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Executive Summary

The Human Service Network (H-Net) project began in November of 2000 as an assessment to identify opportunities for coordination and integration across the various business offices within the Pennsylvania Department of Public Welfare. The assessment involved evaluating the common business processes across the Department, as well as evaluating synergies between the business offices and the Office of Information Systems (OIS). The H-Net vision is to enable citizens and businesses to have seamless and coordinated access to the human services offered by the Commonwealth. While the assessment is complete, the Department continues to implement the common business processes and to build the data and technological infrastructure to support the strategy of integration and coordination. The enterprise architecture that has been built will enable the Department to maintain its high level of service and to continue optimizing its information systems while enduring the fiscal constraints with which many state governments contend.

Common business functions and data will be integrated into common systems that support multiple programs. The Department identified six common business functions, including: Client Management, Provider Management, Customer Relationship Management, Information Management, Quality Management and Financial Management.

Enabling H-Net from a technical perspective involves data management, technical infrastructure, network components, security, application standards, a development framework, configuration management, and interfaces and exchanges. The enterprise architecture has evolved with changing technology that is more efficient, yet more robust in its application. It has also evolved with the changing workforce necessary to support it. Under the H-Net initiative, the Department defined and implemented the enterprise-wide standards for data definition, normalization, physical implementation, and coding for all of the databases that are supported by DPW.

The infrastructure is designed to ensure that standard IT architectures and systems are in place to implement common functions by integrating new functionality within existing systems. The enterprise web architecture enables one server to support numerous DPW applications in development, testing and production environments. Program specific systems are integrated via infrastructure tools, such as middleware, messaging and integration broker technologies. While the applications are developed by the independent project teams, the DPW H-Net team has developed or instituted technical standards, a common set of infrastructure processes, and specific technologies that can be leveraged and reused across the Department. The security infrastructure, for example, provides for a shared-services solution that secures access to program information and manages user identity across the enterprise.

The H-Net initiative provides for increased operational efficiency and coordination of care. The Department has built the data and technical infrastructure to improve data integrity, increase the ability to share information across the enterprise, and in the long term will decrease development, implementation and training costs across business offices.

Written Justification

a) Description of project, including length of time in operation

Continued advances in technology, changing expectations of government and legislative mandates have driven a change in the Department's approach to the delivery of services and provision of information. Information systems play a central role in the management of human services. Historically, DPW's information systems have been used to determine participants' eligibility, to process claims, and to provide program information. However, now the Department's information technology initiatives are not only driven by program or policy changes that require new technology, but also by technological enhancements that change the nature of the information and services available. The technology challenge is to provide the information needed to integrate services to clients and track their progress across multiple programs and business offices, as well as to effectively build the architecture required to facilitate enterprise coordination and provide for reusable technical components. To that end, the Department initiated the Human Services Network (H-Net) initiative in November 2000 and has continued to work toward achieving its vision for human service delivery in the context of a changing environment. The first year of H-Net focused on defining the business, data and technological infrastructure requirements. To date, the Department continues to build the enterprise infrastructure and implement the data and technical standards established as part of the project.

Enterprise Business Process Integration: Client and Provider Registration

H-Net began with an assessment to identify common processes that span the Department. The business functions that are common Department-wide have been identified as: Client Management, Provider Management, Customer Relationship Management, Information Management, Financial Management and Quality Management. These functions and their supporting processes were defined and prioritized by the Department, with the initial priorities including Client and Provider Management.

Client registration utilizing a Master Client Index (MCI) was identified as one of the Department's foundation enterprise processes. Since a client may be served by different business offices within DPW and multiple departments across the Commonwealth it is important to be able to recognize the same individual across these programs. The technical architecture of MCI uses a model that combines a presentation tier, business tier, and data tier, and provides flexibility for system performance, operating system independence, security, and scalability. Also key to the MCI system is its use of an object library of common reusable application development components which can be used in a wide variety of applications with minimum time and effort. The MCI has been built within the Commonwealth's welfare eligibility system in order to reduce redundant data storage and system maintenance. The Master Client Index will begin integrating with DPW applications in July of this year (Figure 1.1).

Similarly, provider registration was identified as a foundation enterprise process that could be coordinated across business offices and systems through the use of a Master Provider Index (MPI). Assigning providers a unique identifier will allow for the sharing and cross-referencing of information across business offices and will eliminate duplicate information capture during the registration process. MPI will reside in two new systems that already contain some of the functionality that MPI would need. All new systems will use the MPI software to assist in ensuring provider uniqueness.
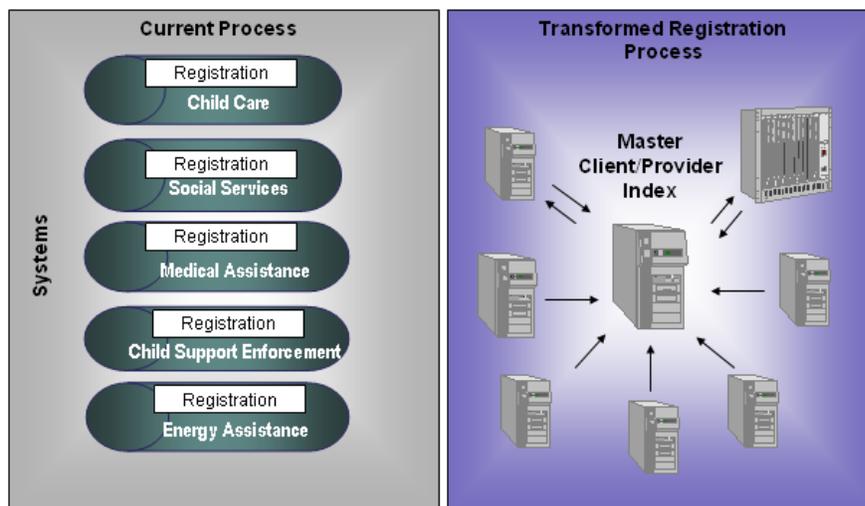

Figure 1.1

Enterprise Technology and Infrastructure

Technical infrastructure plays a vital role in realizing the Department's goal of coordinating and integrating applications. Common functions and data will be integrated into common systems that support multiple programs. MCI and MPI are examples of common functions that will be provided centrally in support of all programs. Program specific functions will continue to be provided by separate business office systems that will be integrated via infrastructure tools, such as middleware, messaging and integration broker technologies. DPW has developed a common set of infrastructure processes and procedures that can be leveraged and reused across the Department; it has developed an information architecture that leverages the advantages of older technologies and integrates with the new. A way to facilitate the combination of such technologies is by establishing standardized methodologies for everyone throughout the organization to learn and follow.

The Department's technical standards and policies have been organized into ten domains, and embody the guidelines, best practices and tools that define the DPW infrastructure. These domains and their organization are depicted in Figure 1.2, and include: Security, Network, Knowledge Management, Integration & Middleware, Platform, Application, Data, Componentware Groupware and Operations & Support. The Department created a repository for these standards and publicized their availability on the DPW Office of Information Systems (OIS) Intranet. In addition, the department has developed a management lifecycle process to identify, approve and publish standards, and performed a quality review and gap analysis of the current Technical Standards and Policies. Examples within each domain are highlighted in Figure 1.2, with additional details to follow organized by domain.
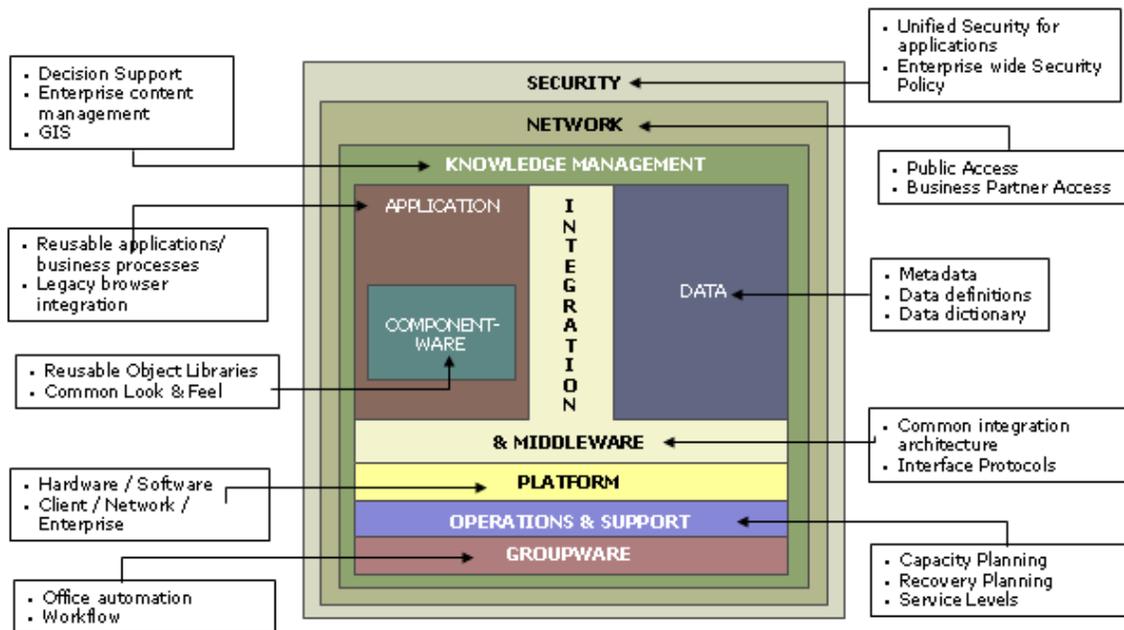

Figure 1.2

Security

The continuing growth in web-based applications generates data about clients, business partners, and DPW staff, all of which must be maintained and managed. Managing user information across business offices and applications can be costly and difficult to coordinate. During the development cycle, new application-specific authorization and authentication logic would have to be incorporated into every new application. To address these issues, the Department has implemented a Unified Security strategy to streamline and better manage the Department's line-of-business security authentication and authorization processes for browser based applications. Unified Security consistently applies security polices across the enterprise and centralizes audit logging information, thus helping DPW to comply with regulations such as HIPAA. The Department has integrated the Unified Security infrastructure components with the respective applications. In addition, the project supports user provisioning, which is the process of automating user management activities in order to set up new users. This will help support the large volume of business partners as well as multi-release applications.

Knowledge Management

The Department supports information sharing and enterprise content management through: an Enterprise Content Management project that provides content and document management services; a Geographic Information Systems initiative to improve address accuracy and enhance reporting; and a Data Warehouse initiative that houses the Department's data elements and enables DPW to draw from extensive, reliable information that can be used to support business and policy analysis.

Platform

An integral part of DPW's architecture is the enterprise server platform consisting of Unisys ES7000 and Sun Sunfire ES2000 servers, which provide a powerful and scalable infrastructure to support the business and technical needs of the Department. The enterprise servers support a number of different application development, test, training, and production environments for eight DPW applications. The enterprise servers also host the utility tools such as the GIS software to support these different environments. The architecture makes full use of the existing capabilities of the Department's legacy mainframe resources. The Department's industry standard network enables access to the legacy system transparently to business functions end-users via standard web-based presentation.

Middleware and Integration Broker

Almost all of the applications within the Department have a need to interface and exchange information with other system entities. The vision behind a common infrastructure is to support the interfaces and exchanges which allow the Department to streamline the manner in which exchanges are performed across the Department. The Department has selected a standard message broker tool that will be foundation for this infrastructure. Disparate applications communicate through a single connection via the messaging middleware transport layer, rather than through multiple, direct communications with each other.

Data

The Department has identified and developed data-based infrastructure and support procedures that enable the implementation of core business processes. DPW's approach to data architecture is to promote consistency, data integrity and information sharing and to reduce redundancy. The Department continues to define, implement and enforce the enterprise-wide standards for data definition, normalization, physical implementation, and coding for all the databases. A common set of data definitions as well as a standardized set of data interchange protocols enable business offices to share information. This includes defining and documenting the procedures that support the workflow and day-to-day activities, including the data dictionary requirements for all applications, the reference table strategy and XML standards research.

The Department worked to establish and publish the criteria that identified elements as 'enterprise' worthy. This streamlined the Enterprise Data Model maintenance process and began a master list of common information. This was initially completed for reference tables. Six-hundred system reference tables were collected and analyzed in order to establish 17 enterprise-wide reference tables that will be reusable across application systems, centrally located and centrally managed.

Componentware

Standardized criteria for the efficient reuse of existing application assets enable faster deployment of new applications. Object oriented analysis and design allows for the reuse of common software components that enable systems to respond quickly to change. With the foundation of reusable components for deployment in application and technical environments established, the Department will continue to enhance this Componentware library by adding components requested for object-oriented development projects. The Department also coordinates implementation activities across project teams through its Web Application Development Guide, which includes standards, guidelines and best practices to be used enterprise-wide.

b) Significance to the improvement of the operation of government

Enterprise Business Process Integration: Client and Provider Registration

- Provides a common central repository, accessible to users from various operational systems, which will make available consistent and uniform client and provider information across programs and systems
- Makes basic information available for re-use Department-wide, after the client or provider has registered once
- Incorporates the legacy system(s) to an open network with a standards-based architecture and a framework for future integration with other applications
- Provides a consistent interface for future DPW systems to register and identify clients and providers
- Provides a mechanism to monitor how and where the client or provider is interacting with the Department and allows for profile management
- Enables efficiencies to be gained by the re-use of application processes and functions

Enterprise Technology and Infrastructure

The enterprise infrastructure initiatives not only improve the Department's ability to provide service and information to its clients and business partners, but also improve its ability to operate effectively and efficiently through the use of a standards-based approach, reusable technology and application integration.

Unified Security involves altering the approach to managing security from an application-centric approach to an identity-centric "networked" focus. The Unified Security system provides the Department with the ability to centrally manage security policies and to delegate administrative tasks to multiple administrators in a flexible way. It provides a holistic view of all protected resources, and enhances the user experience by reducing the number of user names and passwords required by multiple applications. As a centralized approach, the Unified Security system will require fewer administrators and provide for timely, accurate auditing capability. It eliminates the need to build application-specific authentication or authorization logic into every new application. In addition, the user provisioning initiative will enhance the Unified Security process by enabling delegated administration across the Department, identity creation/revocation automation, user self-registration, and business process automation

By using an enterprise server and pooling resources, eight of the Department's line-of-business applications are collectively supported by high quality, high reliability hardware that supports development, testing and production environments. This approach has eliminated the need to acquire individual servers to support each of these environments for each application, as well as additional software costs, licensing costs, supporting human resources and individual disaster recovery equipment. All future projects can leverage this infrastructure and its supporting processes. In addition, applications residing on the server can utilize excess capacity of other applications if necessary as they do not typically peak simultaneously.
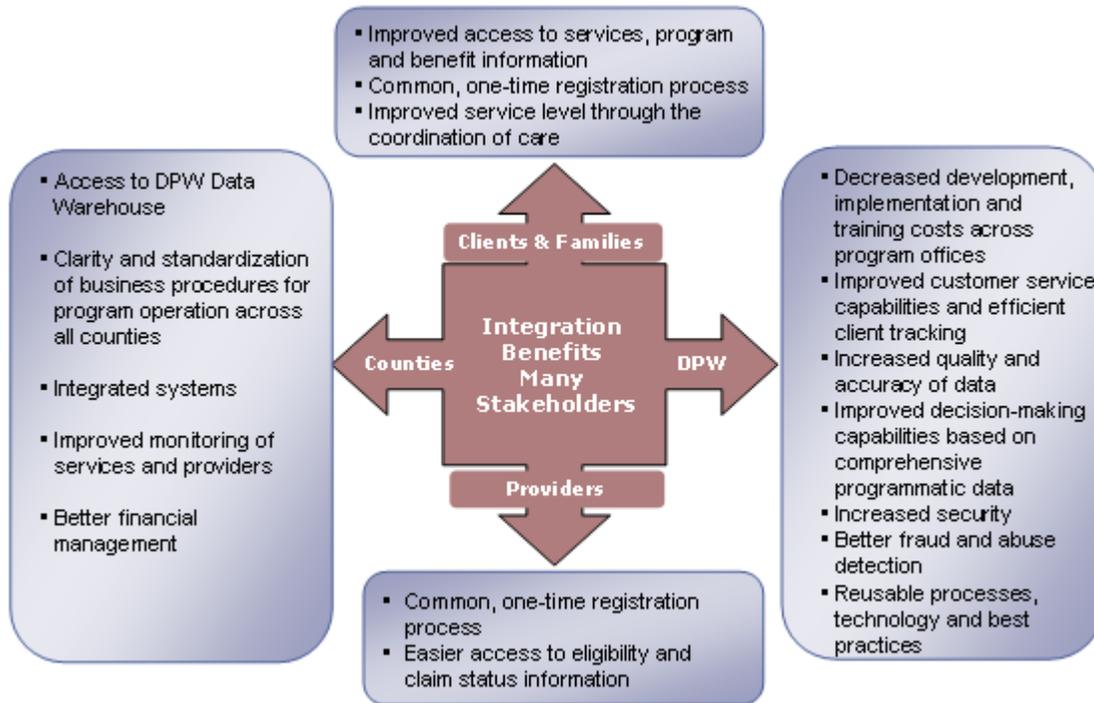
The use of middleware promotes the distribution of real-time, or near real-time data to receiving applications. Users are able to receive the information they need, when they need it. The centralization of data transformation, routing logic, and business partner management functionality within the web-oriented middleware layer reduces the number of components in the overall architecture by reducing redundancies and promoting re-use. The Department will be able to more efficiently process applications, entering data one time – and one time only. Data integrity is increased through the automated synchronization of data, and an integrated, synchronized view of client data enables better customer service.

The Data Warehouse provides a tool for business managers to effectively analyze program effectiveness with the additional ability to compare data across programs. It also enables the Department to more easily meet Federal and State reporting requirements. The reporting and information management efforts of the Department are also supported and enhanced through the use of Geographic Information System technology, which provides a visual representation of data in a spatial context, enables users to detect patterns that are not evident with traditional reports, and helps DPW to manage its programs and target services.

Data management initiatives support information sharing and operational efficiency through:

- The Enterprise Reference Table strategy, which will reduce redundancy and standardize values for all applications on all platforms; the strategy reduces the maintenance overhead for each of the projects as they maintain the reference tables
- Standards used by application developers when creating the data model
- The reduction of redundant data elements by identifying like name elements
- The promotion of data integrity by ensuring data uniqueness and consistency

c) Stakeholder benefits

d) Measurable operational benefits

Initiative within H-Net	Measurable Benefits
Enterprise Client/Provider Registration (Master Client Index and Master Provider Index)	• The first two applications to integrate with MCI will only need to register new clients an average of 30% of the time due to existing data in MCI • The duplication in the number of clients registered in multiple systems was reduced by 418,000 • Fully implemented, MPI will serve about 140,000 providers, reducing overlap
Data	• Analyzed over 600 system specific reference tables, from which 17 common reference tables were identified to be held centrally, enabling enterprise maintenance • Collected several hundred standard data elements from the Master Provider and Master Client Index to be used as standard elements across the enterprise • Created an enterprise XML data type library that houses 100 enterprise data types
Security	• Unified Security integrated with 5 applications; 10 applications in progress • Will support approximately 75,000 users, with the single sign-on enabling the elimination of 4.5 million user passwords (changed quarterly) over three years • Cost avoidance of an estimated $2.1 million in coding, development and administration costs over three years • Long-term savings include the security breach reduction, time savings, efficient and delegated administration
Platform	• 8 DPW strategic IT projects currently reside on the enterprise server • Long term cost avoidance excludes costly proprietary mainframe resources, enables portability and reuse, and adds value to core applications through use of industry standard computing resources; reduces the amount of hardware and software network components
Middleware	• Once fully implemented, the number of interfaces required for the Commonwealth's social service application will be reduced from 14 to 1 by using middleware technology • Long-term savings include the reduction in development cost and time for internal applications and to build custom interfaces; reduced maintenance
Componentware	• Estimated cost avoidance of $525,000 in FY 2003 in development and testing for applications utilizing reusable components • Estimated cost avoidance of $260,000 for development enhancements for 6 applications