborative efforts to solve common problems. This has taken many forms – from regular convenings of a small consortium of human services agencies around data coordination to more wide-scale efforts as evidenced by the recent development of a citywide framework to engage the legal challenges inherent to multi-agency initiatives. Continuing the exploration of collaborative efforts to develop citywide, or “enterprise-level,” information management strategies may help ensure such strategies do not overlook nuance or complexity across the system as a whole.

2. Centralized technologies and tools serve human services agencies better when they are perceived as accessible and easy to self-manage.

Within the City, there are several success stories of centralized technology services that have been built by one agency to support the information and technology needs of other City human services agencies. A few examples include the Department of City Planning’s (DCP) [online geocoding services](#), NYC Opportunity’s [Benefits Screening API service](#) and DOITT’S cross-agency data platforms [such as DataShare](#). In each case, an agency develops and manages an information service that is made available to all other human services agencies (and perhaps, even the public as with DCP and NYC Opportunity). Beyond just being centrally available, many of them are “self-serve” – i.e. an agency can access them and fit them to their technology needs. This model of providing a central service could be extended to other tools that support information sharing and system modernization as long as agencies can utilize such services i) with minimal support or guidance from a centralized staff; ii) without needing highly specialized technical skills or extensive technical programming to make useful to use; and, iii) without presenting significant legal issues, especially for cases of potential data sharing.

3. Developing light-weight, modular tools that support existing case management systems can be an effective way to help deliver modernized digital services to clients.

Building a new client information management system to replace older software can be an extraordinary undertaking for a City agency. It is typically an expensive, years-long process. Depending on size and complexity, the new system will carry perpetual costs to support, enhance, and keep operational through its lifetime. Sometimes, legacy systems can be made more functional by using ancillary tools for specific purposes. For example, it can be difficult to redesign an older mainframe system that predates modern web-enabled services. However, it might be possible to integrate new front-end tools, web pages and services for an end user that integrate with the older system. Human services agencies regularly pursue this strategy on their own, often with significant investment of time, money and resources.

Recommendations

Taking these key themes into consideration, the following recommendations offer practical areas for the City to explore.

Recommendation 1: Explore How Human Services Agencies May Benefit from Access to an Enterprise Master Data Management Service

Master Data Management (MDM) is a method of defining and managing critical data in an organization. MDM provides a secure platform designed to process complex data matching rules automatically, allowing users to quickly identify client record linkages within and across client information management systems. A well architected enterprise MDM service can help City human services agencies overcome the data differences in the way programs or people are represented in systems and enforce standards for data exchange. In turn, this would support greater cross-agency service coordination and integrated analytics for data collected through multiple systems. Given the cost and effort to initiate, implement and maintain a solid MDM solution, a centralized service could accelerate individual agency efforts, thus saving considerable time and resources across the collective.

Recommendation 2: Research the Effectiveness of Implementing Cross-Agency Approaches to Data Governance

Data governance refers to how an enterprise such as the City's domain of health and human services agencies manages its data assets. It encompasses the formal rules, policies, procedures, roles and responsibilities that are established to ensure that data is accurate, consistent, complete, legally and operationally available, and secure. However, given that managing and maintaining data governance across a complex organization or enterprise can be prohibitively costly and resource-intensive, NYC Opportunity provides a few examples for governance strategies the City can explore for potential implementation.

Recommendation 3: Explore Expanding Worker Connect Use and Capabilities

Worker Connect is a cross-agency information-sharing initiative launched in 2009 to reduce data siloes across City human services agencies while adhering to a stringent legal framework. It is a system designed to serve as a virtual case file folder of limited case data and documents integrated from multiple City human services agencies. Using this information, the City’s network of social workers and care providers can expedite the process of connecting individuals and families with income assistance, emergency shelter, employment opportunities, health services, and other help. Worker Connect can be enhanced to further assist social services agencies in providing more effective assistance to their clients.

Recommendation 4: Advocate for Legislative Reform at the Federal and State Level

The mosaic of disparate federal, state, and local privacy laws continues to pose barriers to the inter-agency sharing of personally identifiable information and systems interoperability involving the exchange of such information. Advocating for legislative reform at the federal and state level that enables information sharing opportunities to coordinate the delivery of benefits, services, and care to individuals and households, while still preserving important privacy and data security protections of individuals’ personal information is vital. Many of the applicable rules are applied by federal authority to state practices, limiting what states can do in this area, so any legislative or regulatory reform efforts should consider where the relevant control resides. And, even with legislative reform, there are privacy restrictions that will endure when it comes to disclosing highly protected data, such as Personal Health Information (PHI), for example.

Recommendation 5: Examine the Value of Adopting a Modular Design Approach to Digital Services

Rather than recommending specific tools for specific systems, we propose examining how smaller components of larger systems such as an eligibility screening function or online application might be developed and packaged as stand-alone, or “modular” service that supplement existing client information systems. In essence, this would entail establishing individual digital components as an a la carte portfolio from which human services agencies can choose and deploy if, after review, they determine if it would be valuable to residents seeking program services and would not disrupt current system operations.

Recommendation 6: Support City Requirements for State Modernization Efforts

The New York State-led efforts to modernize WMS (IES) and CONNECTIONS (CCWIS) will have a major impact on City operations in the coming years. Both HRA and ACS are actively collaborating with State offices to help ensure critical requirements for City operations and technology are kept on the table. The City should collectively support an agenda that will ensure the overhaul of these legacy systems as well as open new opportunities for interoperability, service coordination and resident access to services.

Recommendation 7: Conduct Periodic Surveys to Evaluate and Monitor Ongoing Efforts

As stated by LL 75, NYC Opportunity is required to recommend a strategy to evaluate and monitor efforts to ensure the City stays current with advances in technology. Accordingly, we propose a realistic framework for an annual survey of participating human services agencies as well as our own efforts over the next three years.

Background on Coordinated Data Integration among NYC Social Services

To address the requirements of LL 75, we begin with some background on the City’s progress in establishing core mechanisms to facilitate social service client data sharing. Some key fundamentals required to support data sharing include formalized governance practices; established legal review and approval processes; technical standards; and common technical platforms. When these aspects of data-sharing are well-established and maintained, they allow individual data exchanges to be streamlined and establish the groundwork for more extensive interoperability and automation.

New York City took pioneering steps to develop more systematic, cross-agency client-level data-sharing capabilities with the creation of the Health and Human Services Connect (HHS-Connect) initiative in 2008. HHS-Connect was one of the first municipal efforts in the country to use technology and governance strategies to link the work of discrete client-serving human services agencies.³ The Executive Order that established HHS-Connect spelled out its purpose: to “facilitate data integration and exchange between existing agency-based information management systems” by leveraging innovative tools, promoting a common data model, formulating a robust data sharing strategy, developing an enterprise approach to case management, and creating an integrated data portal for workers.⁴

In 2017, HHS-Connect merged with the Center for Economic Opportunity and the combined unit was reorganized as the Mayor’s Office for Economic Opportunity (NYC Opportunity). The data-sharing and integration work of NYC Opportunity has evolved since the early days of HHS-Connect, but there has been a consistent and continuing focus on building digital products and services that help the City deliver more effective and holistic support to clients. Three important strands of programmatic work have shaped cross-agency data integration since 2008: 1) increasing access to benefits; 2) improving the experience of clients engaged with multiple human services agencies; and 3) helping human services agencies better coordinate their services.

To advance these goals, NYC Opportunity has steadily produced a series of components that together, along with active and appropriate governance, form a platform for data-sharing and analysis. These include:

³<https://web.archive.org/web/20111105135802/http://cwhonors.org/viewCaseStudy2010.asp?NominationID=163&Username=cnyhhs>
<https://web.archive.org/web/20110711093439/http://events.computerworld.com/ehome/index.php?eventid=11545&tabid=14848&>
<https://www.governing.com/blogs/bfc/Breaking-Down-the-Barriers.html>

⁴ Executive Order 114 (2008), http://www.nyc.gov/html/om/pdf/eo/eo_114.pdf

Virtual case file folder. [Worker Connect](#) is a system designed to serve as a virtual case file folder of limited case data and documents integrated from multiple City human services agencies. This information is presented on a simple interface for case workers who have been legally authorized to use the data to help individuals and families apply for benefits, connect individuals to services and support client case management and service planning. To facilitate ongoing information sharing through Worker Connect, the City created a single inter-agency agreement routinizing a new use case process across human services agencies providing data to the platform to vet all requests against applicable laws and obtain necessary legal approvals.

Common Client Index. A centralized registry of linked client records that is used to support the integrated client case folder views in Worker Connect.

Data Governance Framework: A data governance and policy framework to support the legal review of new data sharing use cases, cultivate collaborative agency discussions around data and manage the privacy, security and quality of data shared.

Comprehensive Benefits Pre-Screening. [ACCESS NYC](#) is an award-winning⁵ online portal where New Yorkers can anonymously screen their potential eligibility for any one of 30+ City, State, and Federal human services benefit programs, learn how to apply, access application forms, and find directions to service locations.

Public Application Programming Interfaces (APIs) to share standardized information. APIs allow underlying data and content to be distributed for use by other websites and digital tools. The data that NYC Opportunity maintains and publishes include:

- [Benefits and Programs API](#) is dataset available on NYC's Open Data portal that provides benefit, program, and resource information for over 80 health and human services available to NYC residents. The data is kept up-to-date, including the most recent applications, eligibility requirements, and application dates.
- [Eligibility Screening API](#) supports the development of new and existing public benefits-related web applications. Through this API, anonymized household data (i.e. information about a household's income, expenses, housing situation, etc.) can be compared against screening criteria for 30+ Federal, State, and Municipal benefits and programs and a screening result will be produced, containing the potentially eligible benefit and program names and codes.

⁵"ACCESS NYC Receives Award for Best Application Serving the Public"

<https://www1.nyc.gov/site/opportunity/news/013/access-nyc-receives-award-best-application-serving-public-#/0>

- [Social Service Location API](#) makes data available about the verified sites of service delivery for social services contracted by the City of New York, including the agency, program, and some information about the type of service and clients served.

Mobile, User-Friendly Resource Directories. Two on-line resource portals, developed in association with the Children’s Cabinet, aggregate resources managed by different human services agencies into single, audience-specific websites:

- [Growing Up NYC](#) – a mobile-friendly website that makes it simple for families to learn about and access City programs, as well as services and activities available through government human services agencies and community partners in English and Spanish
- [Generation NYC](#) – a mobile-friendly resource to help NYC teens and young adults navigate City resources including a variety of topics, free and inexpensive trips, and inspirational youth profiles.

NYC Opportunity’s portfolio of products and services coupled with insights derived from its evolution from HHS Connect, reflect unique proficiencies in information sharing policy, technology and practices.

There are other offices that play critical roles in helping share data across agencies to support the delivery of social services, including the Department of Information Technology and Telecommunications, the Mayor’s Office of Data Analytics and the Mayor’s Office of Information Privacy.

New York City Department of Information Technology and Telecommunications (DoITT)

DoITT is the City’s centralized technology agency. DoITT maintains core IT infrastructure and systems across the full spectrum of governmental operations. DoITT helps human services agencies provide and consume information through "exchange services" that manage communication protocols and messaging between human services agencies. This platform, known as DataShare, was originally launched in 2005 to improve information sharing between police, courts, and criminal justice human services agencies. DataShare now supports sharing across many City human services agencies. "DataShare" is a City-branded name used for an enterprise integration platform that manages communication protocols, standards and messaging. DoITT also provides a centralized data warehouse ("DataBridge") that can be leveraged by human services agencies to securely store, integrate and analyze large data sets. DataBridge provides human services agencies that would not otherwise be able to invest in their own data warehouse tools for integrating and analyzing data within a single database.

Mayor's Office of Information Privacy (MOIP)

Established in 2018, the MOIP works to protect the privacy of New Yorkers' identifying information, while maximizing data sharing across human services agencies where permitted by law. In doing so, MOIP aims to increase access to and strengthen coordination of services for individuals and families, and to encourage innovative projects throughout the city that advance equity and opportunity. The Office is headed by the City's Chief Privacy Officer (CPO), who works to strengthen and coordinate responsible citywide data-sharing practices. In collaboration with human services agencies, the CPO will also work to improve the way the City uses data to inform fair, equitable policies and best practices.

MOIP's Citywide Data Integration Agreement (CDIA) is a legal framework that facilitates multi-agency data integration projects among City human services agencies, NYCHA, DOE and NYC Health and Hospitals (NYC H+H) utilizing the City's data integration platform DataBridge. The CDIA sets forth terms and conditions relating to the use of data transmitted, exchanged, stored, accessed or analyzed through this platform. The CDIA does not supersede the legal review any agency would need to do to ensure data sharing adheres to any and all applicable laws.

Mayor's Office of Data Analytics (MODA)

MODA is the City's civic intelligence center, which aggregates and analyzes data across City human services agencies, to more effectively address crime, public safety, and quality of life issues. The office uses analytics tools to prioritize risk more strategically, deliver services more efficiently, enforce laws more effectively and increase transparency. Through these efforts, MODA promotes data-driven policy-making and strategies to build human services agencies' internal analytics capabilities.

MODA plays a critical role in information sharing. It oversees the ongoing implementation of the City's Open Data Law (2012), which mandates that public data be made available on a single web portal. To this end, MODA works with City human services agencies to continuously review, update and add new data sets to the City's Open Data Portal. MODA collaborates with Operations, NYC Opportunity and MOIP to support cross-agency information sharing initiatives. They advise on use cases for cross-agency research analyses and govern the implementation of select projects on the DataBridge platform.

The Framework of This Study: Modernizing the Approach to Interoperability

As technology has evolved, so have approaches to client-level data sharing. New tools and strategies are becoming more commonplace to facilitate data exchange efficiently and effectively between parties that use different underlying client information management systems. While previously it may have been advantageous if the parties used the same underlying software that no longer makes much difference – as long as other elements of data interoperability are in place. Perhaps the most important of these are “standards”: agreed upon rules by which data are described and recorded. When these standards are in place, the requirements and design of individual systems can vary based on the specific needs of the users.

There have also been emerging trends in the way government organizations build and manage new IT systems and digital services. Application Programming Interfaces (APIs), for example, offer increased opportunity for interoperability across government systems. APIs allow underlying data and content to be distributed for use by websites and digital tools. They enable a system to transmit or receive data that can be used to securely update or enhance client case records. Depending on how the API is configured, this communication can happen in real-time or as a scheduled process seamlessly between two or more systems.

There is a similar shift in the way IT systems are built from start to finish. One such change seen is the increasing adoption of agile project methodologies over more traditional “waterfall” approaches, in which each step in the project lifecycle proceeds in a sequential and linear manner. Complex IT systems developed as waterfall projects start with lengthy requirements gathering before proceeding to development and testing before the system is launched. For large complex systems, this process can take years. Agile alternatively seeks to deliver system functionality quickly to the end user in the form of workable prototypes and then proceed to perfect the build iteratively based on user feedback. While both approaches have value, the Agile focus on shorter delivery timeframes and customer-centric orientation have seen its popularity increase. Organizations and end users can begin to gauge the value and fit of proposed systems and system changes in months, not years. Agile development also complements human-centered design approaches which seek to build solutions that focus on the user’s perspective through all steps in the process.

These larger trends in managing data and IT systems also marks NYC Opportunity’s shift from the early assumptions of HHS-Connect: When launched, HHS-Connect envisioned that all health and human services agencies would build their case management systems using the same underlying software product, starting with DHS’ Client Assistance and Re-Housing Enterprise System (CARES). DHS CARES launched in 2011 and succeeded in consolidating two older legacy

systems and automating shelter process, demonstrating how centralized technology components and a common data model could be configured to meet an agency's specifications.⁶

This collective experience along with more recent engagements with City human services agencies for this study inform the research framework and recommendations provided in this report. In general, this report recommends the exploration of discrete, shared data services and standards, developed to meet the common needs of multiple human services agencies, as a means to enable better system interoperability and legally allowable information sharing. Similarly, it suggests exploring the value of lighter weight digital services to complement the efforts that human services agencies must undertake to manage large, complex systems.

This report is not intended to provide universal prescription for the range of technical challenges that City human services agencies face to meet legal and programmatic demands. While there are many benefits of agile methodologies, for example, they are not appropriate for all IT projects. Likewise, certain data approaches may not accommodate the complicated and legitimate privacy interests that local, state and federal governments must protect. While we believe this report provides insights into critical challenges and potential opportunities, it also aims to acknowledge the competing considerations that shape public sector technology decisions.

⁶ *Letter Audit Report on the Development and Implementation of the Client Assistance Re-housing Enterprise System Administered by the New York City Department of Homeless Services*
<https://comptroller.nyc.gov/reports/letter-audit-report-on-the-development-and-implementation-of-the-client-assistance-re-housing-enterprise-system-administered-by-the-new-york-city-department-of-homeless-services/>

About This Study: Information Systems and Sharing in New York City

LL 75 requires a study on client information management systems defined as “any electronic software used to collect, record, or manage information about social services that individuals may apply for or receive.”

LL 75 specifically calls for a focus on systems operated by DSS/HRA/DHS, ACS, DOE, and HPD. In addition to these human services agencies, NYC Opportunity engaged with DOF, DYCD, and SBS. NYC Opportunity also sought advisory support from DOITT, the Center for Innovation through Data Intelligence (CIDI) within the office of the Deputy Mayor for Health and Human Services (DMHHS) and the Mayor’s Office of Information Privacy (MOIP). *See Table 1.*

To conduct this study, NYC Opportunity:

- Reviewed local and state efforts to share data, integrate solutions and modernize client information systems;
- Analyzed best practices and tools for facilitating information sharing;
- Assessed of initiatives to share information and update and integrate systems in the City;
- Commissioned background research on information sharing in other jurisdictions and past efforts within NYC;
- Held 17 interviews with 88 individuals across eight human services agencies, including leadership, programmatic, technical, and legal staff, to learn more about priorities, concerns, current efforts, and goals; and,
- Held workshops to generate ideas and validate recommendations with all study participants.

Also, in March 2019, NYC Opportunity with the Mayor’s Office of Operations released a report in response to a separate but related bill, Local Law 60 of 2018 (“LL60”)⁷ about benefits access in New York City. That report offers recommendations for proactive measures to connect individuals and families with needed benefits and services. Many of the human services agencies referred to herein have participated in both studies.

⁷ Local Law 60 - <https://legistar.council.nyc.gov/LegislationDetail.aspx?ID=2386580&GUID=4BCF2F59-387A-430D-8529-7B21EDF70884&Options=ID%7CText%7C&Search=855>

Office	Project Responsibility
Participating Human services agencies (ACS, DOE, DOF, DSS/HRA/DHS, DYCD, HPD, NYCHA, SBS)	Content experts; Co-develop recommendations; Review reports
Advising Human services agencies (DOITT, DMHHS, CIDI, MODA)	Content experts; Co-develop recommendations; Review reports
Mayor’s Office for Economic Opportunity	Research lead; Project oversight; Co-develop recommendations
Mayor’s Office of Information Privacy	Legal analysis and input in collaboration with agency counsels
Mayor’s Office of Operations	Project management; Meeting facilitation; Analysis
CUNY	Case study development

Table 1: Study Contributors

Defining “Client Information Management System”

At the onset of the study, we found it necessary to clarify the term “client information management system.” To this end, we circulated the following description to all human services agencies to ensure consistency of the response:

For the purposes of this study, we define *client information management systems* as technology and software applications having the following characteristics:

- Major information technology (“IT”) or case management systems that support screening, application, eligibility review and determination, service and benefits provision, client engagements, re-certifications or renewals and case closing processes for individuals, families, and/or households.
- Systems that support the delivery of mission-critical human service programs (i.e. any agency program, regardless of size, that serves clients as core to their social service mission or operation) to clients.
- Large data repositories that support analytics, reporting and policy planning on client programs such as data warehouses, data marts and/or operational data stores.

We excluded systems that do not track client services and benefits or whose primary function is financial and accounting management, vendor or contract management, human resources and timekeeping, performance monitoring or general agency support services (such as assets inventory, facilities, etc.). Additionally, we excluded systems that are unsupported applications or spreadsheets that are not core to the agency's service delivery.

Limitations of this Research Study

The findings in this report are based on agency interviews and assessments, analyses of archival documents and follow-up review. We identified systems, tools, and approaches used to facilitate data sharing and interoperability as well as challenges that inhibit the data sharing and system interoperability among NYC's human services agencies, but we acknowledge some limitations of the review. First, the information presented is based on a selection of highly used, mission-critical systems and data exchanges analyzed during the study. This report cannot, and should not, be taken as an exhaustive nor historical review of City client information systems, data sharing or modernization and upgrade efforts. As such, recommendations may not apply to all data systems given the sheer volume of data systems across the City. Second, this report is limited by the staff representatives selected by each agency to participate in the study. We did not speak to all staff representing all human service information systems from across the City. We nevertheless believe these findings to be a reflective snapshot of the current state of client-level data-sharing among human services agencies.

The Current Landscape of Client Information Management Systems

We surveyed human services agencies and spoke with technical teams to learn more about their existing client information management systems as well as the newer technologies they currently exploring to manage or operate.

Traditionally, the mission-critical operations of New York City human services human services agencies have been supported by client information management systems that track new applications for services, eligibility determination processes, benefits and service delivery, and a host of other interactions between the agency and an individual or family. Many of these systems predate present technology design strategies focused on agility, re-use and interoperability, and most were built to capture, but not integrate, data. Implementing changes to make new functions or public-facing tools work, even small changes, can be resource and cost-intensive or require significant integration work with external components. Further, those systems most critical to client service delivery and agency operations are more often than not owned by authorities external to the City, such as the state and federal governments.

We framed our assessment of these systems around the following attributes:

- **System Age** defined herein as the length of time a client information system has been in use by a human service agency since its launch. The older system the more likely the chance that it relies on software or technologies that may predate more modern approaches to interoperate with other systems or easily integrate with external data.
- **Technology Platform** defined herein as the technology, software or coding base upon which the client information management system is built. Client information management systems, particularly those built and still operating in mainframe platforms, may not have the flexibility necessary to reconfigure or extend its current capabilities to match the pace of new or evolving program needs.
- **Integration Readiness** defined herein as the capabilities a client information system has to readily ingest, integrate or transmit data in scheduled or real-time intervals. This can be an indication of the level of difficulty or effort required to make a system seamlessly interoperable with others.
- **System Ownership** defined herein as the possession of authority to determine how a client information management system is built, operated, maintained, accessed and decommissioned. This authority may extend to the legal review of use cases for sharing data with other external agencies, parties or programs. Together, technical and legal restrictions on client information management systems that are used by New York City

human service agencies but owned by state or federal agencies may limit the ability of a local agency to make changes that support essential functions and daily operations unique to the City.

Despite challenges, human services agencies continue to take new and varied approaches to modernize systems, tools and processes to support the delivery of social services. As our survey and interviews revealed, human services agencies are pushing forward in a number of ways, including by fully replacing systems, upgrading legacy systems specific components, and introducing modern digital tools that overlay legacy systems.

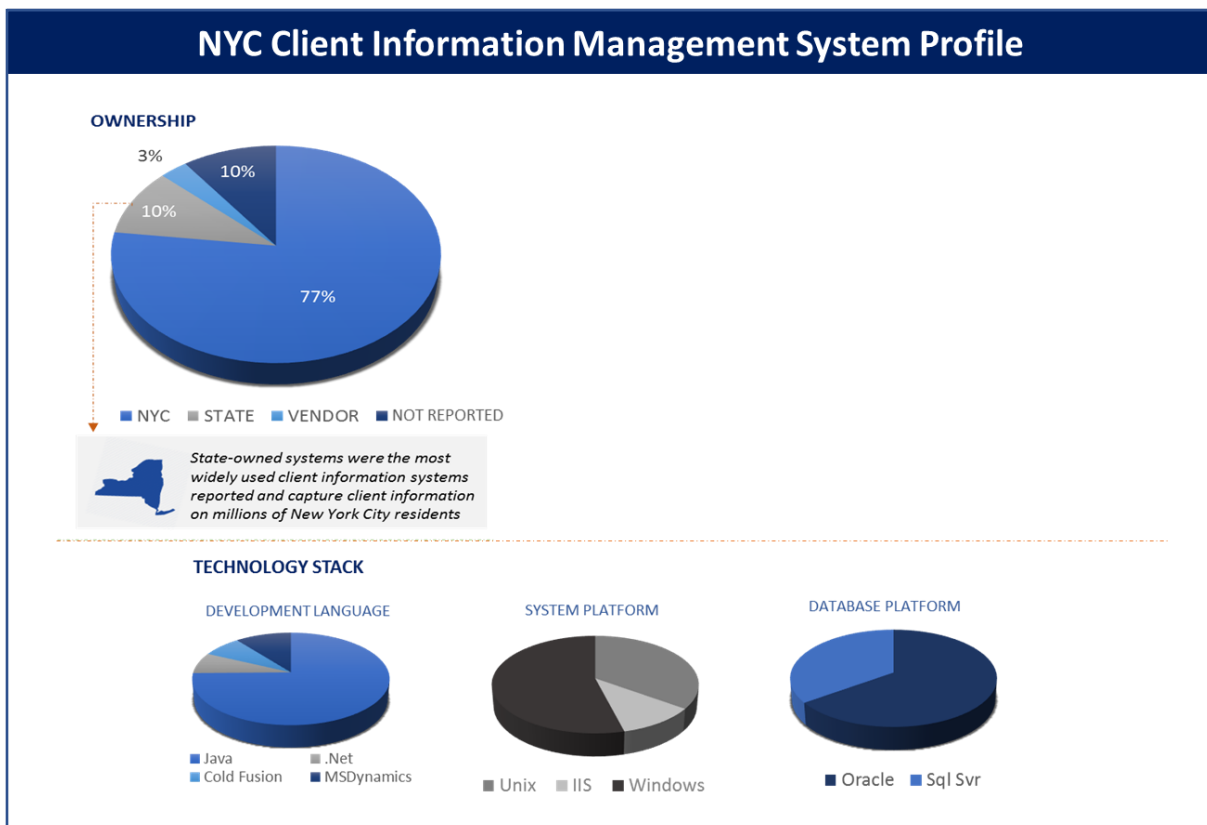


Figure 1: NYC Agency Information System Profile

System Age

Some human services agencies in this study reported a steady reliance on older client information management systems. In interviews, major challenges with legacy technologies were discussed, including significant needs for maintenance and upkeep, costly hardware maintenance, and issues with continued vendor support when they fall out of common usage. Upgrades are not easy to make without re-platforming. As for data-sharing with these older systems, some human services agencies noted that efforts to take data from one of these

systems and share with another requires onerous extraction processes, which are often time and labor intensive.

Technology Platform

Systems used for some of the City's largest social service programs may be housed on older, mainframe platforms that cannot be easily changed to support modern approaches. The legacy technology can be inflexible and can cause business and operational challenges. Hard-coded business rules, for example, make it difficult to respond to legislative or regulatory changes to the eligibility and payment systems. The ages of these systems predate modern methods of data exchange and integration. As a result, human services agencies have had to build ancillary systems and created manual workarounds to circumvent the challenges presented by their core legacy systems.

Integration Readiness

We sought to assess integration capacity of systems to identify if optimal points of integration for legacy and modern systems existed. Common identifiers are used across data sets to facilitate record linkages, making it easier to systematically integrate this disparate information about a person or family from different sources. Much of the benefit of information-sharing and integration depends on the effectiveness of routinely matching client data across multiple systems.

In some instances, the lack of a common identifier may be an obstacle to systems "talking" to one another. Even where there are data elements that could conceptually be used to uniquely identify a client, there still may be system difference or legal restrictions may prevent the use of the data for creating linkages. This is true both between and within agencies. Also, our findings revealed that numerous human services agencies had challenges accessing data from disparate systems within their own agencies, noting that in some cases these systems are entirely distinct. Capturing information in multiple data stores within an agency creates numerous policy and operational challenges. Those reported included duplication, data quality concerns, issues running matches and building reports.

Though each data system may have the necessary client data to create a client record internally, this information may sometimes require sophisticated record linkage (i.e. matching) processes to link to the same records about the same client held within other City systems. This is not a challenge unique to City or to government systems for that matter. Regardless of industry or system, integration efforts will often contend with differences across data due to everything from data entry errors to differences in data formats across systems. Within the study, one possible reason that is specific to the social services domain arises due policy differences about what might constitute the minimum information to open a client case record. For example, whereas a child welfare system may require date of birth and current and prior names of all

household members a system dedicated to managing chronically street homeless individuals may, at best, only be able to collect the first and last names of its clients.⁸

Data platforms such as data warehouses, operational data stores, and data marts can help overcome challenges such as these and are commonly used or under consideration by City agencies and other jurisdictions. HRA's Enterprise Data Warehouse (EDW) is one example. Launched in 2001, the HRA EDW holds historical data across multiple HRA data sources.⁹ The EDW provides accessible and replicable reporting and analysis capability. Several other human services agencies that participated in this study had data warehouses or were in the planning or early implementation stages of their own initiatives.

Ownership

Several City human services agencies surveyed in this study reported a reliance on client information systems that are managed by state or federal authorities to support mission-critical programs. For the purposes of this report, nearly ten percent of the client information management systems surveyed for this study are managed by other government entities that have federal or state ownership. While they represent a fraction of total systems profiled, state-owned systems were reported as high-use systems.

Technical and legal restrictions on access to data held within these systems limit City human services agencies' ability to make necessary changes to support essential functions and daily operations unique to the City. Agencies reported having minimal control over what data is recorded and how it is captured and organized within these systems. The dependencies on non-City-owned systems are rather significant. One agency reported 44 distinct feeds from NYS systems alone.

A Brief Review of Legal and Technical Strategies for Sharing Information

City human services agencies collaborate in a number of different ways to share data. They are executing data-sharing agreements, where data can be legally shared, to promote collaboration, identifying services that can be moved to mobile platforms, streamlining redundant or obsolete systems, and exploring enterprise solutions that facilitate easier data analysis and exchange. Human services agencies can, and most often do, use their own internal technical capabilities to securely transmit and integrate data even when their legacy systems are not optimally designed to do so.

⁸ *Actionable Intelligence: Using Integrated Data Systems to Achieve a More Effective Government*

⁹ <http://www.govtech.com/health/New-York-City-Agency-Simplifies-the-Data-Warehouse.html>

The assessment examined the current landscape of information sharing. We observed the following:

- Information sharing in the City is generally decentralized with many point-to-point exchanges within and across human services agencies, largely driven by business need. Several hundred were identified through the reporting for this study.¹⁰
- Data sharing arrangements are often unilateral – data goes from one agency to another with nothing returned.
- Data sharing is often beset with concerns of misinterpretation of available data.

We framed our assessment of these exchanges across two dimensions:

- **Legal Strategy** to determine the legal methods human service agencies employ to review and codify data sharing arrangements (i.e. are human services agencies leveraging inter-agency legal frameworks for data sharing or opting to execute agency-to-agency specific agreements or memoranda of understanding (MOUs)?).
- **Technical Method** examining the use of tools and technologies that support centralized or point-to-point exchanges of data.

Legal Strategies

The City's human services agencies must comply with various privacy requirements set by federal, state and local laws and regulations, and City policies. Some federal laws, such as the Privacy Act of 1974, establish privacy requirements that may apply to human services agencies across the city, while other federal laws—including the Health Insurance Portability and Accountability Act of 1996 (HIPAA) and the Family Educational Rights and Privacy Act of 1974 (FERPA) — establish privacy requirements specific to certain entities and/or types of information. Federal statutes and regulations that establish and govern specific human services programs as well as citywide or agency-level policies impose other privacy requirements.¹¹ The varying legal and regulatory requirements across human services agencies and the point-to-point nature of exchanges often lead to separate memoranda of understanding (MOUs) being used to establish the sharing of data.

From a legal standpoint, all human services agencies have robust processes to vet requests for sharing against applicable local, state and federal laws and execute, where necessary, formal sharing agreements or MOUs. The City's legal framework for data sharing has further been bolstered by the Citywide Data Integration Agreement (CDIA) and the more recent establishment of the Mayor's Office for Information Privacy (MOIP) which, in collaboration with

¹⁰ Given the degree of internal reporting/sharing, it is worth noting that a significant amount of reporting or data sharing is either manually driven and/or produced as a one-time effort.

¹¹ <https://www.gao.gov/assets/660/652058.pdf>

the City's Law Department and the General Counsel of each agency, issues protocols and guidance for protection and privacy of identifiable information found within the vast stores of agency administrative data.

Even with this collective capacity, data sharing is still a resource-intensive activity. It takes time for two or more human services agencies to elaborate the objectives of a new data sharing project, conduct adequate legal review, and craft an appropriate response or agreement. Depending on the technical complexity, it takes additional effort to identify the right data and systems to fulfill the request, make the data available to this specification, and set up the schedule and method by which data will be shared between human services agencies. This cost is often borne by both the staff of the agency data provider and the intended data recipient.

Laws and regulations may also create limitations where information sharing cannot be reciprocated in some instances. One agency, for example, receives client identifying information from multiple agencies to support clients on their caseloads, but in many instances they are prohibited by law from providing identifying information back to City partner human services agencies.

Technical Methods

Human services agencies can, and most often do, use their own internal technical capabilities to securely transmit and integrate data even when their legacy systems are not optimally designed to do so. They can also tap into centrally-supported data services. DoITT has invested in building and maintaining platforms to support these agency capabilities.

The most common approach for data sharing among New York City human services agencies happens through File Transfer Protocol (FTP) of flat, or non-linked, files. Secure FTPs were used for most of the exchanges that were reviewed for this study. Web Services/APIs, ETLs, and direct exchanges accounted for the remaining exchanges. *See Figure 2.* Secure FTPs are relatively inexpensive to set up and provide a solid way to transmit data between parties securely. FTP sharing often involves extracting large client files from systems to put into a shared folder to which both human services agencies have access.

Though it is the most widely reported vehicle for data sharing, study participants also highlighted the numerous challenges that FTPs present. For example, the FTP sharing process can yield multiple copies of files, making it challenging to identify the original source. The data received from other human services agencies is often not very structured, and differences in client identifiable data may challenge the ability to easily match across data sets. Data latency is also an issue – it's often difficult to exchange data in real time.

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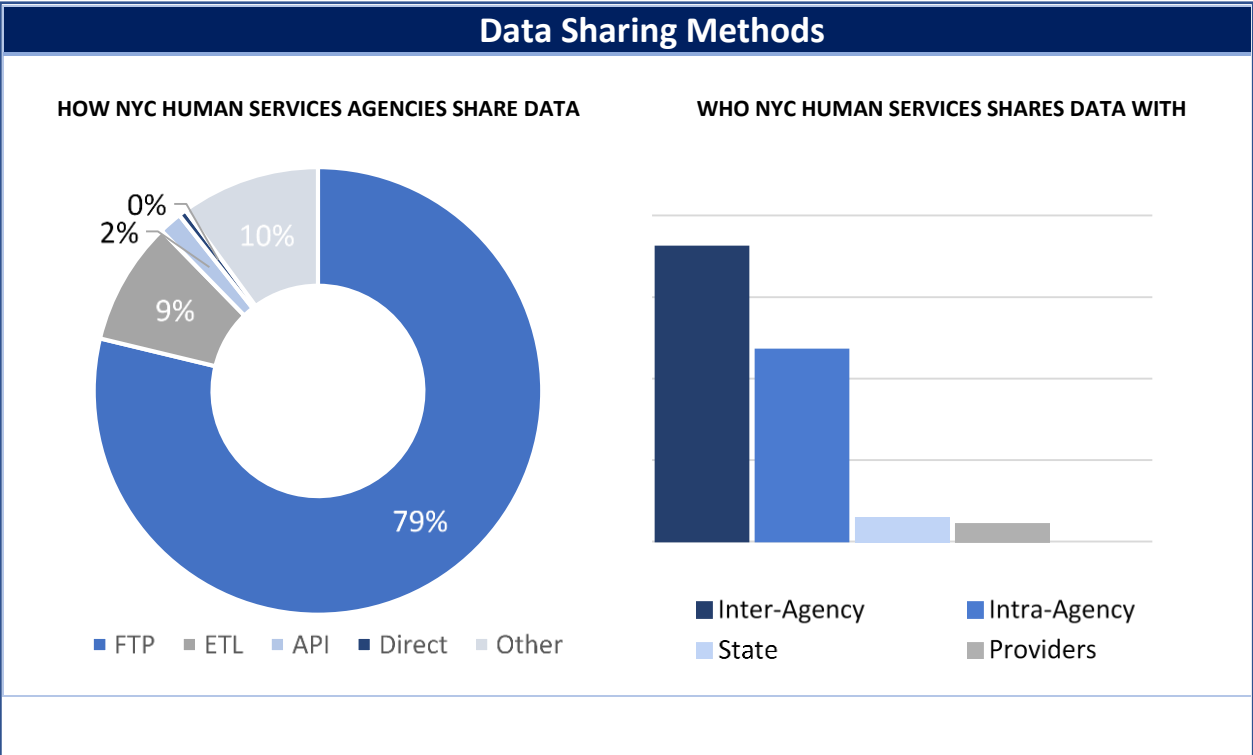


Figure 2: NYCs Human Service Data Sharing Methods (Note: this is not based on an exhaustive review of data sharing across all City human service agencies, but rather a select sample examined during this study).

Summary of Efforts to Modernize Client Information Systems

Human services agencies continually take new and varied approaches to modernize systems, tools and processes to support the delivery of human services. They have exercised various options for technology modernization, including full system replacement, legacy system upgrade or upgrade of specific components, and the introduction of modern digital tools that overlay legacy systems. In our assessment, we identified the following approaches to modernizing systems:

- *Modernizing legacy systems.* Legacy modernization, or software modernization, refers to the conversion, rewriting or porting of a legacy system to a modern computer programming language or hardware platform. This effort may entail the migration of existing systems data and functions to a newly developed platform. Human services agencies often embark upon modernizing systems to support evolving business goals and processes.
- *Integrating existing systems.* Replacing legacy systems, especially older mainframe systems, can be resource-intensive and take years to complete. To overcome these constraints, an agency may opt to take a “systems integration” approach. Through systems integration, the agency plans a careful build of new, major technology components or sub-systems that are intended to be seamlessly integrated with an existing (legacy) system. This might also involve integrating an existing legacy system with a new “front-end” to provide end-users the look and feel of a modernized system.
- *Taking data-centric approaches.* Human services agencies are not only updating systems and software, but also building or improving data infrastructure to support internal data integration and analytics efforts. This includes human services agencies that are supporting, considering or developing data warehouses, data marts, operational data stores and real-time reporting platforms. These efforts typically leverage data collected from client information systems to support the development of reports, applications or online portals outside of the systems themselves. Using data from existing client information management systems, human services can opt to create new digital products or services that support case management processes and decision-making.
- *Leveraging or building stand-alone digital products and services.* Where large system modernization or data integration efforts may not be feasible, human services agencies may take tactical steps to build smart and nimble digital products that comport with their existing systems. This approach is similar to the systems integration approach with the difference that the digital product or service may operate independent of the existing client information management system.

Recommendations

Facilitating Information Sharing and Integration

Recommendation 1: Explore How Human Services Agencies Could Benefit from an Enterprise Master Data Management (MDM) Service

A Master Data Management (MDM) service is a secure platform designed to process complex data matching rules automatically. This enables quick identification of client record linkages within and across client information management systems. As noted above, Worker Connect uses an MDM platform managed by NYC Opportunity to link data from multiple systems into a single, holistic view of a client's benefits and services on one screen.

NYC Opportunity's MDM platform can be extended beyond Worker Connect to support additional data-sharing and matching applications, including for human services agencies' own internal information-sharing and data integration efforts. Human services agencies surveyed in our study reported that they do not have a common unique identifier that easily links cases across their own internal systems. Further exploration on agency access to an enterprise MDM service could help identify ways to navigate this challenge.

A well-architected enterprise MDM service can help City agencies overcome the differences across client identifiers within systems and help enforce standards for data exchange. In turn, this could support greater cross-agency service coordination and integrated analytics for data collected through multiple systems. And, given the cost and effort to initiate, implement and maintain a solid MDM solution, a centralized service could accelerate individual agency efforts, thus saving considerable time and resources across the collective.

Despite these benefits, many human services agencies find it challenging to access NYC Opportunity's MDM platform as a service in its current state. The platform is hosted and managed centrally by NYC Opportunity and DoITT and requires agency technology teams to coordinate their priorities across a citywide queue. This approach isn't adequate for human services agencies' 24 x 7 operations where they require continuous access to data. Additionally, there are a number of functionalities that many human services agencies need that the MDM does not support, such as geocoding or the ability to merge all versions of a client record into a single (i.e. "golden") record. For more modern client information management systems, the current MDM does not allow a client information system to automatically send, update or access records for more seamless system interoperability.

The most significant hurdle for human services agencies, however, may not be technical. From a legal perspective, the current MDM platform does not provide an agency with options to segregate its data for its exclusive control and use. Furthermore, moving data through this

platform – managed by staff outside of the agency – may constitute “disclosures” to NYC Opportunity that are not authorized by law even if NYC Opportunity staff administering the platform do not access the data. To this end, it is not enough to simply make the MDM service an accessible and useful resource for information sharing and integration. It first and foremost must be configured to provide the agency full technical and legal control.

Broader use of NYC Opportunity’s MDM platform could significantly bolster information-sharing across client management systems. And, the more systems that participate in a shared MDM service, the greater the opportunities for integration across the City.

In exploring ways to make an MDM platform accessible and useful to human services agencies, some modifications should be considered:

a. Implementation of technical mechanisms that give a human service agency more control over its own data.

An MDM solution could be explored to determine how a human service agency to control how data is managed and accessed through the MDM platform. The data and systems that it integrates using the MDM service should be limited to the designated staff within the agency. NYC Opportunity, in collaboration with DoITT and City human services agencies, should explore whether mechanisms can be implemented within the MDM platform to give agencies more independence to manage their data.

b. Configuration of the MDM to help reduce differences in client identifiers across City human services agencies.

Most client information management systems assign system identifiers to individuals and households the moment they apply or enroll in a program. These identifiers may be referred to as the client’s (or family’s) *case number*. A case number is often a serial number or combination of letters and numbers used to uniquely refer to an individual case file. The case number will be linked to the benefits, services and other program activity associated with the case throughout its lifecycle.

An individual receiving services from separate human services agencies may have different case numbers assigned to them at each agency. Where data integration or interoperability may be legally allowed, these case identifiers will not be useful in themselves per se to identify clients that may be present in more than one system. Other personal identifiers such as name and birth date may help but could also be subject to variations in data entry or changes in life events such as marriage.

NYC Opportunity might explore whether the MDM platform could generate a shared identifier when it finds record matches the across multiple systems. This single multi-system, or enterprise-level, identifier (“Enterprise ID”) that could then be used to refer to the same individual regardless of client information system from which their case file

originated and independent of the case number assigned by the system. As such, this Enterprise ID would only have informational value for supporting data integration. It would not replace the client case number used by program operations to manage client benefits and service history.

This single Enterprise ID could support data interoperability and integration initiatives where information sharing is legally allowed in a number of different ways. For example, an agency that manages multiple client information management systems can use the Enterprise ID to link client records across their systems without changing the native format of their existing system case numbers. For research projects involving two or more human services agencies, the Enterprise ID can be used in place of personal identifiers such as Name or Date of Birth to indicate where clients engage with multiple programs. As a surrogate identifier – that is, an identifier that is not used or operationally tied to benefits, services or case history – this Enterprise ID should not be able to inadvertently re-identify a client or link them back to the case or program. Thus, its core operational use would be limited to supporting legally approved data integration and information sharing.

Whether this solution could be implemented successfully and provide the intended value would require stringent testing. As such, we recommend a careful investigation of MDM resources and capabilities to offer an enterprise ID limited to specific use cases to determine feasibility and value.

c. Implementation of services that allow human services agencies to interface their systems directly with MDM.

NYC Opportunity could explore the implementation of web and API services that might allow human services agencies to create and manage direct connections between their client information systems and data stores with the MDM platform. These connections or interfaces could then be used to automate their ability to run their data through MDM processes in near-real time as new client records are added or changed in their client information systems. Additionally, these services could allow human services agencies to support their own internal integration store that can be used to search and link clients across their systems.

d. Development of data enrichment services in the MDM platform that benefit an agency's operational and analytic data capabilities.

While the MDM platform's automated record matching may have value for City human services agencies, consideration should be given to enhancing these capabilities with other services that support data integration efforts, including geocoding to support geospatial analysis and mapping, standardizing addresses to support outreach efforts, and merging multiple instances of a client record across different systems into a single master record.

- e. **Extending MDM services to integrate non-person data such as organizations that work with City human services agencies, particularly contracted service providers, vendors, facilities and employers.**

MDM services might also be used to integrate non-person records such as contracted providers to the extent such information is available in existing systems. Like clients, a provider may have multiple relationships (i.e. contracted services) with one City agency as well as relationships with other human services agencies. NYC Opportunity should explore whether the MDM service could be extended to create an integrated index that matches organizations across different human service programs and contracts.

Recommendation 2: Research the Effectiveness of Implementing Cross-Agency Approaches to Data Governance

Better information sharing requires strong data governance. Data governance refers to how an enterprise (e.g. City of New York) manages its data assets. It encompasses the formal rules, policies, procedures, roles and responsibilities that are established to ensure that data is accurate, consistent, complete, available, and secure. It is considered a long-term initiative that must often be steered at the highest levels of the enterprise.

Developing a centralized, sustainable governance framework can be notoriously difficult for large complex organizations and in this regard the City is no exception. For this reason, we recommend developing a pragmatic data governance strategy focused on fundamentals to address two recurring themes from our survey of human services agencies: the importance of shared data standards and the need to support knowledge about the data other human services agencies collect.

A number of City entities can contribute to enhancing the City's data governance practices. NYC Opportunity's institutional history and existing practices related to integrating cross-agency client-level data¹² can help inform where new protocols can build on the past and present approaches. Based on its experience with people-related data sharing and the approach necessitated by the critical privacy and regulatory mandates, NYC Opportunity can also provide some insight on how data governance practices may be adapted based on legal, technical and programmatic considerations. To this end, we propose exploring the feasibility and value of potential measures focused on data governance.

¹² See "Background on Coordinated Data Integration Among NYC Social Services" earlier in this report for a brief overview of NYC Opportunity's mandate, begun under HHS-Connect, to advance client-level data sharing.

a. Development of a set of shared operational standards for collecting, formatting and defining individually identifiable information – starting with a very limited set of critical data elements.

Individually identifiable data is critical to any integration effort that requires reliable data to accurately match and link information about the same person. Establishing common data formats for elements could open the door to facilitate data exchanges. Given the high complexity, variation and volume of different types of data collected across the City, we recommend focusing on a limited set of common and prevalent data elements, in particular Name, Date of Birth, Gender, Race and Ethnicity. The recent passage of several local laws around agency collection of demographic data only serve to underscore the importance and potential impact of shared standards.¹³ Even with a focus on limited data elements this should not be construed as a project of minimal effort. Like many other projects of this magnitude, technical, legal, financial, and resource constraints must be carefully considered.

Standards can be difficult to agree upon and even harder to adopt. We do not recommend changing existing systems. Rather, taking a page from the National Information Exchange Model (NIEM) – a national effort to develop, share and promote data standards across federal and state systems – New York City human services agencies can develop “a dictionary of agreed-upon terms, definitions, relationships, and formats that are independent of how information is stored in individual systems.”¹⁴ As human services agencies prepare to exchange data, shared standards provide a common playbook to save time, increase accuracy and prevent misinterpretation. However, any such effort would have to operate within the confines imposed by federal and state law and regulations which in many cases set the definitions for terms and criteria. These federal and state definitions limit human services agencies’ flexibility to adopt a common lexicon. It would also have to consider the level of effort and costs relative to the operational benefit.

We recommend that City exploring the feasibility of developing standards around a discrete set of common demographic or program attributes. While there are many other areas in need of standardization, focusing on specific attributes or program areas might be a worthwhile place to start.

b. Creation of an API service that might allow human services agencies to standardize common data types against a centralized database.

As standards are developed, NYC Opportunity should explore whether an API service that maintains standardized information could be useful to human services agencies if

¹³ Local laws that involve the collection of demographic data: [126](#), [127](#), and [128](#) of 2016, as amended by [76](#) of 2018

¹⁴ From NIEM website <https://www.niem.gov/about-niem> (last accessed on 08/6/2019)

made more accessible. NYC Opportunity, for example, is using its Program Benefits API to collect information about programs managed by human service agencies to support common naming conventions and service taxonomies. The API currently supports the public-facing websites [GrowingUpNYC](#) and [GenerationNYC](#) by powering the program resource directory made available for site visitors. NYC Opportunity could explore expanding this API to support the development of resource and referral directories to which there may be interest across human service agencies. Additionally, an API could be opened to allow agencies to standardize their own data stores. This would work by allowing an agency to send data “as is” through a web service that would search and return the standard value. For example, in one system we noted that there were several dozen ways of representing the same program or site location. Rather than an overhaul of the system, the agency could standardize these variations to a single value.

c. Developing a searchable, citywide metadata repository that supports shared knowledge of the data human services agencies collect, applicable laws, regulations, and City and agency policies governing that data, and guidance human services agencies can share to prevent unauthorized use and misinterpretation of their data.

Human services agencies are often unaware of the data collected and maintained by other human services agencies. Without adequate documentation, it may take considerable effort for one or more human services agencies to specify the right data and systems suitable for an information request and then make the data available to this specification. Program leadership seeking to increase efficiency through data integration expends valuable time trying to first determine where the data they need is housed. Programs may not even know that relevant data sets exist, including within their own human services agencies, due to lack of a central repository.

To this end, we recommend exploring the development of a centralized, searchable data catalogue. Where feasible, human services agencies could indicate what data elements are housed in such a catalogue. This platform, available to human services agencies through a secure intranet or web-based location, would allow authorized users to explore system resources at other human services agencies that potentially house data of interest, and follow up with the relevant contact.

Due to the sensitivity of the information, we recommend that Agency Privacy Officers and General Counsel have the ability to designate an indicator of sensitivity and identify overarching laws governing the data sets which are being described (not shared) through this repository. Moreover, given the challenges and intensive resources it would take to develop such a resource, further research would have to be done to examine the cost, scope and operational feasibility of developing and maintaining one or more catalogues.

Recommendation 3: Expand Worker Connect Use and Capabilities

Worker Connect, a digital tool operated by NYC Opportunity, is designed to help caseworkers overcome information-sharing hurdles. The Worker Connect system communicates securely with several other City agency systems. If a client has received, or is receiving, services from one of these human services agencies, Worker Connect can provide, where legally authorized a consolidated snapshot of program and household data from those systems on a single screen. Again, with legal permissions, it can also retrieve copies of documents that may have been used previously to verify eligibility for other program benefits. Using this information, the City's authorized users in its network of social workers and care providers can expedite the process of connecting individuals and families with income assistance, emergency shelter, employment opportunities, health services, and other help. In its 10th year since its launch, Worker Connect continues to be one of the most effective tools for information sharing across the human services domain. It now is used by front-line workers in over a dozen human services agencies to help clients access benefits, support case management and service planning, and reconnect clients to services with which they may have lost touch.

Given the benefits to human services agencies that currently share data with Worker Connect, we recommend the following enhancements:

a. Expand the number of participating human services agencies that access data through Worker Connect's comprehensive legal and policy framework.

Worker Connect currently integrates limited client information from the systems of five City human services agencies. Access to this information is governed by strict legal and regulatory guidelines to ensure access to the system is rigorously controlled. Proposed uses cases are reviewed against all applicable laws and regulations, and workers only see specific data elements approved for their agency or department. Through numerous agency surveys, health and human services agencies have identified a number of key administrative data sources that would propel their efforts to connect clients to necessary services and benefits. As such, a careful expansion of user groups that access data, subject to the current rigorous legal review process, could build a better picture of client needs.

b. Enable service alerts and notifications through the system that let workers know when critical service interventions are needed.

The Worker Connect platform could potentially be used to enable "service alerts." Service alerts are secure system alerts that utilize human services data integrated through the platform to inform caseworkers of a recent event or change in a client's living conditions, such as entry into a homeless shelter, that would not otherwise be known. The aim of these alerts is to help caseworkers target potential services or

interventions to these clients that result in positive outcomes. NYC Opportunity has started to research potential alerts that might be useful for human service agencies.

Recommendation 4: Advocate Legislative Reform at the Federal and State Level

The mosaic of disparate federal, state, and local privacy laws continues to pose barriers to inter-agency sharing of personally identifying information and contributes to the complexity of developing interoperable practices and systems. Under the existing patchwork legal framework, access to agency clients' identifying information is generally restricted to specific users performing specific job functions within a single agency and, at times, even within a specific program, making coordinated service delivery and case management involving the same individual or family very difficult. Moreover, requisite language for individual data-sharing consent forms varies widely across laws and oversight agencies.

Amplifying these challenges is the fact that many privacy laws were enacted decades ago, such as the federal Privacy Act of 1974, and do not address technological advancements that could be leveraged to improve interagency data-sharing, coordination, and systems interoperability. Reform at the federal and state level has the potential to support information sharing focused on the coordinated delivery of benefits, services, and care to individuals and households. In advocating for reform, it is important to insist that there be strong privacy and data security protections on individuals' personal information.

Modernizing Client Information Systems

Recommendation 5: Adopt a Modular Design Approach to Digital Services

Nearly all human services agencies surveyed for this study are planning or seeking ways to modernize their system capabilities. Their ability to do this varies. At present, large legacy mainframe systems still manage some of the most mission-critical operations of the City's social services. Complicating the picture further is that some of these systems (and the programs they support) are governed or maintained by state or federal entities.

Rather than recommending specific tools for specific systems, we propose that the City explore the benefits of taking a *modular design approach* to digital services at human services agencies. Here we define a modular design approach as one in which digital services and tools are built as separate, stand-alone components that could be implemented and reused without requiring significant alteration to existing client information systems. For example, a digital forms service might be set up in such a way that allows for a human service agency to customize to match an existing paper-based application and provide secure online access for program applicants. This service could be made available without needing to be fully integrated with the existing client information system in order to be operable.

A modular design approach could have some key advantages towards system modernization efforts. First, it allows human services agencies to test the applicability of services through a proof-of-concept (POC) approach. A POC allows an agency to evaluate solutions against practical, relevant use cases to demonstrate value and operational feasibility before scaling system-wide. Second, a portfolio of reusable digital tools could reduce the need for each human service agency to “reinvent the wheel” by building the same capabilities for different systems. And finally, for some human services agencies a discrete, singular service may provide a necessary interim solution to improve the client experience while they explore more permanent approaches to overcoming significant technology barriers.

Despite these potential benefits, further examination is needed to assess the value of a modular design approach. This might include understanding (1) how flexible and customizable services would be; (2) whether a modular approach would create unintended dependencies on specific tools or services; and (3) whether human services agencies’ IT department have the requisite skillsets to fully leverage and maintain these additional components. Furthermore, as this might result in a shift in technology strategy for certain information systems, the City should consider the operational impact on resident and worker experience, as well as the technology implications of expanding services that may not, in the short- to long-term be integrated, with existing legacy systems.

a. Consider conducting Proof of Concepts (POCs) with City human services agencies to test the utility of digital services, allowing human services agencies to consider the value of adopting and scaling them for their own use.

NYC Opportunity designed several digital tools and services that might provide a starting point for exploring the value of modular design approach. To do this, it might be useful to determine whether there are POCs that allow a human service agency to match tool to an existing need and conduct a small pilot to evaluate how well it meets the need. Some NYC Opportunity tools that could provide be evaluated as modular services include:

- *Eligibility Screener API*: Provides authorized human services agencies the ability to run anonymized household and income data from their client information systems through the ACCESS NYC policy rules engine and identify clients who are likely eligible for certain public benefits. This rules engine is based on the eligibility qualifications documented for 31 city, state and federal benefits programs available for residents to screen themselves on the ACCESS NYC website. As stated earlier, this may have limited or no application for an agency like DSS that has expended significant effort and investment to conduct successful outreach to likely eligible populations.

- *Digital Forms and Applications Service:* NYC Opportunity is currently exploring a service that would give human services agencies the ability to create digitized versions of their program applications that could be filled out online and submitted to the agency. Integrating submissions with an agency's back-end systems would require additional customization. This service would primarily focus on human services agencies that have not yet moved applications online versus those that have already made significant investments in technical and operational changes to integrate new online applications with management and operational systems. Additionally, this could be considered an interim solution. In all cases, each implementation will require an embedded process for legal review and approval when personally identifying information travels between human services agencies and programs to ensure required legal privacy and data security protections are in place.
- *Federated Document Solution ("Digital Wallet"):* Across New York City, missing documentation is often cited as one of the primary reasons for application denials for health and human service benefits. To help residents and human services agencies overcome this challenge, NYC Opportunity is determining the feasibility of prototyping a "digital wallet" solution that would allow residents the ability to securely store, maintain, access and distribute digital records of key documents that are often required for program eligibility determination and recertifications (such as birth certificates, proof of income, etc.). The aim over time would be to make key records already stored by a City agency more accessible to residents and allow residents to give their personal consent to sharing these records with additional human services agencies, subject to relevant legal approvals and privacy and data security protection requirements.
- *Social Services API Management Hub:* A series of standardized web services connected to various sources were developed to support Worker Connect. These web services can be configured and deployed separately as a means for client information management systems to interface across human services agencies. NYC Opportunity is currently seeking to identify on a small set of pilot use cases where human service agencies might find value in connecting their client information systems to an existing data service.

Proof of concept projects will be able to help a human service agency determine whether a full-scale implementation will provide a favorable return-on-investment (ROI) in regards to resident experience, program or operational outcomes and technology strategy.

Recommendation 6: Support City Requirements for State Modernization Efforts

The efforts led by New York State to modernize WMS (with development of a new Integrated Eligibility System) and CONNECTIONS (to comply with the Federal Standard as a Child Care Welfare Information System) will have a major impact on City operations in the coming years. Both HRA and ACS are actively collaborating with state offices to see that critical requirements for City operations and technology are considered. The City should continue to work with the State to support an agenda that will ensure the overhaul of these legacy systems open new opportunities for interoperability, service coordination and resident access to services through modern digital tools.

Recommendation 7: Report out on current and proposed initiatives to modernize and integrate systems

Pursuant to the requirement for ongoing evaluation of efforts, NYC Opportunity will provide summarized annual updates for the next three years on the recommendations to City Council.

Summary of Recommendations

LL 75 Requirements	Recommendation																
	Provide Agencies Access to an Enterprise Master Data Management (MDM) Service					Sustainable Data Governance			Expand Worker Connect Data & Capabilities	Advocate Legislative Reform	Adopt a Modular Design Approach to Digital Services				Support City for State System Modernization	Evaluation Protocol	
	Agency control of data	Common identifier across agencies	RESTful and SOAP APIs	Data Enrichment Services	Extend to non-person entities	Shared data standards	Central data services	Searchable metadata repository	Enable new alerts and notifications	Advocate legislative reform on the state and federal levels	Eligibility Screener API	Digital forms and app service	Federate document solution	Social services API hub	Support agenda that will support overhaul of state legacy systems	CIMS Tracking by agency	Annual surveys
Recommend strategies for facilitating information sharing	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Examine how agencies can use digital tools for client engagement									✓		✓	✓	✓	✓			
Potential technology investments			✓	✓		✓	✓	✓			✓	✓	✓	✓			
Recommend upgrades to client information management systems		✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓		
Ongoing monitoring/evaluation of CIMS																✓	✓

For more information or inquiries about this report, contact the Mayor's Office for Economic Opportunity

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